Veterinary Teaching Hospital Replace
Copper Shielding

Washington State University
Pullman, WA

Project Manual

(Drawings titled: Veterinary Teaching Hospital MRI Replacement)

Project No. 8349-2015
Issued 1/18/2019
Washington State University
Facility Services, Capital
The Architect or Engineer Stamp on this page applies to all portions of the Specifications below.

ARCHITECTS:
Buffalo Design Inc.
1520 Fourth Suite 400
Seattle, WA 98101
(206) 467-6306
chris@buffalodesign.com
Specification Divisions 0-12

MECHANICAL ENGINEERS:
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12202 Pacific Ave S. Suite B
Tacoma, WA 98444
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253.274.5701
Specification Divisions 22-23

ELECTRICAL ENGINEERS:
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923 Martin Luther King Jr. Way
Tacoma, WA 98405
genew@crossengineers.com
253.759.0118
Specification Division 26

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| DRAWINGS | VETERINARY TEACHING HOSPITAL MRI REPLACEMENT |

END OF SECTION 00 01 10
Sealed bids are being requested by the Board of Regents of Washington State University, for the above referenced project.

Project Scope:

The MRI facility in Room 1303A has had challenges with image background artifacts. The likely cause is a compromised radiofrequency (RF) shielding. This project will remove and replace the existing RF shielding for the room, which will require removal and replacement of existing penetrations, including mechanical and electrical components. The vendor of the new MRI will remove the existing MRI magnet and equipment and install new systems. The mechanical and electrical systems inside the existing RF shielding require removal and replacement to facilitate that work. The awarded General Contractor will be required to remove all associated utilities and perform architectural, structural, mechanical and electrical renovations. The Owner has selected an RF Shielding Company to work as a Subcontractor to the General Contractor. An allowance for this cost is provided in section 00 50 00 and shall be included in the General Contractor's bid. The completed project will be a renovated MRI suite with new imaging equipment and a fully functioning RF shielding system. Contract Time shall be 70 Days from Notice to Proceed to Substantial Completion. Proposal must be based on this contract time.

Project Physical address: 205 SE Ott Rd., Pullman, WA 99164

Bid Estimate: $350,000.00 - $370,000.00

Bids will be received prior to 2:00 p.m.; Tuesday, February 12, 2019 at Facilities Services, McCluskey Services Building, 2425 East Grimes Way, Pullman, WA 99164-1150. Proposals will then be publicly opened and read aloud in room 190D, McCluskey Services Building.

A mandatory pre-bid conference for general contractors will be held at 10:00 a.m. on January 31, 2019 at McCluskey Services Building, Room 190D.

Parking on campus is enforced 24 hours a day, every day. It is bidder’s responsibility to obtain parking permits to attend pre-bid meetings, site visits, and bid openings. Daily permit rates may be found at: http://transportation.wsu.edu/TempFees.html. Identify the meeting and project when obtaining the permit to receive appropriate rates.

Bid documents may be obtained at https://facilities.wsu.edu/facilities-services-capital/contractors/. Contractors who would like to be included on the Planholder’s list shall either attend the pre-bid meeting or request to be added by emailing contracts@wsu.edu.

Printing Disclaimer: The bidding documents are available for all interested bidders and plancenters. The University does not provide printing services; it is the bidder’s responsibility to print the drawings to the appropriate scale indicated. We encourage the use of professional printing shops.

Owner reserves the right to reject any and all bids and to waive any informalities or irregularities in the bids received.

Maja S. Huff
Veterinary Teaching Hospital Replace Copper Shielding
Washington State University - Pullman

509-335-9082
Contracts@wsu.edu
Facilities Services
Washington State University

END OF SECTION 00 11 13
PART 1 GENERAL

1.01 PROJECT IDENTIFICATION

A. Refer to the Advertisement for Bids for Project identification, availability of bidding documents, Prebid Conference, and Contract completion date. Refer to Summary of Work, Section 01 11 00, for a brief description of the Work.

1.02 BIDDER QUALIFICATIONS

A. Contractor Registration:

1. Bidders subject to the Contractor's Registration Act (RCW Chapter 18.27) must show their State of Washington Contractor's license number on the Form of Proposal. In addition, bidders are cautioned to verify that all subcontractors submitting bids are also registered and licensed in accordance with the laws of the State of Washington. Owner is prohibited by virtue of RCW 39.06.010 from executing any Contract for public works with any contractor who is not registered or licensed in accordance with the laws of this state. Prior to submitting a bid, bidder must obtain an appropriate clearance and license to do business in the State of Washington as follows:

a. Contractor's License: Make license application to the Department of Labor and Industries, Contractor's Registration, P.O. Box 7689, Olympia, Washington 98504.

b. Registration Number: Out-of-State Contractors must obtain a registration number and permission to do business in the State of Washington from the Secretary of State, Olympia, Washington 98501.

c. Other Registrations: Register with the State Department of Revenue as a contractor engaging in business in this state and register with the State Department of Labor and Industries and the Employment Security Department.

2. Payment and Performance Bonds:

a. Bidders must be able to furnish satisfactory separate Payment and Performance Bonds for full amount of the initial Contract Sum, plus sales tax.

1.03 EXAMINATION OF SITE AND CONTRACT DOCUMENTS

A. Before submitting a bid or proposal, bidders shall carefully examine the Contract Documents, visit the Project site, and fully inform themselves as to all existing conditions and limitations, and shall include in their bid or proposal a sum to cover the cost of all items included in the Work, and shall rely on their own examination in making their bid or proposal. No change in the Work, the
Contract Sum, or the Contract Time will be allowed for issues that would have been reasonably apparent by the foregoing examination.

B. Bidder acknowledges that it has satisfied itself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the Project site, including all exploratory work done by Owner, as well as from the Drawings and Specifications made a part of the Contract Documents.

C. Bidder acknowledges that adjoining areas will be in normal course during the Work. Bidder should anticipate pedestrian and traffic congestion, limited parking, and the need to coordinate all Work with ongoing operations.

D. Owner assumes no responsibility for any conclusions or interpretations made by bidder based on the information made available by Owner. Should a bidder find discrepancies or omissions in the Drawings or Specifications, or should bidder be in doubt as to their meaning, bidder shall at once notify Owner. If appropriate, Owner will send written instructions to all bidders by addenda. Questions received less than 7 Days before the time of bid opening may not be answered. All issued addenda shall be incorporated into these Contract Documents.

1.04 PREBID CONFERENCE

A. All bidders are required to attend a pre-bid conference due to the sensitive nature of the spaces, site access and complexity of project. Refer to the Advertisement for Bids for the date, time and location. Bids from firms that do not attend the pre-bid conference will be determined to be non-responsive and the bids will be returned unopened.

B. Parking on campus is enforced 24 hours a day, every day. It is bidder’s responsibility to obtain parking permits to attend pre-bid meetings, site visits, and bid openings. Due to the possibility of parking at multiple locations on campus, Bidders are advised to consider obtaining Orange Temporary Permits. Go to http://transportation.wsu.edu/TempFees.html for more information about parking permits.

1.05 CLARIFICATIONS

A. Should bidders find discrepancies in, omissions from, or unclear information within the Contract Documents, they should notify Owner at once. Owner shall issue a written instruction in the form of an addendum to all bidders. Neither the Owner nor Architect/Engineer will be responsible for any oral instructions. Questions received less than 7 Days before bid opening may not be answered. All addenda issued prior to the opening of bids will be incorporated into the Contract.
1.06  SPECIFIED PRODUCTS

A.  Bids must be based upon items identified in the Specifications or approved substitutions. In certain cases, specific items have been named because of operational or maintenance considerations; approval of substitutions should not be assumed.

B.  Requests for approval of substitutions must be made in writing and received by Owner at least 7 Days prior to the date of bid opening. Said request must include complete descriptions, technical data, and performance records. Any approval of the proposed substitution will be made by addendum issued to all bidders.

C.  To submit substitution requests prior to Bid opening:

1. Only one substitution request per bidder will be considered for each product.

2. Requests for substitutions shall provide sufficient data to allow Owner to evaluate the suitability of the proposed product. Bidder must clearly identify product and model number of proposed substitution.

D. By requesting a substitution, bidder represents and warrants that (1) it has personally investigated the proposed material or product and determined that it is equal or better in all respects to that specified, (2) the same or better warranty will be provided for the substitution, (3) it has coordinated with affected subcontractors, (4) the substitution will not impact other parts of the Work, (5) the aggregate costs associated with the substitution actually reduces its bid amount, (6) all costs associated with the substitution are included in its bid, and (7) it waives any known or unknown future claim for an increase in the Contract Sum or Contract Time associated with the substitution.

E.  Owner retains full discretion over whether to approve a substitution, and Owner's approval does not relieve bidder of the above requirements.

1.07  TAXES

A.  State of Washington Sales Tax shall not be included in the bid price, except that the retail sales tax upon sales and rentals to prime contractors and subcontractors of tools, cranes, air compressors, bulldozers, lubricating oil, sandpaper, form lumber, and similar items of material and equipment which are primarily for use by the bidder rather than for resale as a component part of the finished work, shall be included in the bid price. (See WAC 458-20-170 (State Department of Revenue Rule 170))

B.  Sales tax applicable to the Contract Sum will be added to the Contract Sum by Owner at the time the Contract (Section 00 50 00) is written and shall be paid to Contractor. Contractor shall then remit payment for the sales tax to the State Department of Revenue in conformance with the law.
1.08 FILING FEES
A. Applicable state laws concerning prevailing wages, hours, workers' compensation, and other conditions of employment are called to the attention of bidders for their compliance. Bidders shall include in their bid any and all fees, including filing fees, required to comply with applicable labor laws.

1.09 PAYMENT AND PERFORMANCE BONDS
A. Upon award of the Contract, the successful bidder will be required to provide Owner with satisfactory separate payment and performance bonds. Cost of bond premiums must be included in the bidder's proposal.

1.10 FORM OF PROPOSAL
A. Proposals must be formatted in accordance with the following:

1. Bidder must utilize the Form of Proposal (Parts A), examples of which are included in the Contract Documents; all numbers must be clearly and legibly stated both in writing and in figures; and signatures must be in longhand.

2. Bids must not contain any recapitulation of the Work to be done.

3. Each part of the Form of Proposal must be sealed in its own opaque envelope and marked "Proposal, Part (A)—Veterinary Teaching Hospital Replace Copper Shielding". Bidders name shall appear on the outside of this sealed envelope. All bids are to be delivered or mailed to Facilities Services, P.O. Box 641150, 100 McCluskey Services Building, Washington State University, Pullman, WA 99164-1150. If mailed, the envelopes for Part A shall be enclosed in a single envelope for mailing.

5. Bids will be received in the following form on the dates and at the times indicated in the Advertisement for Bids.

6. Proposal Part A:
   a. Completed Part A proposal indicating the following:
      1) Base Bid;
      2) Acknowledgment of Addenda received;
      3) Signature, Corporate Identification, and Contractor License number; and
      4) Bid Security to be attached to Part A proposal form.

7. All proposals will remain sealed until the bid opening. Bidders may, at their option, submit a single fully completed proposal (Parts A and B of the Form of Proposal), together with the required bid security, up until the time set for receipt of the first submittal.
8. An official clock, at the office location designated for receipt of bids, will be designated by Owner for determining the timely receipt of each bid.

B. Proposals (Part A) received and determined untimely by Owner, may be considered as non-responsive and will be returned to bidder unopened.

C. Bids (Proposal Parts A) will be received until the respective times indicated in the Advertisement for Bids. They must be received prior to the respective times stated; i.e., where bids for Part A are required until 2:00 p.m., all bids received by 1:59:59 p.m. are timely; all bids received on or after 2:00:00 p.m. are untimely.

D. Bidders are solely responsible for delivery of their proposals at the specified location and before the specified time set for receipt of bids.

1.11 BID ALTERNATES, ALLOWANCES AND UNIT PRICES

A. Bid Alternates, Allowances, and Unit Prices adjust the Project scope by adding, deleting, or modifying specific parts of the Work as stated hereinafter.

B. An Alternate is an amount proposed by bidders and stated on the Bid Form for certain construction activities defined in the bidding documents that may be added to or deducted from the Base Bid amount and/or the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Each bidder shall submit, on the Form of Proposal, an amount for each Bid Alternate stating the difference in cost from the Base Bid amount for adding, deleting, or modifying specific materials and/or construction.

2. The difference in cost shall include all deletions, additions, and adjustments to all trades as may be necessary by each modification.

3. Only Alternates authorized by these specifications or pursuant to addenda will be considered.

C. An Allowance is an amount established in the Contract Documents for inclusion in the Contract Sum to cover the cost of prescribed items not specified in detail sufficient to estimate at time of bid.

1. Each bidder shall include in the Base Bid amount the amount for each Allowance as identified in the bidding documents.

D. A Unit Price is an amount as a price per unit of measurement for materials or services added or deleted from the Base Bid amount.

1. Each bidder shall submit on the Bid Proposal Form, an amount for each Unit Price stating the difference per unit or measurement for materials or services added or deleted from the Base Bid amount.

2. The Unit Price stated shall be used as the amount for either adding or deleting the item per unit of measurement from the Work.
3. The Unit Price amounts submitted on the Form of Proposal shall be used as the cost per unit of measurement for the entire duration of the Contract.

1.12 BID GUARANTEE

A. Bidder shall furnish a bid guarantee in the form of a cashier's check or bid bond made payable to the Board of Regents of Washington State University for an amount equal to at least 5% of the total Base Bid amount, as evidence of good faith and as a guarantee that, if awarded the Contract, the bidder will execute the Contract and provide payment and performance bonds as required.

B. Should the successful bidder fail to enter into a Contract and furnish satisfactory bonds within 10 Days after its proposal has been accepted, the bid security shall be forfeited as liquidated damages.

C. Owner reserves the right to hold the bid guarantee of the 3 lowest bidders until the successful bidder has entered into a contract and furnished required bonds.

1.13 MWBE PARTICIPATION

A. Washington State University is committed to the enhancement of opportunities for minority and women owned and controlled businesses in public contracting. The use or solicitation of minority and women's business enterprise firms is expressly encouraged.

1.14 CONTRACTOR AND SUBCONTRACTOR PARTICIPATION – NOT USED

1.15 MODIFICATION OF PROPOSALS

A. Modifications to proposals already submitted will be permitted only if requested in writing over the signature of the bidder and provided such requests are received prior to the time set for receipt of bids.

B. The original Form of Proposal will remain unopened until bid opening. Modifications in the form of facsimile transmissions will not be accepted.

C. Withdrawal of proposals will be permitted only if requested in writing over the signature of the bidder and provided such requests are received prior to the time set for receipt of bids.

D. Withdrawal requests in the form of facsimile transmissions will not be accepted.

E. After the scheduled closing time for the receipt of Form of Proposals, no bidder will be permitted to withdraw a proposal unless said award is delayed for a period exceeding 60 Days.
1.16 ALTERATIONS PROHIBITED

A. Except as otherwise provided herein, Forms of Proposal which are incomplete, or which are conditioned in any way, or which contain items not called for in the Proposal Form, or which are not in conformity to the law, may be rejected.

B. The Form of Proposal invites bids on specific Drawings and Specifications. Only the amounts and information asked for on the Form of Proposal furnished will be considered.

1.17 LOW RESPONSIBLE BIDDER

A. It is the intent of Owner to award the Contract to the low responsible bidder. Before award, the bidder must meet the following bidder responsibility criteria to be considered a responsible bidder. The bidder may be required by Owner to submit documentation demonstrating compliance with the criteria. Bidder must:

1. Have a current certificate of registration in compliance with chapter 18.27 RCW, which must have been in effect at the time of bid submittal;

2. Have a current Washington Unified Business Identifier (UBI) number;

3. If applicable:
   a. Have Industrial Insurance (workers' compensation) coverage for the bidder’s employees working in Washington, as required in Title 51 RCW;
   b. Have a Washington Employment Security Department number, as required in Title 50 RCW;
   c. Have a Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW;

4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065(3).

5. Not have been found out of compliance by the Washington State Apprenticeship and Training Council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under chapter 49.04 RCW for the one-year period immediately preceding the first date of advertising for this project.

6. Not have been determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries, or through a civil judgment entered by a court of limited or general jurisdiction, to have willfully violated, any provision of chapter 49.46, 49.48, or 49.52 RCW, as defined in RCW 49.48.82.
B. In addition to the bidder responsibility criteria above, bidder must also meet the following supplemental bidder responsibility criteria applicable to the Project:

1. The ability, capacity, and skill of bidder to perform the service required;
2. The experience and efficiency of bidder;
3. Whether bidder can perform the Contract within the time specified;
4. The satisfactory completion of previous contracts or services;
5. Such other information having a bearing on the decision to accept a bid proposal.

C. Whenever Owner evaluates Contractor’s responsibility, the foregoing may be taken into account. In addition to Contractors experience, evaluation of bidder’s responsibility will also be based on the documented experience of the Project Manager, and the Superintendent proposed for the Project. A minimum of five-years experience or three projects of comparable size and scope to this Project will be required for Contractor’s Project Manager, and superintendent.

D. For projects involving medical spaces such as MRI suites, the required experience for bidder, Project Manager, Superintendent, and Project Engineer shall be as follows:

1. Bidder shall have documented experience as a GC on projects of similar type, value, and scope for a minimum of five years or three projects.
2. The Project Manager shall have documented experience managing and planning projects of similar type, value, and scope as the Contractor’s Project Manager for a minimum of five years or three projects.
3. The Superintendent shall have documented experience directing daily activities of all subcontractors on projects of similar type, value, and scope as the GC’s Superintendent for a minimum of five years or three projects.

E. Within 48 hours of receipt of request, apparent low bidder will provide such information about its team as Owner determines to be reasonably necessary to evaluate the responsibility of the bidder. Failure to reply with requested information will render a bidder non-responsible at Owner’s option. At minimum, a bidder shall provide:

1. A financial statement;
2. List of projects currently under construction, including current contract amount and status of each;
3. Names and resumes of proposed Project Manager, Project Engineer, and Superintendent;
4. Name of bonding company/agent; and
5. References including project and owner name, a project contact, and project contact telephone number.

F. As evidence that bidder meets the bidder responsibility criteria, the apparent low bidder must submit documentation as may be required above to the Owner within 48 hours of the bid submittal deadline. Owner reserves the right to request such documentation from other bidders also.

G. Owner will review Contractor’s past Contract Performance to assist in evaluating the contractor’s qualifications and proven ability to successfully perform future contracts only when past performance has been previously documented via the Contract Performance Program.

H. If Owner determines bidder does not meet the bidder responsibility criteria above and is therefore not a responsible bidder, Owner shall notify bidder in writing with the reasons for its determination. If bidder disagrees with this determination, it may appeal the determination within 24 hours of receipt of Owner’s determination by presenting additional information to Owner. Owner will consider the additional information before issuing its final determination. If the final determination affirms that bidder is not responsible, Owner will not execute a Contract with any other bidder until 2 business days after the bidder determined to be not responsible has received the final determination.

1.18 CONTRACT AWARD

A. Owner intends but is not required to enter into a contract with the successful bidder, for all Work called for in the Contract Documents.

B. The determination of the successful bidder will be made on the basis of the sum of the Base Bid together with Owner-selected Alternates, if any.

C. The responsibility of bidder and its subcontractors will be considered in making the award. Owner reserves the right to reject any or all bids and to waive informalities advantageous to Owner and/or the protection of the public interest.

D. Reinstatement of Bid Alternate not initially selected shall be in accordance with provisions of the Bid Proposal Form of Proposal.

1.19 CONTRACT FORMS

A. Owner’s standard form Contract is included with the Contract Documents.

END OF SECTION 00 21 13
This document is Part A submittal. Refer to Instructions to Bidders for bid submittal procedures.

Bidder's Firm Name: _____________________________ Date: ___________

To: Facilities Services, Capital
   McCluskey Services Building, P.O. Box 641150
   Washington State University
   Pullman, Washington 99164-1150

Pursuant to and in compliance with the Advertisement for Bids and the Instructions to Bidders, the Bidder, having carefully examined the Contract Documents entitled "Veterinary Teaching Hospital Replace Copper Shielding" and having visited the Project site and examined the conditions affecting the Work, hereby proposes and agrees to provide all labor, materials, equipment, services, and incidentals necessary to complete the Work for the following stipulated sums:

A. BASE BID


DOLLARS ($ ____________), Including Allowance for RF Shielding in the amount of $232,046.00.

B. UNIT PRICES – NOT USED

C. ALERANTES – NOT USED

D. REINSTATEMENT OF BID ALTERNATES – NOT USED

E. SALES TAX

The Bidder agrees that the amounts indicated in the proposal do not include Washington State and local sales taxes except as required by the Instructions to Bidders.

F. CONTRACT PROVISIONS

Should the Bidder be notified of the acceptance of this proposal within 60 Days from the date set for the opening thereof or at any time thereafter before this proposal is withdrawn, the bidder agrees to execute a Contract for the Work and to furnish the required bonds.
1. **TIME OF COMPLETION**
The bidder agrees, if awarded a Contract for the Work, to complete the Work within the Contract Time specified.

2. **LIQUIDATED DAMAGES**
The bidder agrees that time is of the essence of the Contract and acknowledges that the amount of damages specified is a measure of the damages which the Owner will sustain should the Bidder fail to complete the Work within the Contract Time.

**G. BID GUARANTEE**

The Bidder agrees that the bid guarantee accompanying the Part A Form of Proposal is left in escrow with Owner, that the amount of the guarantee is the measure of the damages that Owner will sustain by failure of the bidder to execute a Contract for the Work and furnish required bonds, and that if the bidder fails to deliver said documents within 10 Days after receipt of notice of award to the bidder, the bid guarantee shall become the property of Owner.

**H. MINORITY AND WOMEN'S BUSINESS ENTERPRISE (MWBE) PARTICIPATION**

Owner is committed to the enhancement of opportunities for minority and women owned and controlled firms in public contracting. While neither required, nor a part of bidder responsiveness, the use or solicitation of minority and women business enterprises is expressly encouraged.

**I. CONTRACTOR AND SUBCONTRACTOR PARTICIPATION**

If Base Bid exceeds one million dollars ($1,000,000), the Bidder agrees, if awarded the Contract, that all firms named on Part B of the Form of Proposal will be directly subcontracted for performance of their respective work category.

**J. ADDENDA**

The bidder hereby acknowledges receipt of Addendum by number(s):

____  ____  ____  ____  ____  ____  ____  ____  ____  ____

**K. PREVAILING WAGE CERTIFICATION**

The bidder has not been determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries, or through a civil judgment entered by a court of limited or general jurisdiction, to have willfully violated, any provision of chapter 49.46, 49.48, or 49.52 RCW, as defined in RCW 49.48.82.

**L. DECLARATION**

The bidder represents and warrants that he/she possess the authority to sign for and bind bidder.
The Bidder declares under penalty of perjury under the laws of the State of Washington, that all of the foregoing information as recited is true and correct to the best of his/her knowledge.

Bidder’s Firm Name: ____________________________________________________________

Signed By: _______________________________ Official Title: _______________________

Print Name: ________________________________________________________________

Address: ___________________________________________________________________

City: __________________________ State: _____________ Zip Code: _______

Telephone: ______________________ Fax: ________________________________

State of Washington Contractor’s License Number: ________________________________

Federal Tax Identification Number: _____________________________________________

Email Address: _____________________________________________________________

The firm represented by the above signature is a:

Sole Proprietorship ____________

Partnership ____________

Corporation ____________ State of Incorporation ______________

Other ____________

END OF SECTION 00 42 13
This AGREEMENT is effective as of the date of the first signature on the Agreement so long as all other parties’ authorized signatories have also executed the Agreement. This Agreement is made by and between the following parties in connection with the Project identified below.

OWNER: Washington State University  
c/o Facilities Services, Capital  
P.O. Box 641150  
Pullman, WA 99164-1150

CONTRACTOR: [To be determined]

ARCHITECT (A/E): Buffalo Design  
1520 Fourth Avenue Suite 400  
Seattle, WA 98101

PROJECT: Veterinary Teaching Hospital Replace Copper Shielding  
205 SE Ott Rd.  
Pullman, WA 99164

In consideration of the mutual covenants and obligations contained herein, Owner and Contractor agree as set forth herein.

**Article 1**  
The Work of the Contract

1.1 **Contractor to fully execute the Work.** Contractor shall fully execute the entire Work in strict accordance with the Contract Documents, and shall provide all material, equipment, tools, and labor necessary to timely complete the Work described in and reasonably inferable from the Contract Documents, except to the extent specifically indicated to be the responsibility of others.

1.2 **Contractor to further Owner’s interests.** Contractor accepts the relationship of trust and confidence established by this Agreement and covenants with Owner to cooperate and collaborate with Owner and others involved with the Project and to exercise Contractor’s best skill and judgment; to furnish efficient, professional construction administration, management services and supervision with sufficient quantities of fully qualified, competent and experienced personnel; and to perform the Work in an expeditious and economical manner consistent with Owner’s interests. The parties will endeavor to promote harmony, cooperation and mutual respect among the Project participants to the fullest extent possible in order to further the success of the Project and to effect prompt and successful completion of the Project within the requirements of the Contract Documents, the Contract Time and the Contract Sum.
Article 2
Contract Documents

2.1 The Contract Documents. The “Contract Documents” form the “Contract.” The Contract Documents consist of this Agreement (Agreement between Owner and Contractor or the “Agreement”); any attached Exhibits and other documents listed in the Contract Documents; the General Conditions; other documents listed in Article 8 of this Agreement; and written modifications, amendments and Change Orders to the Contract issued after execution of this Agreement.

2.2 Contract is complete and integrated agreement. The Contract represents the entire, complete, and integrated agreement between the parties and supersedes prior negotiations, representations or agreements, either written or oral. No oral representations or other agreements have been made by the parties except as specifically established in the Contract.

2.3 Contract is between only Owner and Contractor. The Contract Documents shall not be construed to create a contractual relationship of any kind between any Persons other than Owner and Contractor.

Article 3
Definitions

3.1 Terms, words and phrases to have ordinary meanings. Terms, words and phrases used in the Contract Documents shall have the meanings given them in this Agreement and in the General Conditions or, if not defined, in a manner consistent with construction industry standards. In the event of any inconsistency in such definitions, the definitions in this Agreement shall control.

3.2 Construction Documents. The Construction Documents are identified in the General Conditions and other Contract Documents as Drawings and Specifications. The Construction Documents do not include shop drawings or other Submittals.

3.3 Contractor. “Contractor” is the Person identified as such in the Agreement and General Conditions. Contractor must be licensed, bonded, and insured as a contractor in the State of Washington, and must legally be permitted to do business. Contractor’s authorized representative, including its Designated Representative, shall be authorized to act on Contractor’s behalf with respect to the Project.

3.4 General Conditions modified. Section 4.03E of the General Conditions is hereby modified to clarify that Contractor and Owner may agree on the number of copies of Submittals to be provided to Owner. If no such agreement is reached, Contractor shall submit five copies.

Article 4
Notice to Proceed and Substantial Completion

4.1 Notice to Proceed. The date of Notice to Proceed will be specified in a written Notice issued by Owner. Owner may issue separate written authorizations to proceed for different portions of the Work.

4.2 Contract Time measured from date of commencement. The Contract Time shall be
measured from the Notice to Proceed date to the contractual date of Substantial Completion established in Section 4.3, subject to adjustments as provided in the Contract Documents. Time is of the essence in completion of the Work.

4.3 Substantial Completion and Final Completion. Contractor shall achieve Substantial Completion of the Work by Seventy (70), subject to adjustments as provided in the Contract Documents, and shall achieve Final Completion not later than Sixty (60) Days thereafter. Contractor represents to Owner that the Contract Time is adequate for full performance of the Work. Contractor shall also achieve any interim milestones and phasing requirements set forth in the Contract Documents.

4.4 Liquidated damages. Owner will assess, and Contractor will be responsible for, liquidated damages in the amount of Two thousand seven hundred twenty-nine dollars and five cents ($2,729.05) per Day for each Day beyond the contractual date for Substantial Completion that Substantial Completion is not timely achieved, and subsequently One thousand two hundred fifty-four dollars and fifty-five cents ($1,254.55) per Day for each Day beyond the time period established in Section 4.3 that Final Completion of the entire Work is not achieved. Contractor and Owner agree that the liquidated damages amounts are not penalties and are a reasonable estimation of actual damages to Owner, as of this date of Agreement, based on the inherent uncertainty and difficulty in calculating and quantifying damages caused by delays in the construction of university facilities.

Article 5
Contract Sum

5.1 Contract Sum. For Contractor’s performance of the Contract, Owner shall pay to Contractor the Contract Sum of ________________ dollars ($__________), subject to additions and deductions for changes in the Work as provided in the Contract Documents. The Contract Sum includes by way of example and not limitation all costs of construction; general conditions; all taxes except Washington State sales tax due on the Contract Sum; Contractor’s contingency; any approved Allowances; all insurance; overhead; and Contractor’s fee.

5.2 Alternates. The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by Owner:

<table>
<thead>
<tr>
<th>Alternate Number</th>
<th>Description</th>
<th>Price ($0.00)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.3 Unit Prices. Any Unit Prices are as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Units</th>
<th>Price ($0.00)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Unit Prices as set forth in the Contract Documents are “all in.” They include all material, equipment, labor, delivery, installation, and Subcontractor costs, any overhead and profit not included in the fee, and any other costs or expenses in connection with, or incidental to, the performance of that portion of the Work to which such Unit Prices apply.
5.4 Allowances. Allowances included in the Contract Sum are as follows:

<table>
<thead>
<tr>
<th>Allowance</th>
<th>Amount</th>
<th>Included Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF Shielding -</td>
<td>$232,046.00</td>
<td>RF Shielding material, Labor, testing</td>
</tr>
<tr>
<td>ETS Lindgren</td>
<td></td>
<td>and freight.</td>
</tr>
</tbody>
</table>

Allowances may be included in the Contract Sum due to uncertainty in scope, price and/or quantity at the time this Agreement is executed. Whenever actual costs are more or less than an allowance, the Contract Sum will be appropriately adjusted. Contractor must provide Owner with written notice of its intent to expend an allowance amount (providing Owner with the opportunity to approve or reject the cost) before expending an allowance amount.

5.5 Changes in the Work.

5.5.1 Owner may, without invalidating the Contract, order changes in the Work consisting of additions, deletions or other revisions. Owner shall issue such changes in writing.

5.5.2 Adjustments of the Contract Sum and/or Contract Time on account of changes in the Work may be determined by any of the methods listed in the General Conditions.

Article 6
Payments

6.1 Applications for Payment.

6.1.1 The Contract Documents detail the requirements for Applications for Payment. Based upon Applications for Payment that Contractor submits to Owner, Owner shall make progress payments to Contractor on account of the Contract Sum.

6.2 Progress Payments.

6.2.1 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows and in accordance with Section 01 29 00, Applications for Payment:

.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage of completion of each portion of the Work by the share of the Contract Sum allocated to that portion in the Schedule of Values. Pending final determination of the cost to Owner of changes in the Work, amounts not in dispute may be included as provided in the General Conditions unless Owner requires that actual cost records be provided;

.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by Owner, suitably stored and insured off the site at a location agreed upon in writing);

.3 Subtract the aggregate sum of previous payments made by Owner;

.4 Subtract amounts, if any, for which Owner has withheld payment; and
.5 Subtract the statutory retainage of five percent (5%) of the above amount as a fund for the protection and payment of the claims of any Person arising out of the Work and the State of Washington with respect to taxes.

6.3 Final Payment.

6.3.1 Final payment, constituting the entire unpaid balance of the Contract Sum, less retainage, shall be made by Owner to Contractor no later than 30 Days after Contractor has fully performed the Contract and Final Completion has occurred (except for Contractor's responsibility to correct non-conforming Work discovered after final payment or to satisfy other requirements, if any, that extend beyond final payment), and Contractor has submitted a final Application for Payment.

6.3.2 Owner shall release retainage to Contractor in accordance with Chapter 60.28 RCW and the Contract Documents.

Article 7
Miscellaneous Provisions

7.1 Designated Representatives.

7.1.1 Owner's Designated Representative, designated below, shall be authorized to act on Owner's behalf with respect to the Project:

<table>
<thead>
<tr>
<th>Kevin Poitra</th>
<th>Brian Funke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Manager</td>
<td>Construction Manager</td>
</tr>
<tr>
<td>Facilities Services, Capital</td>
<td>Facilities Services, Capital</td>
</tr>
</tbody>
</table>

7.1.2 Contractor's Designated Representative, identified below, shall be authorized to act on Contractor's behalf with respect to the Project:

7.1.3 Neither Owner’s nor Contractor’s Designated Representatives shall be changed without 10 Days’ written notice to the other party.

7.2 Interest. Payments due and unpaid under the Contract Documents shall bear interest as specified by RCW 39.76, not to exceed the Bank of America prime plus two percent (2%) per annum.

7.3 Quality control and assurance and Owner’s right to inspect the Work: Contractor shall develop and submit an overall Quality Control and Assurance Plan to ensure that the Work is inspected by qualified members of Contractor’s staff or third parties. The Quality Control and Assurance Plan must be acceptable to Owner. Owner expressly reserves the right to inspect any and all portions of the Work at any time during the Project. Contractor shall provide access to the Work as needed by Owner or its representatives, including the use of scaffolding, platforms, or lifts. All corrections or observations noted by Owner shall be logged by Contractor for correction, tracking and documentation to the satisfaction of Owner.
7.4 Contractor to actively manage and supervise Work. Contractor shall review and inspect the Work of Subcontractors on a regular basis for defects and deficiencies in their Work and for conformance with the Construction Documents and other Contract Documents, and shall stop the Work of Subcontractors, if necessary. Contractor shall provide notification at regularly scheduled progress meetings of any major defects or deficiencies and recommend remedial action.

7.5 Use of Third Party Neutral. Owner and Contractor intend to utilize a Third Party Neutral to assist in addressing and resolving disputes that may arise during the Project. The Third Party Neutral will be jointly engaged and will have the roles and responsibilities set forth in a Third Party Neutral Agreement, which shall be established in accordance with Section 00 80 10, Third Party Neutral.

Article 8
Enumeration of the Contract Documents

8.1 The Contract Documents. The Contract Documents, except for modifications issued after execution of this Agreement, are enumerated as follows:

8.1.1 This executed Agreement, any attached Exhibits and other documents listed in this Agreement.


8.1.3 The Addenda, if any, are as follows:

<table>
<thead>
<tr>
<th>Number</th>
<th>Date</th>
<th>Pages</th>
</tr>
</thead>
</table>

8.1.4 Other documents, if any, forming part of the Contract Documents are as follows:

See Contract Documents.
Department of Labor and Industries Prevailing Wage Rates.

OWNER: WASHINGTON STATE UNIVERSITY
CONTRACTOR: FIRM NAME
WA CONTRACTOR LICENSE NUMBER

(Signature) (Date) (Signature) (Date)
(Printed Name) (Printed Name)
(Title) (Title)

END OF SECTION 00 50 00
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PART 1 - GENERAL PROVISIONS

1.01 DEFINITIONS

A. “Application for Payment” means a written request submitted by Contractor to Owner for payment of Work completed in accordance with the Contract Documents and approved Schedule of Values, supported by such substantiating data as Owner may require.

B. “Architect,” “Engineer,” or “A/E” means a person or entity lawfully entitled to practice architecture or engineering, representing Owner within the limits of its delegated authority.

C. An “Allowance” is an amount included in the Contract Sum for a stated part of the Work that is not fully defined and/or quantified at the time the Contract Sum is established. When that part of the Work is adequately defined and/or quantified, the Contract Sum will be adjusted to account for the difference between the Allowance and the actual cost of the item. Following the adjustment, that part of the Work will no longer be an Allowance item. Although not capitalized in Section 5.02B, “allowance” shall mean “Allowance.”

D. “Change Order” means a written instrument signed by Owner and Contractor stating their agreement upon all of the following: (1) a change in the Work; (2) the amount of the adjustment in the Contract Sum, if any, and (3) the extent of the adjustment in the Contract Time, if any.

E. “Claim” means Contractor’s exclusive remedy for resolving disputes with Owner arising out of or relating to the Contract Documents or the breach thereof or requesting an adjustment in the Contract Sum or Contract Time, as more fully set forth in Part 8. As used in the Contract Documents, the exclusive meaning of “equitable adjustment” is the ability of Contractor to follow the contractual dispute resolution process in Part 8, including the requirement for submitting a timely Notice, substantiation, and Claim.

F. The “Contract” is the agreement between Owner and Contractor and is formed by the Contract Documents. The Contract represents the entire and integrated agreement between Owner and Contractor and supersedes prior negotiations, representations or agreements, either written or oral.

G. “Contract Award Amount” is the sum of the Base Bid and any accepted Alternates, if any, for Design-Bid-Build projects and is the accepted initial Guaranteed Maximum Price for Design-Build and GC/CM projects.

H. “Contract Documents” means the General Conditions, modifications to the General Conditions, Supplemental Conditions, Agreement, Drawings and Specifications, and all addenda and modifications thereof.

I. “Contract Sum” is the total amount payable by Owner to Contractor for performance of the Work in accordance with the Contract Documents, including all taxes imposed by law and properly chargeable to the Work, except Washington State sales tax.

J. “Contract Time” is the number of Days or other time period allotted in the Contract Documents from the Notice to Proceed for achieving Substantial Completion of the Work.

K. “Contractor” means the person or entity who has agreed with Owner to perform the Work in accordance with the Contract Documents.

L. “Day(s)” means calendar day(s) unless otherwise specified.
M. "Drawings" are the graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work, and may include plans, elevations, sections, details, schedules, and diagrams.

N. "Final Acceptance" means the written acceptance of the Work by Owner, as more fully set forth in Section 6.08B.

O. "Final Completion" means that the Work is fully and finally complete in accordance with the Contract Documents and Contractor has submitted its final Application for Payment, as more fully set forth in Section 6.09A.

P. "Force Majeure" means those acts entitling Contractor to request an equitable adjustment in the Contract Time, as more fully set forth in paragraph 3.05A.

Q. "Notice" means a written notice which has been delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended or, if delivered or sent by registered or certified mail, to the last business address known to the party giving notice. Although not capitalized in the following provisions, "notice" shall mean "Notice" in Sections 3.03B, 3.03C, 3.06A, 5.01D, 5.02C, 5.03, 5.09A, 5.10A, 5.15A, 5.16F, 5.17, 9.01A, 9.02A, and 9.02B.

R. "Notice to Proceed" means a written Notice from Owner to Contractor that permits pre-construction and construction activities to commence upon specified terms and defines the date on which the Contract Time begins to run.

S. "Owner" means the Washington State University Board of Regents, which has the authority to enter into, administer, and/or terminate the Work in accordance with the Contract Documents. Owner shall designate in writing a Representative who shall have authority to bind Owner with respect to all matters requiring Owner’s approval or authorization. A/E does not have such authority.

T. "Person" means a corporation, partnership, business association of any kind, trust, company, or individual.

U. "Prior Occupancy" means Owner’s use of all or parts of the Project before Substantial Completion, as more fully set forth in Section 6.08A.

V. "Progress Schedule" means a schedule of the Work, in a form satisfactory to Owner, as further set forth in Section 3.02.

W. "Project" means the total construction of which the Work performed in accordance with the Contract Documents may be the whole or a part and which may include construction by Owner or by separate contractors.

X. "Project Record" means the separate set of Drawings and Specifications as further set forth in paragraph 4.02A.

Y. "Schedule of Values" means a written breakdown allocating the total Contract Sum to each principal category of Work, in such detail and format as requested by Owner.

Z. "Specifications" are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.
AA. "Subcontract" means a contract between Contractor and a Subcontractor for the purpose of obtaining supplies, materials, equipment, work or services of any kind for or in connection with the Work. Although not capitalized in the following provisions, "subcontract" shall mean "Subcontract" in Sections 5.10A, 5.20E, 9.01B, and 9.02B.

BB. "Subcontractor" means any Person of any tier, other than Contractor, who agrees to furnish or furnishes by contract with, or through Contractor, any supplies, materials, equipment, or services of any kind in connection with the Work. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor. Although not capitalized in the following provisions, “subcontractor” shall mean “Subcontractor” in Sections 5.04B, 5.04C, 5.04G, 5.20A, and 5.21B.

CC. "Substantial Completion" means that stage in the progress of the Work (or portion of the Work designated and approved by Owner) when the construction is sufficiently complete, in accordance with the Contract Documents, so that Owner can fully occupy or utilize the Work (or portion designated by Owner) for its intended use, as more fully set forth in Section 6.07. There may be separate dates of Substantial Completion specified in the Contract Documents for various phases or portions of the Work.

DD. "Work" means the construction and services required by the Contract Documents, and includes, but is not limited to, labor, materials, supplies, equipment, services, permits, and the manufacture and fabrication of components, performed, furnished, or provided in accordance with the Contract Documents. Although not capitalized in the following provisions, “work” shall mean “Work” in Sections 3.02D, 5.04B, 5.04C, 5.07D, 5.12A, 6.02 and 7.02A.

EE. A "Work Directive" ("WD") is a binding written order prepared by Owner that directs Work prior to total agreement on adjustment, if any, in the Contract Sum or Contract Time, or both.

FF. "Work Site" means the space identified and circumscribed on construction documents. The work site is controlled by the Contractor and the Contractor is responsible for compliance to regulatory requirements within the circumscribed area. Changes to the work site shall be submitted by Contractor and approved by Owner.

1.02 ORDER OF PRECEDENCE

Any conflict or inconsistency in the Contract Documents shall be resolved by giving the documents precedence in the following order, with a revision to a Contract Document having precedence over the original document and a later document having precedence over an earlier document:

1. Signed Agreement, with any Change Orders having precedence.

2. Supplemental Conditions.

3. Modifications to the General Conditions.

4. General Conditions.

5. Specifications and Drawings. The Specifications and Drawings are complementary and shall have equal precedence. Thus, anything mentioned in the Specifications but not shown on the Drawings, or shown on the Drawings but not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both. If there is any inconsistency between the Specifications and Drawings, Contractor will make an inquiry to Owner to determine how to proceed. Unless otherwise directed, Contractor will provide the better quality or greater quantity of any Work or materials, as reasonably interpreted by Owner, at no change in the Contract Sum or Contract Time.
1.03 EXECUTION AND INTENT

Contractor Representations: Contractor makes the following representations to Owner:

1. Contract Sum and Contract Time reasonable: The Contract Sum is reasonable compensation for the Work and the Contract Time is adequate for the performance of the Work, as represented by the Contract Documents;

2. Contractor familiar with project: Contractor has carefully reviewed the Contract Documents, visited and examined the Project site, become familiar with the local conditions in which the Work is to be performed, and satisfied itself as to the nature, location, character, quality and quantity of the Work, the labor, materials, equipment, goods, supplies, work, services and other items to be furnished and all other requirements of the Contract Documents, as well as the surface and subsurface conditions and other matters that may be encountered at the Project site or affect performance of the Work or the cost or difficulty thereof;

3. Contractor financially capable: Contractor is financially solvent, able to pay its debts as they mature, and possesses sufficient working capital to complete the Work and perform Contractor’s obligations required by the Contract Documents; and

4. Contractor can complete Work: Contractor is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work and perform the obligations required by the Contract Documents and has sufficient experience and competence to do so.

PART 2 - INSURANCE AND BONDS

2.01 CONTRACTOR’S LIABILITY INSURANCE

General insurance requirements: Prior to commencement of the Work, Contractor shall obtain all the insurance required by the Contract Documents and provide evidence satisfactory to Owner that such insurance has been procured, including but not limited to (1) Certificates of Insurance on ACORD Form 25, and/or ACORD Form 27 or their equivalents, and which shall list any applicable self-insured retentions, (2) the actual costs (expressed as a percentage) of Contractor’s liability insurance under Section 2.01A.1 below, (3) applicable endorsements evidencing proof of compliance with the requirements listed below, (4) evidence of State Workers’ Compensation coverage, and (5) a copy of any builder’s risk policy required by the Contract Documents. All policies, endorsements and certificates must be signed copies and shall contain a provision that policies will not be cancelled without first giving thirty (30) days (or in the event of non-payment of premium, ten (10) days) prior written Notice to Owner. Contractor shall furnish to Owner copies of any subsequently issued endorsements amending, modifying, altering or restricting coverage terms or limits. Review of Contractor’s insurance by Owner shall not relieve or decrease the liability of Contractor. Companies writing the insurance to be obtained by Part 2 shall be licensed to do business under Chapter 48 RCW or comply with the Surplus Lines Law of the State of Washington. Contractor shall include in the Contract Sum the cost of all insurance and bond costs required for the Work. Insurance carriers providing insurance shall be acceptable to Owner, and its A. M. Best rating shall be indicated on the insurance certificates.

A. Term of insurance coverage: Contractor shall maintain the following insurance coverage during the Work and for one year after Substantial Completion. Contractor shall also maintain the following insurance coverage during the performance of any corrective Work required by Section 5.16.
1. **General Liability Insurance**: Commercial General Liability (CGL) on an occurrence-based ISO Form CG 00 01 or broader, including products and completed operations, personal and advertising injury, bodily injury and property damage liability arising from Contractor’s operations or Work, including operations or Work Contractor may subcontract or sublet to others.

The policy shall be purchased from a company or companies lawfully authorized to do business in the State of Washington possessing an A.M. Best’s policyholder’s rating of A or better and a financial rating of no less than XI.

Contractor’s policy shall be designated primary and non-contributory to Owner’s policies, and shall include a waiver of subrogation against Owner. Any self-insured retentions or deductibles must be disclosed and approved by Owner, and Contractor agrees to be responsible for payment of any and all self-insured retentions or deductibles.

2. **Automobile Liability Insurance**: Automobile liability on ISO Form CA 00 01 covering Code 1 (any auto).

3. **Stop Gap Liability Insurance** for damages because of bodily injuries to Contractor’s employees.

B. **Industrial Insurance compliance**: Contractor shall comply with the Washington State Industrial Insurance Act and, if applicable, the Federal Longshoremen’s and Harbor Workers’ Act and the Jones Act.

C. **Insurance to protect for the following**: All insurance coverages shall protect against claims for damages for personal and bodily injury or death, as well as claims for property damage, which may arise from operations in connection with the Work whether such operations are by Contractor or any Subcontractor.

D. **Owner as Additional Insured**: All insurance coverages shall be endorsed to include Owner, its officers, and employees, and any required governmental agencies as additional named insureds with coverage at least as broad as ISO Forms CG 20 10, CG 20 37, and CA 20 48, with no self-insured retentions applicable to the additional insureds.

E. **Subcontractor Coverage**: Contractor shall ensure and require that Subcontractors have insurance coverage to cover bodily injury and property damage on all operations and all vehicles owned or operated by Subcontractors. Subcontractors shall name Contractor and Owner, any required governmental agencies, and others designated in the Contract Documents as well as their officers and employees, as additional insureds and give at least thirty (30) Days’ Notice of cancellation.

2.02 **COVERAGE LIMITS**

**Insurance amounts**: The coverage limits shall be not less than the amounts specified in the Agreement; if limits are not specified in the Agreement, coverage limits shall be not less than as follows:

A. $1,000,000 per occurrence for bodily injury, property damage, personal and advertising injury.

B. $2,000,000 general aggregate to apply separately to each project or location.

C. $2,000,000 annual aggregate for products and completed operations.

D. $1,000,000 combined single limit each automobile accident or loss.
E. $1,000,000 per accident for bodily injury or occupational disease of Contractor’s employees

Coverages and Minimums: Owner’s review, specification or approval of the insurance in this Contract or of its coverage or amount shall not relieve or decrease the liability of Contractor under the Contract Documents or otherwise. Coverages are the minimum to be provided and are not limitations of liability under the Contract, indemnification, or applicable law provisions. Contractor may, at its expense, purchase larger coverage amounts.

2.03 PROOF OF INSURANCE COVERAGE

A. Certificate & endorsements required: Prior to commencement of the Work, Contractor shall furnish to Owner completed certificates of insurance coverage and endorsements evidencing compliance with the additional insured, cancellation, and waiver of subrogation requirements.

B. List Project info: All insurance certificates shall name Owner’s Project number and Project title.

C. Policy: In the event of a claim or loss, Contractor shall promptly provide Owner with a complete copy of all applicable policies.

2.04 PAYMENT AND PERFORMANCE BONDS

Conditions for bonds: Payment and performance bonds for 100% of the Contract Award Amount, plus Washington State sales tax, shall be furnished for the Work, using the current version of the Payment Bond and Performance Bond form published by and available from the American Institute of Architects (AIA) – form A312. No payment or performance bond is required if the Contract Sum is $150,000 or less and Contractor requests and the Owner agrees that Owner may, in lieu of the bond, retain 10% of the Contract Sum for the period specified in RCW 39.08.010.

2.05 ALTERNATIVE SURETY

When alternative surety required: Contractor shall promptly furnish payment and performance bonds from an alternative surety if:

A. Owner has a reasonable objection to the surety; or

B. Any surety fails to furnish reports on its financial condition if required by Owner.

2.06 BUILDER’S RISK

A. Owner to buy builder’s risk insurance: Owner shall purchase and maintain builder’s risk insurance in the amount of the Contract Sum, including all Change Orders, for the Work on a replacement cost basis until Substantial Completion. For projects not involving new building construction, an “Installation Floater” is an acceptable substitute for the builder’s risk insurance. The insurance shall cover the interests of Owner, Contractor, and any Subcontractors, as their interests may appear.

B. Losses covered: Builder’s risk insurance shall be placed on an “all risk” basis or equivalent policy form and insure against the perils of fire and extended coverage and physical loss or damage including theft, vandalism, malicious mischief, collapse, false work, flood, wind, temporary buildings, earthquake, debris removal including demolition, and shall cover reasonable compensation for A/E’s services and expenses required as a result of an insured loss. Losses up to the deductible amount shall be the responsibility of Contractor.
C. Waiver of subrogation rights: Owner and Contractor waive all subrogation rights against each other, any Subcontractors, A/E, A/E’s subconsultants, separate contractors described in Section 5.19, if any, and any of their subcontractors, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this Section 2.06 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by Owner as fiduciary. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective to a Person or entity even though that Person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the Person or entity had an insurable interest in the property damaged.

PART 3 - TIME AND SCHEDULE

3.01 PROGRESS AND COMPLETION

Contractor to meet schedule: Contractor shall diligently prosecute the Work, with adequate forces, achieve Substantial Completion within the Contract Time, and achieve Final Completion within the time period specified in the Contract Documents. If Contractor fails to perform in a timely manner in accordance with the Contract Documents and, through the fault of Contractor or Subcontractor(s), fails to meet the Progress Schedule, Contractor shall be in default and shall take such steps as may be necessary to immediately improve its progress without change in the Contract Sum or Contract Time.

3.02 CONSTRUCTION SCHEDULE

A. Preliminary Progress Schedule: Unless otherwise provided in Division 1, Contractor shall, within 14 Days after issuance of the Notice to Proceed, submit a preliminary Progress Schedule consistent with the requirements of the Contract Documents. The Progress Schedule shall not exceed time limits specified by the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work, and shall show the sequence in which Contractor proposes to perform the Work, and the dates on which Contractor plans to start and finish major portions of the Work, including dates for submission of Submittals per Section 4.03, which shall be coordinated with the Progress Schedule and identify dates for Owner review, and for acquiring materials and equipment.

B. Form of Progress Schedule: Unless otherwise provided in Division 1, the Progress Schedule shall be in the form of a bar chart, or a critical path method analysis, as specified by Owner. The preliminary Progress Schedule may be general, showing the major portions of the Work, with a more detailed Progress Schedule submitted as directed by Owner.

C. Owner comments on Progress Schedule: Owner shall return comments on the preliminary Progress Schedule to Contractor within 14 Days of receipt. Review by Owner of Contractor’s schedule does not constitute an approval or acceptance of Contractor’s construction means, methods, logic or sequencing, or its ability to complete the Work within the Contract Time. Contractor shall revise and resubmit its schedule, as necessary. Owner may withhold a portion of progress payments until a Progress Schedule has been submitted that meets the requirements of this Section 3.02.

D. Monthly updates and compliance with Progress Schedule: Contractor shall utilize and comply with the Progress Schedule. On a monthly basis, or as otherwise directed by Owner, Contractor shall submit an updated Progress Schedule at its own expense to Owner indicating actual progress. If, in the opinion of Owner, Contractor is not in conformance with the Progress Schedule for reasons other than acts of Force Majeure as identified in Section 3.05, Contractor shall take such steps as are necessary to bring the actual completion dates of its work activities into conformance with the Progress Schedule, and if directed by Owner, Contractor shall submit a
corrective action plan or revise the Progress Schedule to reconcile with the actual progress of the Work.

E. Contractor to notify Owner of delays: Contractor shall perform the Work in accordance with the most recent Progress Schedule submitted to Owner. Contractor shall promptly notify Owner in writing of any actual or anticipated event that is delaying or could delay achievement of any milestone or performance of any critical path activity of the Work. Contractor shall indicate the expected duration of the delay, the anticipated effect of the delay on the Progress Schedule, and the action being or to be taken to correct the problem. Provision of such Notice does not relieve Contractor of its obligation to complete the Work within the Contract Time.

3.03 OWNER’S RIGHT TO SUSPEND THE WORK FOR CONVENIENCE

A. Owner may suspend Work: Owner may, at its sole discretion, order Contractor, in writing, to suspend all or any part of the Work for up to 90 Days, or for such longer period as mutually agreed.

B. Compliance with suspension; Owner’s options: Upon receipt of a written notice suspending the Work, Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of cost of performance directly attributable to such suspension. Within a period up to 90 Days after the notice is delivered to Contractor, or within any extension of that period to which the parties shall have agreed, Owner shall either:

1. Cancel the written notice suspending the Work; or
2. Terminate the Work covered by the notice as provided in the termination provisions of Part 9.

C. Resumption of Work: If a written notice suspending the Work is cancelled or the period of the notice or any extension thereof expires, Contractor shall resume Work.

D. Equitable Adjustment for suspensions: Contractor shall be entitled to an equitable adjustment in the Contract Time, or Contract Sum, or both, for increases in the time or cost of performance directly attributable to such suspension, provided Contractor complies with all requirements set forth in Part 7.

3.04 OWNER’S RIGHT TO STOP AND/OR CARRY OUT THE WORK FOR CAUSE

A. Owner may stop Work for Contractor’s failure to perform: If Contractor fails or refuses to perform its obligations in accordance with the Contract Documents, Owner may order Contractor, in writing, to stop the Work, or any portion thereof, until Owner has accepted satisfactory corrective action.

B. Owner may carry out the Work after Contractor’s failure to perform: If Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a 14-Day period after receipt of written Notice from Owner to commence and continue to make reasonable progress toward the correction of such default or neglect with diligence and promptness, Owner may, without prejudice to other remedies Owner may have, correct such deficiencies, and an appropriate Change Order shall be issued deducting from payments then or thereafter due Contractor the reasonable cost of correcting the deficiencies, including Owner’s expenses and compensation for A/E’s additional services made necessary by the default, neglect or failure. If payments then or thereafter due Contractor are not sufficient to cover such amounts, Contractor shall pay the difference to Owner.
C. No equitable adjustment for Contractor’s failure to perform: Contractor shall not be entitled to an equitable adjustment in the Contract Time or Contract Sum for any increased cost or time of performance attributable to Contractor’s failure or refusal to perform or from any reasonable remedial action taken by Owner based upon such failure.

3.05 DELAY

A. Force Majeure actions not a default; Force Majeure defined: Any delay in or failure of performance by Owner or Contractor shall not constitute a default if and to the extent the cause for such delay or failure of performance was unforeseeable and beyond the control of the party. Acts of Force Majeure include, but are not limited to:

1. Acts of God or the public enemy;
2. Acts or omissions of any government entity not the fault of Owner or Contractor;
3. Fire or other casualty for which Contractor is not responsible;
4. Quarantine or epidemic;
5. Industry-wide strike or defensive lockout;
6. Unusually severe weather conditions which could not have been reasonably anticipated; and
7. Unusual delay in receipt of supplies or products which were ordered and expedited and for which no substitute reasonably acceptable to Owner was available.

a. “Unusually severe weather” shall mean weather conditions that are abnormal for the period of time for which Force Majeure is claimed, that could not reasonably have been anticipated or avoided, and that had an adverse effect on the Progress Schedule. Neither the Contract Time nor the Contract Sum will be adjusted for normal inclement weather or if the Work was behind schedule (unless behind schedule for a reason not the responsibility of the Contractor) at the time the unusually severe weather occurred. The Contractor shall be entitled to a change in the Contract Time only (but not a change in the Contract Sum) if the Contractor can substantiate to the reasonable satisfaction of the Owner that there was unusually severe weather as compared to normal using a ten (10) year average of accumulated record mean values from climatological data compiled by the U.S. Department of Commerce National Oceanic and Atmospheric Administration for the locale closest to the Project, and that the abnormal inclement weather actually impacted and extended the critical path of the Work. Unusual is defined as a 10-year weather event of either or both precipitation or temperature extremes that fall outside the upper and lower ranges within a 10-year periodicity.

B. Contract Time adjustment for Force Majeure: Contractor shall be entitled to an equitable adjustment in the Contract Time for changes in the time of performance directly attributable to an act of Force Majeure, provided it makes a request for equitable adjustment. Contractor shall not be entitled to an adjustment in the Contract Sum resulting from an act of Force Majeure.

C. Contract Time or Contract Sum adjustment if Owner at fault: Contractor shall be entitled to an equitable adjustment in Contract Time, and may be entitled to an equitable adjustment in
Contract Sum, if the cost or time of Contractor's performance is changed due to the fault or negligence of Owner, provided the Contractor makes a request for equitable adjustment.

D. No Contract Time or Contract Sum adjustment if Contractor at fault: Contractor shall not be entitled to an adjustment in Contract Time or in the Contract Sum for any delay or failure of performance to the extent such delay or failure was caused by Contractor or anyone for whose acts Contractor is responsible.

E. Contract Time adjustment only for concurrent fault: To the extent any delay or failure of performance was concurrently caused by the Owner and Contractor, Contractor shall be entitled to an adjustment in the Contract Time for that portion of the delay or failure of performance that was concurrently caused, provided it makes a request for equitable adjustment, but shall not be entitled to an adjustment in Contract Sum.

F. Contractor to mitigate delay impacts: Contractor shall make all reasonable efforts to prevent and mitigate the effects of any delay, whether occasioned by an act of Force Majeure or otherwise. Contractor shall not recover damages, an equitable adjustment or an increase in the Contract Sum or Contract Time from Owner where Contractor could have reasonably avoided the delay by the exercise of due diligence.

G. Types of damages permitted: If Contractor and its Subcontractors are entitled to a change in the Contract Sum, the amount of the change shall be the actual costs incurred by the Contractor and Subcontractors directly related to the change calculated in accordance with Section 7.02. Contractor and its Subcontractors shall not otherwise (not reflected by the actual costs incurred as calculated in accordance with Section 7.02) be entitled to damages arising out of actual or alleged loss of efficiency; morale, fatigue, attitude, or labor rhythm; constructive acceleration; home office overhead; expectant underrun; trade stacking; reassignment of workers; rescheduling of Work, concurrent operations; dilution of supervision; learning curve; beneficial or joint occupancy; logistics; ripple; season change; extended overhead; profit upon damages for delay; impact damages including cumulative impacts; or similar damages. Any effect that such alleged events may have on Contractor or its Subcontractors, to the extent not otherwise paid, is subsumed in and fully compensated through the percentage Fee on Change Orders paid through Section 7.02A.3.e and any liquidated damages paid hereunder.

3.06 NOTICE TO OWNER OF LABOR DISPUTES

A. Contractor to notify Owner of labor disputes: If Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay timely performance in accordance with the Contract Documents, Contractor shall immediately give notice, including all relevant information, to Owner.

B. Pass through notification provisions to Subcontractors: Contractor agrees to insert a provision in its Subcontracts and to require insertion in all sub-subcontracts, that in the event timely performance of any such contract is delayed or threatened by delay by any actual or potential labor dispute, the Subcontractor or Sub-subcontractor shall immediately notify the next higher tier Subcontractor or Contractor, as the case may be, of all relevant information concerning the dispute.

3.07 DAMAGES FOR FAILURE TO ACHIEVE TIMELY COMPLETION

A. Liquidated Damages:

1. Reason for Liquidated Damages: Timely performance and completion of the Work is essential to Owner and time limits stated in the Contract Documents are of the essence.
Owner will incur serious and substantial damages if Substantial Completion of the Work does not occur within the Contract Time. However, it would be difficult if not impossible to determine the exact amount of such damages. Consequently, provisions for liquidated damages are included in the Contract Documents.

2. Calculation of Liquidated Damages amount: The liquidated damage amounts set forth in the Contract Documents will be assessed not as a penalty, but as liquidated damages for breach of the Contract Documents. This amount is fixed and agreed upon by and between the Contractor and Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain. This amount shall be construed as the actual amount of damages sustained by the Owner, and may be retained by the Owner and deducted from periodic payments to the Contractor.

3. Contractor responsible even if Liquidated Damages assessed: Assessment of liquidated damages shall not release Contractor from any obligations or liabilities pursuant to the Contract Documents. If Contractor substantially fails to perform in a timely manner in accordance with the Contract Documents and, through the fault of Contractor or Subcontractor(s), fails to achieve Substantial Completion within the Contract Time, Contractor shall be in default.

B. Actual Damages: If no liquidated damages are established, actual damages may be assessed for failure to achieve both Substantial Completion and Final Completion within the time provided. Actual damages will be calculated on the basis of direct architectural, administrative, and other related costs attributable to the Project from the date when Substantial and/or Final Completion should have been achieved, as applicable. Owner may offset these costs against any payment due Contractor.

PART 4 - SPECIFICATIONS, DRAWINGS, AND OTHER DOCUMENTS

4.01 DISCREPANCIES AND CONTRACT DOCUMENT REVIEW

A. Specifications and Drawings are basis of the Work: The intent of the Specifications and Drawings is to describe a complete Project to be constructed in accordance with the Contract Documents. Contractor shall furnish all labor, materials, equipment, tools, transportation, permits, and supplies, and perform the Work required in accordance with the Drawings, Specifications, and other provisions of the Contract Documents.

B. Parts of the Contract Documents are complementary: The Contract Documents are complementary. What is required by one part of the Contract Documents shall be binding as if required by all. Anything mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both.

C. Contractor to report discrepancies in Contract Documents: Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by Owner. If, during the performance of the Work, Contractor finds a conflict, error, inconsistency, or omission in the Contract Documents, it shall promptly and before proceeding with the Work affected thereby, report such conflict, error, inconsistency, or omission to A/E in writing.

D. Contractor knowledge of discrepancy in documents – responsibility: Contractor shall do no Work without applicable Drawings, Specifications, and, where required, accepted shop drawings and other Submittals, unless instructed to do so in writing by Owner. If Contractor performs any construction activity, and it knows or reasonably should have known that any of the Contract
Documents contain a conflict, error, inconsistency, or omission, Contractor shall be responsible for the performance and shall bear the cost for its correction.

E. **Contractor to perform Work implied by Contract Documents:** Contractor shall provide any work or materials the provision of which is clearly implied and is within the scope of the Contract Documents even if the Contract Documents do not mention them specifically.

F. **Interpretation questions referred to A/E:** Questions regarding interpretation of the requirements of the Contract Documents shall be referred to the A/E.

### 4.02 PROJECT RECORD

A. **Contractor to maintain Project Record Drawings and Specifications:** Contractor shall legibly mark in ink on a separate set of the Drawings and Specifications all actual construction, including depths of foundations, horizontal and vertical locations of internal and underground utilities and appurtenances referenced to permanent visible and accessible surface improvements, field changes of dimensions and details, actual suppliers, manufacturers and trade names, models of installed equipment, changes made to the building enclosure, and Change Order Proposals. This separate set of Drawings and Specifications shall be the “Project Record.” The Project Record shall include all Architectural, Mechanical, Electrical, Structural and Civil as-built drawings, whether or not any changes occur and shall also include Addenda, Change Orders, WDs and other modifications to the Contract, in good order and marked currently to indicate field changes and selections made during construction, as well as one copy of accepted shop drawings, product data, samples and other required Submittals.

B. **Update Project Record weekly and keep on site:** The Project Record shall be maintained on the Project site throughout the construction and shall be clearly labeled “PROJECT RECORD.” The Project Record shall be available to A/E and Owner at all times. The Project Record shall be updated at least weekly noting all changes and shall be available to Owner at all times.

C. **Final Project Record to A/E before Final Acceptance:** Contractor shall submit the completed and finalized Project Record to A/E prior to Final Acceptance.

### 4.03 SUBMITTALS

A. **Definition of Submittals:** “Submittals” means documents and other information required to be submitted to A/E by Contractor pursuant to the Contract Documents, showing in detail: the proposed fabrication and assembly of structural elements; and the installation (i.e. form, fit, and attachment details) of materials and equipment. Submittals can include, but are not limited to, drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, samples, and similar materials furnished by Contractor to explain in detail specific portions of the Work required by the Contract Documents. For materials and equipment to be incorporated into the Work, Contractor submittal shall include the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the item. When directed, Contractor shall submit all samples at its own expense. Owner may duplicate, use, and disclose Submittals provided in accordance with the Contract Documents.

B. **Approval of Submittals by Contractor and A/E:** Contractor shall coordinate all Submittals with the Progress Schedule per Section 3.02A, shall review them for accuracy, completeness, and compliance with the Contract Documents, and shall indicate its approval thereon as evidence of such coordination and review. Where required by law, Submittals shall be stamped by an appropriate professional licensed by the state of Washington. Submittals submitted to A/E without evidence of Contractor's approval shall be returned for resubmission. Contractor shall
review, approve, and submit Submittals with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of Owner or separate contractors. Contractor’s submittal schedule shall allow a reasonable time for A/E review. A/E will review, approve, or take other appropriate action on the Submittals. Contractor shall perform no portion of the Work requiring submittal and review of Submittals until the respective submittal has been reviewed and the A/E has approved or taken other appropriate action. Owner and A/E shall respond to Submittal with reasonable promptness. Any Work by Contractor shall be in accordance with reviewed Submittals. Submittals made by Contractor which are not required by the Contract Documents may be returned without action.

C. Contractor not relieved of responsibility when Submittals approved: Approval, or other appropriate action with regard to Submittals, by Owner or A/E shall not relieve Contractor of responsibility for any errors or omissions in such Submittals, nor from responsibility for compliance with the requirements of the Contract Documents. Unless specified in the Contract Documents, review by Owner or A/E shall not constitute an approval of the safety precautions employed by Contractor during construction, or constitute an approval of Contractor’s means or methods of construction. If Contractor fails to obtain approval before installation and the item or work is subsequently rejected, Contractor shall be responsible for all costs of correction.

D. Variations between Submittals and Contract Documents: Submittals, including product data, samples and similar submissions, are not Contract Documents. If Submittals vary from the requirements of the Contract Documents, Contractor shall describe such variations in writing, separate from the Submittals, at the time it submits the Submittals containing such variations. If Owner approves any such variation, an appropriate Change Order will be issued. If the variation is minor and does not involve an adjustment in the Contract Sum or Contract Time, a Change Order need not be issued; however, the modification shall be approved by Owner in writing and recorded upon the Project Record. Approval for substitutions shall not be sought and shall not be approved through the submission of Submittals.

E. Contractor to submit 5 copies of Submittals: Unless otherwise provided in Division 1, Contractor shall submit to A/E for approval 5 copies of all Submittals. Unless otherwise indicated, 3 sets of all Submittals shall be retained by A/E and 2 sets shall be returned to Contractor.

4.04 ORGANIZATION OF SPECIFICATIONS

Specification organization by trade: Specifications are prepared in sections which conform generally with trade practices. These sections are for Owner and Contractor convenience and shall not control Contractor in dividing the Work among the Subcontractors or in establishing the extent of the Work to be performed by any trade.

4.05 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS, AND OTHER DOCUMENTS

A. A/E, not Contractor, owns Copyright of Drawings and Specifications: The Drawings, Specifications, and other documents prepared by A/E are instruments of A/E’s service through which the Work to be executed by Contractor is described. Neither Contractor nor any Subcontractor shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by A/E, and A/E shall be deemed the author of them and will, along with any rights of Owner, retain all common law, statutory, and other reserved rights, in addition to the copyright. All copies of these documents, except Contractor’s set, shall be returned or suitably accounted for to A/E, on request, upon completion of the Work.

B. Drawings and Specifications to be used only for this Project: The Drawings, Specifications, and other documents prepared by the A/E, and copies thereof furnished to Contractor, are for use solely with respect to this Project. They are not to be used by Contractor or any Subcontractor on
other projects or for additions to this Project outside the scope of the Work without the specific written consent of Owner and A/E. Contractor and Subcontractors are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications, and other documents prepared by A/E appropriate to and for use in the execution of their Work.

C. **License granted to Owner:** Contractor and all Subcontractors grant a non-exclusive license to Owner, without additional cost or royalty, to use for its own purposes (including reproduction) all Submittals, together with the information and diagrams contained therein, prepared by Contractor or any Subcontractor. In providing Submittals, Contractor and all Subcontractors warrant that they have authority to grant to Owner a license to use the Submittals, and that such license is not in violation of any copyright or other intellectual property right. Contractor agrees to defend and indemnify Owner pursuant to the indemnity provisions in Section 5.03 and 5.22 from any violations of copyright or other intellectual property rights arising out of Owner's use of the Submittals hereunder, or to secure for Owner, at Contractor's own cost, licenses in conformity with this section.

D. **Submittals to be used only for this Project:** Submittals prepared by Contractor, Subcontractors of any tier, or its or their equipment or material suppliers, and copies thereof furnished to Contractor, are for use solely with respect to this Project. They are not to be used by Contractor or any Subcontractor of any tier, or material or equipment supplier, on other projects or for additions to this Project outside the scope of the Work without the specific written consent of Owner. The Contractor, Subcontractors of any tier, and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Submittals appropriate to and for use in the execution of their Work under the Contract Documents.

E. **Electronic Files:** If the parties intend to transmit the instruments of service or any other information or documentation in digital form (other than PDF), they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Contract Documents.

**PART 5 - PERFORMANCE**

**5.01 CONTRACTOR CONTROL AND SUPERVISION**

A. **Contractor responsible for Means and Methods of construction:** Contractor shall supervise and direct the Work, using its best skill and attention, and shall perform the Work in a skillful manner. Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work, unless the Contract Documents give other specific instructions concerning these matters. Contractor shall disclose its means and methods of construction when requested by Owner.

B. **Competent superintendent required:** Contractor, as soon as practicable after award of the Contract, shall furnish in writing to Owner the name and qualifications of its proposed superintendent. Owner may reply within 14 Days to Contractor in writing stating (1) whether Owner has reasonable objection to the proposed superintendent or (2) that Owner requires additional time to review. Failure of Owner to reply within the 14-Day period shall constitute Notice of no reasonable objection. The superintendent shall not be employed on any other project during the course of the Work. Unless approved by the Owner’s representative and only when overseeing projects on the same campus or location where oversite and supervision will not be degraded. Performance of the Work shall be directly supervised by a competent superintendent who shall be in attendance at the Project site during performance of the Work and who has authority to act on behalf of Contractor. Communications given to the superintendent shall be as binding as if given to Contractor. The superintendent must be satisfactory to Owner and shall not be changed without the prior written consent of Owner. Owner may require
Contractor to remove the superintendent from the Work or Project site, if Owner reasonably deems the superintendent incompetent, careless, or otherwise objectionable, provided Owner has first notified Contractor in writing and allowed a reasonable period for transition.

C. **Contractor responsible for acts and omissions of self and agents:** Contractor shall be responsible to Owner for acts and omissions of Contractor, Subcontractors, and their employees and agents.

D. **Contractor to employ competent and disciplined workforce:** Contractor shall enforce strict discipline and good order among all of the Contractor’s employees and other persons performing the Work. Contractor shall not permit employment of persons not skilled in tasks assigned to them. Contractor’s employees shall at all times conduct business in a manner which assures fair, equal, and nondiscriminatory treatment of all persons. Owner may, by written notice, request Contractor to remove from the Work or Project site any employee Owner reasonably deems incompetent, careless, or otherwise objectionable.

E. **Contractor to keep project documents on site:** Contractor shall keep on the Project site a copy of the Drawings, Specifications, addenda, reviewed Submittals, and permits and permit drawings.

F. **Contractor to comply with ethical standards:** Contractor shall ensure that its owner(s) and employees, and those of its Subcontractors, comply with the Ethics in Public Service Act RCW 42.52, which, among other things, prohibits state employees from having an economic interest in any public works contract that was made by, or supervised by, that employee. Contractor shall remove, at its sole cost and expense, any of its, or its Subcontractors' employees, if they are in violation of this act.

5.02 **PERMITS, FEES, AND NOTICES**

A. **Contractor to obtain and pay for permits:** Unless otherwise provided in the Contract Documents, Contractor shall secure and pay for the building, any land use permits and all other permits, licenses, and inspections necessary for proper execution and completion of the Work. Prior to Final Acceptance, the approved, signed permits shall be delivered to Owner.

B. **Allowances for permit fees:** If allowances for permits or utility fees are called for in the Contract Documents and set forth in Contractor’s bid, and the actual costs of those permits or fees differ from the allowances in the Contract Documents, the difference shall be adjusted by Change Order.

C. **Contractor to comply with all applicable laws:** Contractor shall comply with and give notices required by all federal, state, and local laws, ordinances, rules, regulations, and lawful orders of public authorities applicable to performance of the Work.

D. **Taxes:** Contractor shall pay sales, consumer, use, business and occupation, income and similar taxes for the Work that are legally enacted when the initial Contract Sum is agreed.

5.03 **PATENTS AND ROYALTIES**

Payment, indemnification, and notice: Contractor is responsible for, and shall pay, all royalties and license fees. Contractor shall defend, indemnify, and hold Owner harmless from any costs, expenses, and liabilities arising out of the infringement by Contractor of any patent, copyright, or other intellectual property right used in the Work; however, provided that Contractor gives prompt notice, Contractor shall not be responsible for such defense or indemnity when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents. If Contractor has reason to believe that use of the required design, process, or product constitutes an infringement of a patent or copyright, it shall promptly notify Owner of such potential infringement.
5.04 PREVAILING WAGES

A. Contractor to pay Prevailing Wages: Contractor shall pay the prevailing rate of wages to all workers, laborers, or mechanics employed in the performance of any part of the Work in accordance with RCW 39.12 and the rules and regulations of the Department of Labor and Industries. The schedule of prevailing wage rates for the locality or localities of the Work, is determined by the Industrial Statistician of the Department of Labor and Industries. It is the Contractor's responsibility to verify the applicable prevailing wage rate.

B. Statement of Intent to Pay Prevailing Wages: Before payment is made by the Owner to the Contractor for any work performed by the Contractor and subcontractors whose work is included in the application for payment, the Contractor shall submit, or shall have previously submitted to the Owner for the Project, a Statement of Intent to Pay Prevailing Wages, approved by the Department of Labor and Industries, certifying the rate of hourly wage paid and to be paid each classification of laborers, workers, or mechanics employed upon the Work by Contractor and Subcontractors. Such rates of hourly wage shall not be less than the prevailing wage rate.

C. Affidavit of Wages Paid: Prior to release of retainage, the Contractor shall submit to the Owner an Affidavit of Wages Paid, approved by the Department of Labor and Industries, for the Contractor and every subcontractor that performed work on the Project.

D. Disputes: Disputes regarding prevailing wage rates shall be referred for arbitration to the Director of the Department of Labor and Industries. The arbitration decision shall be final and conclusive and binding on all parties involved in the dispute as provided for by RCW 39.12.060.

E. Statement with pay application; Post Statements of Intent at job site: Each Application for Payment submitted by Contractor shall state that prevailing wages have been paid in accordance with the prefilled statement(s) of intent, as approved. Copies of the approved intent statement(s) shall be posted on the job site with the address and telephone number of the Industrial Statistician of the Department of Labor and Industries where a complaint or inquiry concerning prevailing wages may be made.

F. Contractor to pay for Statements of Intent and Affidavits: In compliance with chapter 296-127 WAC, Contractor shall pay to the Department of Labor and Industries the currently established fee(s) for each statement of intent and/or affidavit of wages paid submitted to the Department of Labor and Industries for certification.

G. Certified Payrolls: Consistent with WAC 296-127-320, the Contractor and any subcontractor shall submit a certified copy of payroll records if requested.

5.05 HOURS OF LABOR

A. Overtime: Contractor shall comply with all applicable provisions of RCW 49.28 and they are incorporated herein by reference.

5.06 NONDISCRIMINATION

A. Discrimination prohibited by applicable laws: Discrimination in all phases of employment is prohibited by, among other laws and regulations, Title VII of the Civil Rights Act of 1964, the Vietnam Era Veterans Readjustment Act of 1974, Sections 503 and 504 of the Vocational Rehabilitation Act of 1973, the Equal Employment Act of 1972, the Age Discrimination Act of 1967, the Americans with Disabilities Act of 1990, the Civil Rights Act of 1991, Presidential Executive Order 11246, Executive Order 11375, the Washington State Law Against Discrimination, RCW 49.60, and Gubernatorial Executive Order 85-09. These laws and...
regulations establish minimum requirements for affirmative action and fair employment practices which Contractor must meet.

B. During performance of the Work:

1. **Protected Classes**: Contractor shall not discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex, age, marital status, or the presence of any physical, sensory, or mental disability, Vietnam era veteran status, or disabled veteran status, nor commit any other unfair practices as defined in RCW 49.60.

2. **Advertisements to state nondiscrimination**: Contractor shall, in all solicitations or advertisements for employees placed by or for it, state that all qualified applicants will be considered for employment, without regard to race, creed, color, national origin, sex, age, marital status, or the presence of any physical, sensory, or mental disability.

3. **Contractor to notify unions and others of nondiscrimination**: Contractor shall send to each labor union, employment agency, or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice advising the labor union, employment agency, or workers’ representative of Contractor’s obligations according to the Contract Documents and RCW 49.60.

4. **Owner and State access to Contractor records**: Contractor shall permit access to its books, records, and accounts, and to its premises by Owner, and by the Washington State Human Rights Commission, for the purpose of investigation to ascertain compliance with this section of the Contract Documents.

5. **Pass through provisions to Subcontractors**: Contractor shall include the provisions of this section in every Subcontract.

### 5.07 SAFETY PRECAUTIONS

A. **Contractor responsible for safety**: Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Work. Contractor shall be solely and completely responsible for conditions of the Project site, including safety of all persons and property, during performance of the Work. Contractor shall maintain the Project site and perform the Work in a manner that meets statutory and common-law requirements for the provision of a safe place to work. This requirement shall apply continuously and not be limited to working hours. Any review by Owner or A/E of Contractor’s performance shall not be construed to include a review of the adequacy of Contractor’s safety measures in, on or near the site of the Work.

B. **Contractor safety responsibilities**: In carrying out its responsibilities according to the Contract Documents, Contractor shall protect the lives and health of employees performing the Work and other persons who may be affected by the Work; prevent damage to materials, supplies, and equipment whether on site or stored off-site; and prevent damage to other property at the site or adjacent thereto. Contractor shall comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss; shall erect and maintain all necessary safeguards for such safety and protection; and shall notify owners of adjacent property and utilities when prosecution of the Work may affect them.

C. **Contractor to maintain safety records**: Contractor shall maintain an accurate record of exposure data on all incidents relating to the Work resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment. Contractor shall immediately report
any such incident to Owner. Owner shall, at all times, have a right of access to all records of exposure.

D. Contractor to provide HazMat training: Contractor shall provide all persons working on the Project site with information and training on hazardous chemicals in their work at the time of their initial assignment, and whenever a new hazard is introduced into their work area.

1. Information. At a minimum, Contractor shall inform persons working on the Project site of:

   a. WAC: The requirements of chapter 296-62 WAC, General Occupational Health Standards;

   b. Presence of hazardous chemicals: Any operations in their work area where hazardous chemicals are present; and

   c. Hazard communications program: The location and availability of written hazard communication programs, including the required list(s) of hazardous chemicals and material safety data sheets required by chapter 296-62 WAC.

2. Training. At a minimum, Contractor shall provide training for persons working on the Project site which includes:

   a. Detecting hazardous chemicals: Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);

   b. Hazards of chemicals: The physical and health hazards of the chemicals in the work area;

   c. Protection from hazards: The measures such persons can take to protect themselves from these hazards, including specific procedures Contractor, or its Subcontractors, or others have implemented to protect those on the Project site from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and

   d. Hazard communications program: The details of the hazard communications program developed by Contractor, or its Subcontractors, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.

E. Hazardous, toxic or harmful substances: Contractor’s responsibility for hazardous, toxic, or harmful substances shall include the following duties:

1. Illegal use of dangerous substances: Contractor shall not keep, use, dispose, transport, generate, or sell on or about the Project site, any substances now or hereafter designated as, or which are subject to regulation as, hazardous, toxic, dangerous, or harmful by any federal, state or local law, regulation, statute or ordinance (hereinafter collectively referred to as “hazardous substances”), in violation of any such law, regulation, statute, or ordinance, but in no case shall any such hazardous substance be stored more than 90 Days on the Project site.
2. **Contractor notifications of spills, failures, inspections, and fines**: Contractor shall promptly notify Owner of all spills or releases of any hazardous substances which are otherwise required to be reported to any regulatory agency and pay the cost of cleanup. Contractor shall promptly notify Owner of all failures to comply with any federal, state, or local law, regulation, or ordinance; all inspections of the Project site by any regulatory entity concerning the same; all regulatory orders or fines; and all responses or interim cleanup actions taken by or proposed to be taken by any government entity or private party on the Project site.

F. **Public safety and traffic**: All Work shall be performed with due regard for the safety of the public. Contractor shall perform the Work so as to cause a minimum of interruption of vehicular traffic or inconvenience to pedestrians. All arrangements to care for such traffic shall be Contractor’s responsibilities. All expenses involved in the maintenance of traffic by way of detours shall be borne by Contractor.

G. **Contractor to act in an emergency**: In an emergency affecting the safety of life or the Work or of adjoining property, Contractor is permitted to act, at its discretion, to prevent such threatened loss or injury, and Contractor shall so act if so authorized or instructed.

H. **No duty of safety by Owner or A/E**: Nothing provided in this Section 5.07 shall relieve Contractor of sole and complete responsibility for safety at the Project site, for sole and complete responsibility for any violation of safety or property protection requirements or the correction thereof, or impose any duty upon Owner or A/E with regard to, or as constituting any express or implied assumption of control or responsibility over, any other safety conditions relating to employees or agents of Contractor or any of its Subcontractors, or the public. Any Notice Owner or A/E gives to Contractor of a safety or property protection violation will not: (1) relieve Contractor of sole and complete responsibility for the violation and the correction thereof, or for sole liability for the consequences of said violation; (2) impose any obligation upon Owner or A/E to inspect or review Contractor’s safety program or precautions or to enforce Contractor’s compliance with the requirements of this Section 5.07; or (3) impose any continuing obligation upon Owner or A/E to provide such Notice to Contractor or any other persons or entity.

5.08 **OPERATIONS, MATERIAL HANDLING, AND STORAGE AREAS**

A. **Limited storage areas**: Contractor shall confine all operations, including storage of materials, to Owner-approved areas.

B. **Temporary buildings and utilities at Contractor expense**: Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be provided by Contractor only with the consent of Owner and without expense to Owner. The temporary buildings and utilities shall be removed by Contractor at its expense upon completion of the Work.

C. **Roads and vehicle loads**: Contractor shall use only established roadways or temporary roadways authorized by Owner. When materials are transported in prosecuting the Work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by federal, state, or local law or regulation.

D. **Ownership and reporting by Contractor of demolished materials**: Ownership and control of all materials or facility components to be demolished or removed from the Project site by Contractor shall immediately vest in Contractor upon severance of the component from the facility or severance of the material from the Project site. Contractor shall be responsible for compliance with all laws governing the storage and ultimate disposal. Contractor shall provide Owner with a copy of all manifests and receipts evidencing proper disposal when required by Owner or applicable law.
E. Contractor responsible for care of materials and equipment on-site: Contractor shall be responsible for the proper care and protection of its materials and equipment delivered to the Project site. Materials and equipment may be stored on the premises subject to approval of Owner. When Contractor uses any portion of the Project site as a shop, Contractor shall be responsible for any repairs, patching, or cleaning arising from such use.

F. Contractor responsible for loss of materials and equipment: Contractor shall protect and be responsible for any damage or loss to the Work, or to the materials or equipment until the date of Substantial Completion, and shall repair or replace without cost to Owner any damage or loss that may occur, except damages or loss caused by the acts or omissions of Owner. Contractor shall also protect and be responsible for any damage or loss to the Work, or to the materials or equipment, after the date of Substantial Completion, and shall repair or replace without cost to Owner any such damage or loss that might occur, to the extent such damages or loss are caused by the acts or omissions of Contractor, or any Subcontractor.

5.09 PRIOR NOTICE OF EXCAVATION

A. Excavation defined; Use of locator services: “Excavation” means an operation in which earth, rock, or other material on or below the ground is moved or otherwise displaced by any means, except the tilling of soil less than 12 inches in depth for agricultural purposes, or road ditch maintenance that does not change the original road grade or ditch flow line. Before commencing any excavation, Contractor shall provide notice of the scheduled commencement of excavation to all owners of underground facilities or utilities, through locator services.

5.10 UNFORESEEN PHYSICAL CONDITIONS

A. Notice requirement for concealed or unknown conditions: If Contractor encounters conditions at the site which are subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents, or unknown physical conditions of an unusual nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then Contractor shall give written notice to Owner promptly and in no event later than 7 Days after the first observance of the conditions. Conditions shall not be disturbed prior to such notice.

B. Adjustment in Contract Time and Contract Sum: If such conditions differ materially and cause a change in Contractor’s cost of, or time required for, performance of any part of the Work, the Contractor may be entitled to an equitable adjustment in the Contract Time or Contract Sum, or both, provided it makes a request therefore as provided in Part 7.

5.11 PROTECTION OF EXISTING STRUCTURES, EQUIPMENT, VEGETATION, UTILITIES AND IMPROVEMENTS

A. Contractor to protect and repair property: At all times until Owner’s occupancy of the Work or a designated portion of the Work, Contractor shall protect the Work from damage, weather, deterioration, theft, vandalism and malicious mischief and shall bear the risk of any uninsured loss or destruction of, or injury or damage to, all materials, equipment, tools, and other items incorporated or to be incorporated in the Work or designated portion, or consumed or used in the performance of the Work or designated portion, including all Work in process and completed Work. Contractor shall protect from damage all existing structures, equipment, improvements, utilities, streets, curbs, walks and vegetation at or near the Project site or on adjacent property of a third party, the locations of which are made known to or should be known by Contractor. Contractor shall repair any damage, including that to the property of a third party, resulting from failure to comply with the requirements of the Contract Documents or failure to exercise reasonable care in performing the Work. If Contractor fails or refuses to repair the damage
promptly, Owner may have the necessary work performed and charge the cost to Contractor. If a governmental authority having jurisdiction requires that the repairing and patching be done with its own labor and/or materials, Contractor shall abide by such regulations, and it shall pay for this work at no additional cost to Owner.

B. Tree and vegetation protection: Contractor shall only remove trees when specifically authorized to do so, and shall protect vegetation that will remain in place.

C. Special site conditions: If, in the course of the Work, Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, Contractor shall immediately suspend any operations that would affect them and shall notify Owner and A/E. Upon receipt of such Notice, Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. Contractor shall continue to suspend these operations until otherwise instructed by Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Part 8.

5.12 LAYOUT OF WORK

A. Advanced planning of the Work: Contractor shall plan and lay out the Work in advance of operations so as to coordinate all work without delay or revision.

B. Layout responsibilities: Contractor shall lay out the Work from Owner-established baselines and bench marks indicated on the Drawings, and shall be responsible for all field measurements in connection with the layout. Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the Work. Contractor shall be responsible for executing the Work to the lines and grades that may be established. Contractor shall be responsible for maintaining or restoring all stakes and other marks established.

5.13 MATERIAL AND EQUIPMENT

A. Contractor to provide new and equivalent equipment and materials: All equipment, material, and articles incorporated into the Work shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in the Contract Documents. References in the Specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard quality and shall not be construed as limiting competition. Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of A/E and after submittal and approval of a substitute request, is equal to that named in the Specifications, unless otherwise specifically provided in the Contract Documents.

B. Contractor responsible for fitting parts together: Contractor shall do all cutting, fitting, or patching that may be required to complete the Work or to make its several parts fit together properly, or receive or be received by work of others set forth in, or reasonably implied by, the Contract Documents. Contractor shall not damage or endanger any work of Owner or separate contractors by cutting, excavating, or otherwise altering the Work and shall not cut or alter the work of any other contractor unless approved in advance by Owner. Contractor shall restore all areas requiring cutting, fitting and patching to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

C. Owner may reject defective Work: Should any of the Work be found defective, or in any way not in accordance with the Contract Documents, this Work, in whatever stage of completion, may be
rejected by Owner. However, neither this authority of Owner nor a decision made either to exercise or not to exercise such authority shall give rise to a duty or responsibility of Owner or its representatives to Contractor, Subcontractors, their agents or employees, or other persons or entities performing portions of the Work.

5.14 AVAILABLE AND USE OF UTILITY SERVICES

A. Owner to provide and charge for utilities: Owner shall make all reasonable utilities available to Contractor from existing outlets and supplies, as specified in the Contract Documents. Unless otherwise provided in the Contract Documents, the utility service consumed shall be charged to or paid for by Contractor at prevailing rates charged to Owner or, where the utility is produced by Owner, at reasonable rates determined by Owner. Contractor will carefully conserve any utilities furnished.

B. Contractor to install temporary connections and meters: Contractor shall, at its expense and in a skillful manner satisfactory to Owner, install and maintain all necessary temporary connections and distribution lines, together with appropriate protective devices, and all meters required to measure the amount of each utility used for the purpose of determining charges. Prior to the date of Final Acceptance, Contractor shall remove all temporary connections, distribution lines, meters, and associated equipment and materials.

5.15 TESTS AND INSPECTION

A. Contractor to provide for all testing and inspection of Work: Contractor shall maintain an adequate testing and inspection program and perform such tests and inspections as are necessary or required to ensure that the Work conforms to the requirements of the Contract Documents. Contractor shall be responsible for inspection and quality surveillance of all its Work and all Work performed by any Subcontractor. Unless otherwise provided, Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. Contractor shall give Owner timely notice of when and where tests and inspections are to be made. Contractor shall maintain complete inspection records and make them available to Owner.

B. Owner may conduct tests and inspections: Owner may, at any reasonable time, conduct such inspections and tests as it deems necessary to ensure that the Work is in accordance with the Contract Documents. Owner shall promptly notify Contractor if an inspection or test reveals that the Work is not in accordance with the Contract Documents. Unless the subject items are expressly accepted by Owner, such Owner inspection and tests are for the sole benefit of Owner and do not:

1. Constitute or imply acceptance;

2. Relieve Contractor of responsibility for providing adequate quality control measures;

3. Relieve Contractor of responsibility for risk of loss or damage to the Work, materials, or equipment;

4. Relieve Contractor of its responsibility to comply with the requirements of the Contract Documents; or

5. Impair Owner’s right to reject defective or nonconforming items, or to avail itself of any other remedy to which it may be entitled.
C. **Inspections or inspectors do not modify Contract Documents:** Neither observations by an inspector retained by Owner, the presence or absence of such inspector on the site, nor inspections, tests, or approvals by others, shall relieve Contractor from any requirement of the Contract Documents, nor is any such inspector authorized to change any term or condition of the Contract Documents.

D. **Contractor responsibilities on inspections:** Contractor shall promptly furnish, without additional charge, all facilities, labor, material and equipment reasonably needed for performing such safe and convenient inspections and tests as may be required by Owner. Owner may charge Contractor any additional cost of inspection or testing when Work is not ready at the time specified by Contractor for inspection or testing, or when prior rejection makes reinspection or retest necessary. Owner shall perform its inspections and tests in a manner that will cause no undue delay in the Work.

5.16 **CORRECTION OF NONCONFORMING WORK**

A. **Work covered by Contractor without inspection:** If a portion of the Work is covered contrary to the request of Owner or the requirements in the Contract Documents or a governmental authority having jurisdiction, it must, if required in writing by Owner, be uncovered for Owner’s observation and be replaced at Contractor’s expense and without change in the Contract Sum or Contract Time.

B. **Payment provisions for uncovering covered Work:** If, at any time prior to Final Completion, Owner desires to examine the Work, or any portion of it, which has been covered, Owner may request to see such Work and it shall be uncovered by Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an adjustment in the Contract Sum for the costs of uncovering and replacement, and, if completion of the Work is thereby delayed, an adjustment in the Contract Time, provided it makes such a request as provided in Part 7. If such Work is not in accordance with the Contract Documents, the Contractor shall pay the costs of examination and reconstruction.

C. **Contractor to correct and pay for non-conforming Work:** Contractor shall promptly correct Work found by Owner not to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed, or completed. Contractor shall bear all costs of correcting such nonconforming Work, including additional testing and inspections.

D. **Contractor’s compliance with correction and warranty provisions:** If, within one year after the date of Substantial Completion of the Work or designated portion thereof, or within one year after the date for commencement of any system warranties established under Section 6.08, or within the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, Contractor shall correct it promptly after receipt of written Notice from Owner to do so. Owner shall give such Notice promptly after discovery of the condition. This period of one year shall be extended, with respect to portions of Work first performed after Substantial Completion, by the period of time between Substantial Completion and the actual performance of the Work. Contractor’s duty to correct with respect to Work repaired or replaced shall run for one year from the date of repair or replacement. Obligations under this Section 5.16D shall survive Final Acceptance and are in addition to other warranties provided by contract or law.

E. **Contractor to remove non-conforming Work:** Contractor shall remove from the Project site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by Contractor nor accepted by Owner.
F. Owner may charge Contractor for non-conforming Work: If Contractor fails to correct nonconforming Work within a reasonable time after written notice to do so, Owner may replace, correct, or remove the nonconforming Work and charge the cost thereof to the Contractor.

G. Contractor to pay for damaged Work during correction: Contractor shall bear the cost of correcting destroyed or damaged Work, whether completed or partially completed, caused by Contractor’s correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

H. No Period of limitation on other requirements: Nothing contained in this section shall be construed to establish a period of limitation with respect to other obligations which Contractor might have according to the Contract Documents. Establishment of the time period of one year as described in Section 5.16D relates only to the specific obligation of Contractor to correct the Work, and has no relationship to the time within which the Contractor’s obligation to comply with the Contract Documents may be sought to be enforced, including the time within which such proceedings may be commenced.

I. Owner may accept non-conforming Work and charge Contractor: If Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, Owner may do so instead of requiring its removal and correction, in which case the Contract Sum may be reduced as appropriate and equitable.

5.17 CLEAN UP

Contractor to keep site clean and leave it clean: Contractor shall at all times keep the Project site, including hauling routes, infrastructures, utilities, and storage areas, free from accumulations of waste materials. Before completing the Work, Contractor shall remove from the premises its rubbish, tools, scaffolding, equipment, and materials. Upon completing the Work, Contractor shall leave the Project site in a clean, neat, and orderly condition satisfactory to Owner. If Contractor fails to clean up as provided herein, and after reasonable notice from Owner, Owner may do so and the cost thereof shall be charged to Contractor.

5.18 ACCESS TO WORK

Owner and A/E access to Work site: Contractor shall provide Owner and A/E access to the Work in progress wherever located.

5.19 OTHER CONTRACTS

Owner may award other contracts; Contractor to cooperate: Owner may undertake or award other contracts for additional work at or near the Project site. Owner shall help coordinate the activities of Owner’s own forces and of each separate contractor engaged by Owner with the Work of Contractor, who shall reasonably cooperate with the other contractors and with Owner’s employees and shall carefully adapt scheduling and perform the Work in accordance with these Contract Documents to reasonably accommodate the other work.

5.20 SUBCONTRACTORS AND SUPPLIERS

A. Subcontractor Responsibility: The Contractor shall include the language of this paragraph in each of its first tier subcontracts, and shall require each of its subcontractors to include the same language of this section in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. Upon request of the Owner, the Contractor shall promptly provide documentation to the Owner demonstrating that the subcontractor meets the subcontractor responsibility criteria below. The requirements of this paragraph apply to all subcontractors...
regardless of tier. At the time of subcontract execution, the Contractor shall verify that each of its first tier subcontractors meets the following bidder responsibility criteria:

1. Have a current certificate of registration as a contractor in compliance with chapter 18.27 RCW, which must have been in effect at the time of subcontract bid submittal;
2. Have a current Washington Unified Business Identifier (UBI) number;
3. If applicable, have:
   a. Industrial Insurance (workers’ compensation) coverage for the subcontractor’s employees working in Washington, as required in Title 51 RCW;
   b. A Washington Employment Security Department number, as required in Title 50 RCW;
   c. A Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW;
   d. An electrical contractor license, if required by Chapter 19.28 RCW;
   e. An elevator contractor license, if required by Chapter 70.87 RCW.
4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065 (3).
5. On a project subject to the apprenticeship utilization requirements in RCW 39.04.320, not have been found out of compliance by the Washington state apprenticeship and training council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under chapter 49.04 RCW for the one-year period immediately preceding the date of the Owner’s first advertisement of the project.
6. Meet all supplemental responsibility criteria set forth in the Contract Documents.

B. Provide names of Subcontractors and use qualified firms: Before submitting the first Application for Payment, Contractor shall furnish in writing to Owner the names, addresses, and telephone numbers of all Subcontractors, as well as suppliers providing materials in excess of $2,500. Contractor shall utilize Subcontractors and suppliers which are experienced and qualified, and meet the requirements of the Contract Documents, if any. Contractor shall not utilize any Subcontractor or supplier to whom Owner has a “reasonable objection,” and shall obtain Owner’s written consent before making any substitutions or additions. A “reasonable objection” shall include without limitation:

   .1 a proposed Subcontractor differing from the entity listed with a proposal or bid,
   .2 lack of “responsibility” of the proposed Subcontractor, as defined in RCW 39.04.350 or otherwise in the Contract Documents, or
   .3 lack of qualification, including technical qualification, as required by the Specifications.

C. Subcontracts in writing and pass through provision: All Subcontracts must be in writing. By appropriate written agreement, Contractor shall require each Subcontractor, so far as applicable to the Work to be performed by the Subcontractor, to be bound to Contractor by terms of the
Contract Documents, and to assume toward Contractor all the obligations and responsibilities which Contractor assumes toward Owner in accordance with the Contract Documents. Each Subcontract shall preserve and protect the rights of Owner in accordance with the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights. Where appropriate, Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. However, nothing in this paragraph shall be construed to alter the contractual relations between Contractor and its Subcontractors with respect to insurance or bonds.

D. Coordination of Subcontractors; Contractor responsible for Work: Contractor shall schedule, supervise, and coordinate the operations of all Subcontractors. No Subcontracting of any of the Work shall relieve Contractor from its responsibility for the performance of the Work in accordance with the Contract Documents or any other obligations of the Contract Documents.

E. Automatic assignment of subcontracts: Each subcontract agreement for a portion of the Work is hereby assigned by Contractor to Owner provided that:

1. Effective only after termination and Owner approval: The assignment is effective only after termination by Owner for cause pursuant to Section 9.01 and only for those Subcontracts which Owner accepts by notifying the Subcontractor in writing; and

2. Owner assumes Contractor's responsibilities: After the assignment is effective, Owner will assume all future duties and obligations toward the Subcontractor which Contractor assumed in the Subcontract.

3. Impact of bond: The assignment is subject to the prior rights of the surety, if any, obligated under any bond provided in accordance with the Contract Documents.

5.21 WARRANTY OF CONSTRUCTION

A. Contractor warranty of Work: In addition to any special warranties provided elsewhere in the Contract Documents, Contractor warrants that all Work conforms to the requirements of the Contract Documents and is free of any defect in equipment, material, or design furnished, or workmanship performed by Contractor.

B. Contractor responsibilities: With respect to all warranties, express or implied, for Work performed or materials furnished according to the Contract Documents, Contractor shall:

1. Obtain warranties: Obtain, assign if requested, and furnish directly to Owner, all warranties that would be given in normal commercial practice or that are required by the Contract Documents, first executed by the applicable Subcontractor and those suppliers and manufacturers furnishing materials for the Work, and subsequently countersigned by Contractor, which shall extend to Owner all rights, claims, benefits and interests that Contractor may have under express or implied warranties or guarantees against the Subcontractor, supplier or manufacturer for defective or non-conforming Work;

2. Warranties for benefit of Owner: Require all warranties to be executed, in writing, for the benefit of Owner;

3. Enforcement of warranties: Enforce all warranties for the benefit of Owner, if directed by Owner; and
4. **Contractor responsibility for subcontractor warranties:** Be responsible to enforce any subcontractor’s, manufacturer’s, or supplier’s warranties should they extend beyond the period specified in the Contract Documents.

C. **Warranties beyond Final Acceptance:** The obligations under this section shall survive Final Acceptance.

5.22 **INDEMNIFICATION**

A. **Contractor to indemnify Owner:** To the fullest extent permitted by law, Contractor shall defend, indemnify, and hold Owner and A/E, their consultants, and agents and employees, directors, officers, lenders, successors and assigns of any of them (collectively, the "Indemnified Parties"), harmless from and against all third-party claims, demands, losses, damages, or costs, including but not limited to damages arising out of bodily injury or death to persons and damage to property, direct and indirect, or consequential (including but not limited to costs and attorneys' fees incurred on such claims or in proving the right to indemnification), arising out of, caused by or resulting from:

1. **Sole negligence of Contractor:** The sole negligence or willful misconduct of Contractor or any of its Subcontractors, their agents and anyone directly or indirectly employed by them or anyone for whose acts they may be liable ("Indemnitor");

2. **Concurrent negligence:** The concurrent negligence of Indemnitor, but only to the extent of the negligence of Indemnitor; and

3. **Patent infringement:** The use of any design, process, or equipment that constitutes an infringement of any United States patent presently issued, or violates any other proprietary interest, including copyright, trademark, and trade secret, unless specifically directed to use such design, process, or equipment by Owner.

The obligations of Contractor under this Section 5.22 shall not be construed to negate, abridge, or otherwise reduce any other right or obligations of indemnity that would otherwise exist as to any party or person described in this Section. To the extent the wording of this Section 5.22 would reduce or eliminate the insurance coverage of Owner or Contractor, this Section 5.22 shall be considered modified to the extent that such insurance coverage is not affected. To the extent that any portion of this Section 5.22 is stricken by a court or arbitrator for any reason, all remaining provisions shall retain their vitality and effect. The provisions of this Section 5.22 shall survive completion, acceptance, final payment and termination of the Contract.

B. **Employee action and RCW Title 51:** In any action against Owner and any other entity indemnified in accordance with this section, by any employee of Contractor, its Subcontractors, Sub-subcontractors, agents, or anyone directly or indirectly employed by any of them, the indemnification obligation of this section shall not be limited by a limit on the amount or type of damages, compensation, or benefits payable by or for Contractor or any Subcontractor under RCW Title 51, the Industrial Insurance Act, or any other employee benefit acts. In addition, Contractor waives immunity as to Owner and A/E only, in accordance with RCW Title 51.

**PART 6 - PAYMENTS AND COMPLETION**

6.01 **CONTRACT SUM**

**Owner shall pay Contract Sum:** Owner shall pay Contractor the Contract Sum plus Washington State sales tax for performance of the Work, in accordance with the Contract Documents.
6.02 SCHEDULE OF VALUES

Contractor to submit Schedule of Values: Before submitting its first Application for Payment, Contractor shall submit to Owner for approval a breakdown allocating the total Contract Sum to each principal category of work, in such detail as requested by Owner (“Schedule of Values”). The approved Schedule of Values shall allocate at least the percentage of the original Contract Sum so designated in the Contract Documents to that portion of the Work between Substantial Completion and Final Completion to recognize not-yet-earned costs for demobilization, Project Record, O&M manuals, and any other requirements for Project closeout and in advancing the Work from Substantial Completion to Final Completion. The approved Schedule of Values shall be used by Owner as a basis for reviewing progress payments. Payment for Work shall be made only for and in accordance with those items included in the Schedule of Values.

6.03 APPLICATION FOR PAYMENT

A. Monthly Application for Payment with substantiation: At monthly intervals, unless determined otherwise by Owner, Contractor shall submit to Owner an itemized Application for Payment for Work (using Owner’s form) completed in accordance with the Contract Documents and the approved Schedule of Values. Each application shall be supported by such substantiating data as Owner may require.

B. Contractor certifies Subcontractors paid: By submitting an Application for Payment, Contractor is certifying that all Subcontractors have been paid, less earned retainage in accordance with RCW 60.28.011, as their interests appeared in the last preceding Application for Payment. By submitting an Application for Payment, Contractor is recertifying that the representations set forth in Section 1.03 are true and correct, to the best of Contractor’s knowledge, as of the date of the Application for Payment. Owner has the right to request written evidence from Contractor that Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by Owner to Contractor for subcontracted Work. Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Owner shall not have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

C. Reconciliation of Work with Progress Schedule: At the time it submits an Application for Payment, Contractor shall analyze and reconcile, to the satisfaction of Owner, the actual progress of the Work with the Progress Schedule. The submission of an Application for Payment constitutes a certification that the Work is current on the Progress Schedule.

D. Payment for material delivered to site or stored off-site: If authorized by Owner, the Application for Payment may include request for payment for material delivered to the Project site and suitably stored, or for completed preparatory work. Payment may similarly be requested for material stored off the Project site, provided Contractor complies with or furnishes satisfactory evidence of the following:

1. Suitable facility or location: The material will be placed in a facility or location that is structurally sound, dry, lighted and suitable for the materials to be stored or otherwise approved by Owner;

2. Facility or location within 10 miles of Project: The facility or location is located within a 10-mile radius of the Project. Other locations may be utilized, if approved in writing, by Owner;
3. **Facility or location exclusive to Project’s materials:** Only materials for the Project are stored within the facility or location (or a secure portion of a facility or location set aside for the Project);

4. **Insurance provided on materials in facility or location:** Contractor furnishes Owner a certificate of insurance extending Contractor’s insurance coverage for damage, fire, and theft to cover the full value of all materials stored, or in transit;

5. **Facility or location locked and secure:** The facility or location (or secure portion thereof) is continuously under lock and key, and only Contractor’s authorized personnel shall have access;

6. **Owner right of access to facility or location:** Owner shall at all times have the right of access in company of Contractor;

7. **Contractor assumes total responsibility for stored materials:** Contractor and its surety assume total responsibility for the stored materials; and

8. **Contractor provides documentation and Notice when materials moved to site:** Contractor furnishes to Owner certified lists of materials stored, bills of lading, invoices, and other information as may be required, and shall also furnish Notice to Owner when materials are moved from storage to the Project site.

### 6.04 PROGRESS PAYMENTS

A. **Owner to pay within 30 Days:** Owner shall make progress payments, in such amounts as Owner determines are properly due, within 30 Days after receipt of a properly executed Application for Payment. Owner shall notify Contractor in accordance with chapter 39.76 RCW if the Application for Payment does not comply with the requirements of the Contract Documents.

B. **Withholding retainage; Options for retainage:** Owner shall retain 5% of the amount of each progress payment until 45 Days after Final Acceptance and receipt of all documents required by law or the Contract Documents, including, at Owner’s request, consent of surety to release of the retainage. In accordance with chapter 60.28 RCW, Contractor may request that monies reserved be retained in a fund by Owner, deposited by Owner in a bank or savings and loan, or placed in escrow with a bank or trust company to be converted into bonds and securities to be held in escrow with interest to be paid to Contractor. Owner may permit Contractor to provide an appropriate bond in lieu of the retained funds.

C. **Title passes to Owner upon payment:** Title to all Work and materials covered by a progress payment shall pass to Owner at the time of such payment free and clear of all liens, claims, security interests, and encumbrances. Passage of title shall not, however, relieve Contractor from any of its duties and responsibilities for the Work or materials, or waive any rights of Owner to insist on full compliance by Contractor with the Contract Documents. A progress payment, or partial or entire use or occupancy of the Project by Owner, shall not constitute acceptance of Work.

D. **Interest on unpaid balances:** Payments due and unpaid in accordance with the Contract Documents shall bear interest as specified in chapter 39.76 RCW.
6.05  **PAYMENTS WITHHELD**

A. **Owner’s right to withhold payment**: Owner may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any payment to such extent as may be necessary to protect Owner from loss or damage for reasons including but not limited to:

1. **Non-compliant Work**: Work not in accordance with the Contract Documents;

2. **Remaining Work to cost more than unpaid balance**: Reasonable evidence that the Work required by the Contract Documents cannot be completed for the unpaid balance of the Contract Sum;

3. **Owner correction or completion of Work**: Work by Owner to correct defective Work or complete the Work in accordance with Section 5.16;

4. **Third party claims for which Contractor may be responsible**: Claims (except where an insurer has unconditionally accepted coverage without prior payment of any deductibles or self-insured retentions) filed or reasonable evidence indicating probable filing of such claims unless Contractor provides security acceptable to Owner;

5. **Failure to pay Subcontractor**: The failure of Contractor to make payments to Subcontractors for labor, materials or equipment;

6. **Damages**: Damage to Owner or a separate contractor (except where an insurer has unconditionally accepted coverage);

7. **Affidavits of Wages Paid**: Failure to submit affidavits pertaining to wages paid as requested or otherwise required by statute;

8. **Progress Schedule**: Failure to submit a properly updated Progress Schedule;

9. **Maintenance of Project Record**: Failure to properly maintain as the Project Record;

10. **Other construction records**: Failure to properly submit any other required construction reports or records;

11. **Certified payrolls**: Failure to properly submit certified payrolls when requested;

12. **Contractor’s failure to perform**: Contractor’s failure otherwise to perform in accordance with the Contract Documents;

13. **Contractor’s negligent acts or omissions**: Cost or liability that may occur to Owner as the result of Contractor’s fault or negligent acts or omissions.

B. **Owner to notify Contractor of withholding for unsatisfactory performance**: In any case where part or all of a payment is going to be withheld for unsatisfactory performance, Owner shall notify Contractor in accordance with chapter 39.76 RCW.

6.06  **RETAI NAGE, BOND CLAIM RIGHTS, AND LIENS**

A. **Chapters 39.08 RCW and 60.28 RCW incorporated by reference**: Chapters 39.08 RCW and 60.28 RCW, concerning the rights and responsibilities of Contractor and Owner with regard to the performance and payment bonds and retainage, are made part of the Contract Documents by reference as though fully set forth herein.
B. **Liens:** Contractor shall promptly pay (and secure the discharge of any liens asserted by) all persons properly furnishing labor, equipment, materials or other items in connection with the performance of the Work (including, but not limited to, any Subcontractors) to the extent that Owner has paid Contractor for this Work. Owner may, at its option, withhold payment, in whole or in part, to Contractor until lien and claim releases are furnished. Contractor may provide other security acceptable to Owner, such as a bond, in lieu of paying disputed liens or claims. Contractor shall defend, indemnify, and hold harmless Owner from any liens, including all expenses and attorneys’ fees, except to the extent a lien has been recorded because of a failure of payment by Owner for the Work implicated in any such lien.

6.07 **SUBSTANTIAL COMPLETION**

A. **Substantial Completion defined:** Substantial Completion is the stage in the progress of the Work (or portion thereof designated and approved by Owner) when the construction is sufficiently complete, in accordance with the Contract Documents, so Owner has full and unrestricted use and benefit of the facilities (or portion thereof designated and approved by Owner) for the use for which it is intended, the Project has been constructed in substantial accordance with the Contract Documents, and at a minimum the following elements have been accomplished (see also, Section 01 70 00 Project Completion):

1. A written punch list has been prepared;
2. The Authority Having Jurisdiction has granted a certificate of occupancy; and
3. The first final draft of the Operation and Maintenance manuals has been submitted to Owner.

All Work other than incidental corrective or punch list work shall be completed. Substantial Completion shall not have been achieved if the Work cannot achieve Final Completion within the time specified in the Agreement. The date Substantial Completion is achieved shall be established in writing by Owner. Contractor may request an early date of Substantial Completion which must be approved by Change Order. Owner’s occupancy of the Work or designated portion thereof does not necessarily indicate that Substantial Completion has been achieved.

B. **Contractor to provide weekly reports before Substantial Completion:** Beginning at least 30 Days before the scheduled date of Substantial Completion, Contractor shall prepare reports weekly, identifying items to be completed in order to obtain necessary occupancy certificates and permits, and make recommendations to Owner for effectuating the earliest possible completion. When Contractor considers that the Work, or a portion thereof that Owner agrees to accept separately, has achieved Substantial Completion, Contractor shall prepare and submit to Owner a comprehensive list of items to be completed or corrected prior to final payment. Contractor shall proceed promptly to complete and correct items on the list. Failure to include an item on the list does not alter the responsibility of Contractor to complete all Work in accordance with the Contract Documents.

C. **Owner to determine if Work is complete:** Upon receipt of Contractor’s list, Owner will make an inspection to determine whether the Work or designated portion thereof has achieved Substantial Completion. If Owner’s inspection discloses any item, whether or not included on Contractor’s list, that is not sufficiently complete in accordance with the Contract Documents so that Owner can occupy or utilize the Work or designated portion thereof for its intended use, Contractor shall, before the occurrence of Substantial Completion, complete or correct the item upon notification by Owner, and Contractor shall then submit a request for another inspection by Owner to determine Substantial Completion. If Owner determines that the Work or designated portion has not achieved Substantial Completion, Contractor shall expeditiously complete the Work or
designated portion, again request an inspection, and pay the costs associated with the re-inspection.

D. **Owner may take over punch list:** If, at 30 Days after the date of Substantial Completion, Owner considers that the remaining items on its list (“punch list”) are unlikely to be completed within the time period specified in the Contract Documents for Final Completion, Owner may, upon seven Days’ written Notice to Contractor, take over and perform some or all of the punch list items. If Contractor fails to correct the deficiencies within the time period specified, Owner may deduct the actual cost of performing this punch list work, including any design costs, plus ten 10% to account for Owner’s transaction costs, from the Contract Sum.

E. **Owner to establish date of Substantial Completion:** When the Work or designated portion thereof has achieved Substantial Completion, Owner shall establish the date of Substantial Completion in writing, establish responsibilities of Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and fix the time within which Contractor shall finish all items on the list accompanying the document. The writing establishing Substantial Completion shall be submitted to Contractor for its written acceptance of the responsibilities assigned to it. Any items not included in the document but required or necessary for Final Completion of the Work shall be supplied and installed by Contractor as a part of the Contract Sum, notwithstanding their not being included in the punch list. Upon written acceptance of the writing establishing Substantial Completion by Contractor and Owner, and upon Contractor’s Application for Payment, Owner shall make payment as provided in the Contract Documents. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents. No further payment will be due or owing until the payment following Final Completion.

F. **Contractor to complete punch list in timely manner:** Contractor shall prepare, continue to monitor, and cause to be completed, all punch lists with respect to the activity of each Subcontractor and report weekly to Owner on outstanding punch list items.

### 6.08 PRIOR OCCUPANCY

**A. Prior Occupancy defined; Restrictions:** Owner may, when legally permissible to do so and upon written Notice to Contractor, take possession of or use any completed or partially completed portion of the Work (“Prior Occupancy”) at any time prior to Substantial Completion, and Contractor shall cooperate with such occupancy and use and the establishment of a punch list. Unless otherwise agreed in writing, Prior Occupancy shall not: be deemed an acceptance of any portion of the Work; accelerate the time for any payment to Contractor; prejudice any rights of Owner provided by any insurance, bond, guaranty, or the Contract Documents; relieve Contractor of the risk of loss or any of the obligations established by the Contract Documents; establish a date of Substantial or Final Completion; establish a date for termination or partial termination of the assessment of liquidated damages; or constitute a waiver of claims.

**B. Damage; Duty to repair and warranties:** Notwithstanding anything in the preceding paragraph, Owner shall be responsible for loss of or damage to the Work resulting from Prior Occupancy. Contractor’s one year duty to repair any system warranties shall begin on building systems activated and used by Owner as agreed in writing by Owner and Contractor.

### 6.09 FINAL COMPLETION, ACCEPTANCE, AND PAYMENT

**A. Final Completion defined:** Final Completion shall be achieved when the Work is fully and finally complete in accordance with the Contract Documents. The date Final Completion is achieved shall be established by Owner in writing, but in no case shall it constitute Final Acceptance, which is a subsequent, separate, and distinct action (see also, Section 01 70 00 Project Completion).
B. **Final Acceptance defined:** Unless otherwise determined by Owner, Final Acceptance shall be achieved after Contractor has completed all the requirements of the Contract Documents. The date Final Acceptance is achieved shall be established by Owner in writing. Pursuant to RCW 60.28, "Lien for Labor, Materials, Taxes on Public Works," completion of the Contract Work shall occur upon Final Acceptance. Neither Final Acceptance nor final payment shall release Contractor or its sureties from any obligations of these Contract Documents or the payment and performance bonds, or constitute a waiver of any claims by Owner arising from Contractor’s failure to perform the Work in accordance with the Contract Documents (see also, Section 01 70 00 Project Completion).

C. **Final payment waives Claim rights:** Acceptance of final payment by Contractor or any Subcontractor shall constitute a waiver and release to Owner of all claims by Contractor or any such Subcontractor for an increase in the Contract Sum or the Contract Time, and for every act or omission of Owner relating to or arising out of the Work, except for those Claims made in accordance with the procedures, including the time limits, set forth in Part 8.

**PART 7 - CHANGES**

**7.01 CHANGE IN THE WORK**

**A. Changes in the Work:** Changes in the Work may be accomplished after execution of the Contract without invalidating the Contract. Changes in the Work that adjust the Contract Sum and/or Contract Time are incorporated into the Contract solely by Change Order and are subject to the limitations stated in this Part 7 and elsewhere in the Contract Documents. A Change Order may be bilateral or unilateral, as described below. Change Orders may be initiated by mutual agreement or through a Contract Change Proposal ("CCP") or Work Directive ("WD").

**B. Change Orders:**

1. A Bilateral Change Order is signed by Owner and Contractor to record their agreement on the terms of a change in the Work. A Bilateral Change Order may reflect the agreement of Owner and Contractor on a standalone issue, or it may incorporate one or more mutually agreed upon CCPs or WDs. A Bilateral Change Order shall constitute full payment and final settlement of all claims for time and cost, including direct, indirect, impact and consequential costs, related to the Change Order and Work covered by, affected by and related to the events giving rise to the Change Order.

2. A Unilateral Change Order is initially signed only by Owner to set forth, subject to the Contract, the terms of a change in the Work based upon one or more CCPs and/or WDs to which the parties have not yet fully agreed. Within 7 Days of its receipt of a Unilateral Change Order, Contractor shall notify Owner in writing either (a) of its acceptance of its terms, in which case the Unilateral Change Order will automatically become a Bilateral Change Order, or (b) of Contractor's rejection, in which case Contractor must submit a written rejection within 14 Days after Contractor delivered written Notice of rejection to Owner as noted above. The written rejection must fully explain the reasons for rejecting the Unilateral Change Order and include all necessary supporting documentation. The rejection will then be considered in accordance with Section 8.02 (Informal Resolution of Disputes). Failure to submit a written Notice of rejection within 7 Days of Contractor's receipt of a Unilateral Change Order or a written rejection with 14 Days shall constitute Contractor’s acceptance of the terms of the Unilateral Change Order.
C. Change Orders via Contract Change Proposal:

1. Contractor shall be responsible for maintaining an Issues Log. If Contractor at any time believes that a change in the Work has or may have occurred, Contractor shall add such item to the Issues Log. At a minimum, the Issues Log shall identify:

   a. Detailed scope of the change in the Work;

   b. Contract Time impact noting specifically how it impacted the critical path of the project, if any;

   c. The amount of any anticipated, proposed, or approved change in the Contract Sum;

   d. Date first included on the Issues Log;

   e. Owner-initiated or Contractor-initiated; and

   f. Action status.

2. If the Contractor believes an item on the Issues Log warrants a CCP, Contractor shall provide written Notice to Owner in accordance with Section 8.02, and shall submit a written CCP in accordance with this Section. All CCPs shall be substantiated and submitted within 7 Days of being added to the Issues Log along with a revised progress schedule identifying the time impact affecting the critical path, if any. The CCP shall identify the proposed full compensation for implementing the proposed change in the Work, including any adjustment in the Contract Sum or Contract Time. Upon receipt of the CCP, Owner may accept the proposal and incorporate it into a Bilateral Change Order, reject the proposal and either issue a WD or elect not to proceed with the proposal, request further documentation, or negotiate acceptable terms with Contractor.

D. Work Directives:

1. A WD is a written order prepared by Owner that directs Contractor to perform Work prior to total agreement on an adjustment, if any, in the Contract Sum and/or Contract Time. Owner may direct Contractor, at any time and without invalidating the Contract, through a WD to proceed with a change in the Work or to perform Work that Contractor contends to be a change in the Work, with or without the agreement of Contractor and prior to agreement of the basis for adjustment, if any, to the Contract. Owner’s use of a WD does not constitute agreement that the directive constitutes a change in the Work, the Contract Sum or the Contract Time.

2. A WD normally includes:

   a. The scope of the directed Work,

   b. Any proposed adjustment to the Contract Sum or not-to-exceed amount,

   c. Any proposed change to the Contract Time,

   d. The proposed method of determining any change in the Contract Sum and/or Contract Time, and
e. The supporting data that Contractor must submit in accordance with the requirements of Part 7 of the General Conditions.

3. Upon receipt of a WD, Contractor shall promptly commence and proceed diligently with performance of the directed Work. Within 7 Days of its receipt of a WD, Contractor shall notify Owner in writing either (a) of its acceptance of its terms, in which case the terms will become effective, and the WD will be incorporated into a Bilateral Change Order, or (b) of Contractor’s rejection of the terms, in which case Contractor must submit a written rejection within 14 Days after Contractor delivered written Notice to Owner as noted above. The written rejection must fully explain the reasons for rejecting the WD and include all necessary supporting documentation. The rejection will then be considered in accordance with Section 8.02. Contractor’s rejection of a WD shall not relieve Contractor of its obligation to comply promptly with the WD.

E. Contractor fault or negligence alleged as basis for change in Contract Sum: No change in the Contract Sum shall be allowed to the extent Contractor’s changed cost of performance is due to the fault or negligence of Contractor or anyone for whose acts Contractor is responsible; or to the extent Contractor is responsible for change concurrently caused by Contractor and Owner; or to the extent the change is caused by an act of Force Majeure as defined in Section 3.05.

7.02 CHANGE IN THE CONTRACT SUM

A. General Application

1. Contract Sum changes only by Change Order: The Contract Sum shall only be changed by a Change Order.

2. Allowances: Any Allowances stated in the Contract Documents shall be included in the Contract Sum. Items covered by Allowances shall be supplied for such amounts and by such persons or entities as Owner may direct, but Contractor shall not be required to employ persons or entities to whom Contractor has made reasonable and timely objection. Owner shall select materials and equipment under an Allowance with reasonable promptness. Allowances shall cover the net cost to Contractor of materials and equipment delivered and/or installed at the site, as identified in the Allowance, and all required taxes, less applicable trade discounts. Whenever actual costs are more than or less than Allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect the difference between actual, reasonable costs and the Allowances.

3. Pricing Components: Contractor shall maintain and submit a complete itemization of the costs incurred as a result of any change in the Work, including labor, material, Subcontractor costs, and fee. The total cost of any change in the Work or of any other increase or decrease in the Contract Sum, including a Claim, shall be limited to the actual, reasonable amounts for the following components, itemized in the manner set forth below and submitted on breakdown sheets in a form approved by Owner. If the total cost of the change in the Work does not exceed $5,000.00, Contractor shall not be required to submit a breakdown if the description of the change in the Work is sufficiently definitive for Owner to determine fair value.

a. Labor costs: The labor cost component is determined by multiplying the estimated or actual additional number of hours needed to perform the change in the Work by the fully burdened hourly labor costs. The fully burdened hourly costs shall include the following:
(1) **Basic wages and benefits:** Hourly rates and benefits as stated on the Department of Labor and Industries approved “Statement of Intent to Pay Prevailing Wages” shall be applicable unless a high, documented amount is actually paid by a contractor for the laborers, apprentices, journeymen, foremen, and other staff performing and/or directly supervising the change in the Work at the site. Any amount in excess of approved “Statement of Intent to Pay Prevailing Wages” shall be substantiated and subject to audit.

(2) **Worker’s insurance:** Direct contributions to the State of Washington for industrial insurance; medical aid; and supplemental pension, by the class and rates established by the Department of Labor and Industries.

(3) **Federal insurance:** Direct contributions required by the Federal Insurance Compensation Act; Federal Unemployment Tax Act; and the State Unemployment Compensation Act.

(4) **Supervision:** The labor cost component may include the actual, demonstrated additional supervision hours (not already compensated by Owner) directly related to a change in the Work.

(5) **Travel and Per Diem allowance:** Travel allowance and/or subsistence, if applicable, required by regional labor union agreements, which are itemized and identified separately.

b. **Material costs:** The material cost component must be itemized and include material invoices or reasonable lump-sum estimates of the quantity and cost of additional materials needed to perform the change in the Work. Material costs shall be developed first from actual known costs; second from supplier quotations; and, if neither of these is available, then from standard industry pricing guides acceptable to Owner. Material costs shall consider all available discounts. Freight costs, express charges, or special delivery charges shall be itemized.

c. **Equipment costs:** The equipment cost component must be itemized by the type of equipment and include the estimated or actual length of time the construction equipment appropriate for the Work is or will be used on the change in the Work on site. Costs will be allowed for construction equipment only to the extent used solely for the changed Work, or for additional rental costs actually incurred by Contractor solely for the changed Work. Equipment charges shall be computed on the basis of actual invoice costs or, if owned, from the current edition of the Associated General Contractors Washington State Department of Transportation (AGC WSDOT) Equipment Rental Agreement current edition as of the Contract execution date. The EquipmentWatch Rental Rate Blue Book shall be used as a basis for establishing rental rates of equipment not listed in the above source. The maximum rate for standby equipment shall not exceed that shown in the AGC WSDOT Equipment Rental Agreement. The rate for Contractor-owned equipment necessarily standing by for future use on the changed Work shall be no more than 50% of the rate established above unless otherwise approved by Owner. The total rental cost shall not exceed the cost of purchasing the equipment outright.

d. **Subcontractor costs:** The Subcontractor cost component consists of payments Contractor makes to Subcontractors for the cost of changed Work performed by
Subcontractors. Subcontractors’ costs shall be calculated and itemized in the same manner as prescribed herein for Contractor.

e. **Fee:** The Fee component is compensation for all items and costs not listed in subparagraphs a through d above, and is added to the total cost to Owner of the sum of these items. The Fee shall compensate Contractor, Subcontractor and suppliers for, among other things, combined overhead, profit and other costs, including all office, home office and site overhead, employee per diem, subsistence and travel costs not separately reimbursable under subparagraph a above, warranty, safety costs, printing and copying, quality control/assurance, purchasing, small or hand tool (a tool that costs $250 or less and is normally furnished by the performing contractor) or expendable charges, temporary construction facilities, field engineering, schedule updating, Project Record, home office cost, taxes (including all taxes except B&O tax and Washington State sales tax payable based on the amount of the approved Application for Payment), office engineering, estimating costs, additional overhead because of extended time, Claim and change preparation, direct and indirect delay, acceleration or impact, and any other cost incidental to the change in the Work. The Fee shall be strictly limited in all cases to the rates below.

1. **Contractor markup on Contractor Work:** Contractor is allowed a Fee for any Work actually performed by Contractor's own forces of 16% of the first $50,000 of the cost of such Work and 4% of the remaining cost, if any.

2. **Subcontractor markup for Subcontractor Work:** Each Subcontractor (including lower-tier Subcontractors) is allowed a Fee for any Work actually performed by its own forces of 16% of the first $50,000 of the cost of such Work and 4% of the remaining cost, if any.

3. **Contractor markup for Subcontractor Work:** Contractor is allowed a Fee for any Work performed by its Subcontractor(s) of 6% of the first $50,000 of the amount due each Subcontractor for such Work and 4% of the remaining amount, if any.

4. **Subcontractor markup for lower-tier Subcontractor Work:** Each Subcontractor is allowed a Fee for any Work performed by its Subcontractor(s) of any lower-tier of 4% of the first $50,000 of the amount due the lower-tier Subcontractor for such Work and 2% of the remaining amount, if any.

5. **Basis of cost applicable for markup:** The cost of the Work to which the Fee is to be applied shall be based on the cost components in subparagraphs 7.02.A 3.a – d.

6. **Application of Fee:** The Fee shall not be included on deductive changes in the Work. Where a change in the Work involves additive and deductive work by Contractor or the same Subcontractor, the Fee as well as bond and insurance markups will apply to the net difference.

f. **Insurance and bond premiums:** The cost of any change in insurance or bond premium is added to the sum of the cost components in subparagraphs 7.02.A 3.a – e and is limited to the following:
(1) **Contractor's liability insurance:** The cost of any changes in Contractor's contractually required liability insurance arising directly from the Change Order; and

(2) **Payment and Performance Bond:** The cost of any additional premium for Contractor's contractually required bond arising directly from the Change Order.

g **Tax:** Washington State sales tax and B&O tax arising directly from the Change Order shall be added to the cost of the Change Order.

h **Unit Prices:** If Unit Prices, including pre-agreed rates for material quantities, are applicable to a change in the Work, the Unit Prices shall be applied to the quantities of the items involved as determined in Section 7.02A. Quantities must be supported by field measurement statements signed by Owner. Owner shall be afforded access and be permitted to measure quantities. Contractor shall not exceed any cost limit(s) without Owner's prior written approval. Unit Prices shall include reimbursement for all direct and indirect costs of the Work, but exclude Fee (7.02 A.e), bond, and insurance costs (7.02 A.f.).s.

### 7.03 CHANGE IN THE CONTRACT TIME

A. **Changes in Contract Time:** The Contract Time shall only be changed by a Change Order.

B. **Time extension permitted only if delay is not Contractor’s fault:** If Contractor is delayed at any time in the commencement or progress of the Work (1) by an act or neglect of Owner or anyone for whose acts Owner is responsible; or (2) by changes ordered by Owner in the Work; or (3) by Force Majeure; or (4) by delay authorized by Owner pending dispute resolution; or (5) by other causes that Owner determines may justify delay, then Contractor shall reasonably attempt to mitigate the delay, and the Contract Time shall be extended by Change Order for such reasonable time as Owner may reasonably determine consistent with the provisions of the Contract Documents. No adjustment in the Contract Time shall be allowed to the extent Contractor’s changed time of performance is due to the fault or negligence of Contractor or anyone for whose acts Contractor is responsible.

C. **Contractor must demonstrate impact on critical path of schedule:** Any change in the Contract Time covered by a Change Order or Claim shall be limited to the change in the critical path of the Work attributable to the change or event(s) giving rise to the Change Order or Claim. Contractor shall be responsible for showing clearly on the Progress Schedule that the change or event had a specific impact on the critical path and, except in case of concurrent delay, was the sole cause of such impact, and could not have been avoided by resequencing of the Work or other reasonable alternatives in accordance with Section 01 32 13 Project Schedule.

D. **Cost arising from change in Contract Time:** Contractor is entitled to compensation for the cost of a change in Contract Time only if all the following conditions are met:

1. **Must be solely fault of Owner:** The change in Contract Time must solely be caused by the fault or negligence of Owner or others for whom Owner is responsible;

2. **Procedures:** Contractor must follow the procedure set forth in Section 7.03B and Section 8.02;

3. **Demonstrate impact on critical path:** Contractor must establish the extent of the change in Contract Time in accordance with Section 7.03C and Section 01 32 13 Project Schedule.
Schedule. Owner is not obligated directly or indirectly for damages or an increase in the Contract Sum for any delay suffered by a Subcontractor that does not increase the Contract Time; and

4. Cost measured exclusively by the pricing components of Section 7.02A.3: If Contractor or a Subcontractor of any tier is entitled to compensation arising from or related to a change in Contract Time, the pricing components of Section 7.02A.3 shall exclusively be used to measure the actual costs incurred as a result of the change in Contract Time. Neither Contractor nor a Subcontractor of any tier is entitled to payment for costs arising out of actual or alleged loss of efficiency; morale, fatigue, attitude, or labor rhythm; home office overhead; expectant underrun; trade stacking; reassignment of workers; rescheduling of work; concurrent operations; dilution of supervision; learning curve; beneficial or joint occupancy; logistics; ripple; season change; extended overhead; profit upon damages for delay; impact damages, including cumulative impact; or similar damages.

PART 8 - CLAIMS AND DISPUTE RESOLUTION

8.01 CLAIMS

A. Definition: A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of the Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract Documents. The term “Claim” also includes other disputes and matters in question between Owner and Contractor arising out of or relating to the Contract Documents. Claims must be initiated in writing and be made in accordance with the Contract Documents. Neither a CCP, a Request for Information, a Bilateral or Unilateral Change Order, a reservation of rights, minutes of a meeting, a daily report, or a log entry shall constitute a Claim or Notice of a Claim. However, Owner and Contractor may agree in a signed writing to supplement how Contractor can provide a Notice of Claim as specified in this Part 8.

B. Continuing Contract performance: Pending final resolution of a Claim, including the dispute resolution process in Part 8, and except as otherwise agreed in writing or in the Contract Documents, Contractor shall proceed diligently with performance of the Work and maintain the Progress Schedule, and Owner shall continue to make payments of undisputed amounts in accordance with the Contract Documents.

C. Claims for additional cost: If Contractor wishes to make a Claim for an increase in the Contract Sum, written Notice as provided herein shall be given before proceeding to execute the Work, and written Notice and a written Claim must be made in accordance with this Part 8, or it will be waived.

D. Claims for additional time: If Contractor wishes to make a Claim for an increase in the Contract Time, written Notice as provided herein shall be given, and a written Claim must be made in accordance with this Part 8, or it will be waived.

E. Claims for consequential damages: Contractor and Owner waive certain Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes damages incurred by Owner for profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and damages incurred by Contractor for principal and home office overhead and expenses including but not limited to the compensation of personnel stationed there, for loss of financing, business and/or reputation, for losses on other projects, for loss of profit, and for interest or financing costs. This mutual waiver is applicable, without limitation, to all consequential damages due to either party’s termination. Nothing contained in this subparagraph E, however, shall be deemed to preclude an
award of liquidated or other delay damages, when applicable, in accordance with the Contract Documents, or to preclude or limit Contractor’s obligation to procure and maintain the insurance policies required by this Contract or indemnify Owner for damages, including direct, indirect or consequential damages, alleged by a third party.

8.02 INFORMAL RESOLUTION OF DISPUTES

A. Procedure to reduce disputes: In an effort to reduce the incidence and cost to all parties of extended disputes, all disputes, direct or indirect, arising out of or relating to the Contract Documents or the breach thereof, except those that have been waived under the terms of the Contract Documents, shall be decided exclusively by the dispute resolution procedure of Part 8 unless the parties mutually agree in writing otherwise. To the extent that Owner and Contractor agree to a partnering or dispute review process to help address disputes, these processes shall be in addition to, and not in place of, the mandatory contractual dispute resolution procedures.

B. Notice: Except for disputes requiring Notice before proceeding with the affected Work as otherwise described in the Contract Documents, Contractor shall submit a written Notice of any Claim to Owner’s Project Manager, consistent with the requirements of the Contract Documents, within 7 Days of the occurrence of the event giving rise to a dispute. If Contractor did not have actual knowledge of such an event, the written Notice shall be submitted within 7 Days of the date that Contractor reasonably should have been aware of the event. The Notice shall set forth, at a minimum, a description of the event(s) leading to or causing the dispute, the nature of the impacts to Contractor and its Subcontractors, if any, and an estimate of any claimed adjustments in the Contract Sum and/or Contract Time. Without waiving any rights, Owner and Contractor may discuss and attempt to resolve a dispute identified in a Notice of Claim directly with each other or with a third-party neutral or dispute review board if utilized on a Project.

C. Substantiation: If an issue remains unresolved, Contractor shall submit timely written substantiation to support Contractor's position relating to the Notice of Claim. Such substantiation, which shall include an explanation of Contractor's position and any supporting documentation, shall be provided within 30 Days of submitting a Notice. Contractor may delay submitting data by an additional 14 Days if it notifies Owner that substantial data must be assembled.

D. Owner’s Project Manager to make initial decision on all disputes: After Contractor has submitted written substantiation to Owner that complies with all applicable provisions of Parts 7 and 8, as well as Section 01 32 13, Project Schedule, Owner’s Project Manager will endeavor to respond, in writing, to Contractor within 7 Days of the date substantiation is received, or with Notice to Contractor of the date by which Owner’s Project Manager expects to render a decision. If necessary to fully and fairly evaluate an issue, the Project Manager may request additional information or extend the time in which to respond. If the issue is not resolved, or if Project Manager does not respond within the later of 7 Days of the date written substantiation is received or the date specified for rendering a decision, the dispute may be escalated by Contractor to Owner's Assistant Vice President, Facilities Services, Capital as set forth in Section 8.02E below.

E. Contractor may respond to initial decision: The initial decision of the Project Manager will be final and conclusive unless, within 7 Days of the date Contractor receives the initial decision or the date specified for rendering a decision, Contractor notifies Owner's Project Manager in writing of Contractor's disagreement with the initial decision, in which case Contractor must then submit a written rejection to Owner's Assistant Vice President, Facilities Services, Capital within 14 Days. The written rejection must attach the submitted Notice and substantiation and fully explain the reasons for Contractor’s disagreement with the initial decision. It must also include all applicable supporting documentation. Failure to submit a written rejection to Owner’s Assistant Vice
President, Facilities Services, Capital within 14 Days shall constitute Contractor’s acceptance of
the initial decision.

F. Assistant Vice President, Facilities Services, Capital decision: Following Contractor’s full
compliance with the procedure above, Owner’s Assistant Vice President, Facilities Services,
Capital will endeavor to respond in writing to Contractor with a decision within 7 Days of delivery
of the Contractor’s rejection or with Notice to Contractor of the date by which Owner’s Assistant
Vice President, Facilities Services, Capital expects to render a decision. If Owner’s Assistant
Vice President, Facilities Services, Capital does not respond within the later of 7 Days after
delivery of the rejection or the date specified to render a decision, the dispute will be deemed
denied and Contractor may further escalate the dispute as set forth in Section 8.02G below.

G. Claim: If Contractor disagrees with the decision of the Assistant Vice President, Facilities
Services, Capital, or if no decision is timely received, Contractor shall timely submit a Claim if it
wishes to pursue formal dispute resolution or seek additional relief against Owner of any kind. A
Claim must be consistent with the Notice, substantiation and rejection previously provided, be
submitted to Owner in writing within 14 Days of the date the decision of the Assistant Vice
President, Facilities Services, Capital is received by Contractor or due, and comply with
Section 8.04. Any claim of a Subcontractor of any tier may be brought only through, and after
review by, Contractor. Contractor acknowledges and agrees that no additional documentation
from what was submitted to Owner’s Assistant Vice President, Facilities Services, Capital (per
part ‘F’ of this section) may be submitted and considered in any subsequent dispute resolution
proceeding. Contractor’s failure to provide timely information for Owner’s consideration during
the dispute resolution procedure of Part 8 has a substantial impact upon and prejudices Owner,
including but not limited to its inability to fully investigate or verify a Claim, mitigate damages,
choose alternative options, adjust the budget, delete or modify the impacted Work, and/or monitor
time, cost and quantities.

8.03 FORMAL RESOLUTION OF CLAIMS

A. Option for direct discussions: At any time following Contractor’s initiation of formal dispute
resolution, Owner may require that an officer of Contractor and Owner’s Assistant Vice President,
Facilities Services, Capital (all with authority to settle) meet, confer, and attempt to resolve the
Claim. If the Claim is not resolved during such meeting, or if no such meeting is requested,
Contractor may bring no litigation against Owner unless Contractor complies with the procedures
described in Sections 8.03B and C. This requirement cannot be waived except by an explicit
written waiver signed by Owner and Contractor.

B. Mediation:

1. Mediation required: Claims, disputes, or other matters in controversy arising out of or
related to the Contract shall be subject to mediation as a condition precedent to the
initiation of binding dispute resolution. This requirement cannot be waived except by an
explicit written waiver signed by both Owner and Contractor. Unless Owner and
Contractor mutually agree in writing otherwise, all unresolved Claims shall be considered
at a single mediation session that shall occur after Substantial Completion and prior to
Final Acceptance by Owner.

2. Mediation procedure: The parties shall endeavor to resolve Claims by mediation. A
request for mediation shall be delivered in writing to the other party to the Contract, and
the parties shall promptly attempt to mutually agree on a mediator. If the parties do not
agree on a mediator within 30 Days of a party’s demand, the mediation, unless the
parties mutually agree otherwise, shall be administered by the American Arbitration
Association in accordance with its Construction Industry Mediation Procedures in effect
on the date of the Agreement. Mediation shall proceed in advance of binding dispute resolution proceedings.

3. **Mediation fee to be shared**: The parties to the mediation shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction.

4. **Representatives with authority must attend mediation**: Representatives of Contractor and Owner must attend the mediation session in person with authority to settle the Claim. To the extent there are other parties in interest, such as A/E, insurers or Subcontractors, their representatives, also with authority to settle the Claim, shall also attend the mediation session in person.

C. **Litigation**: Contractor may bring no litigation on a Claim unless the Claim has been raised and considered in accordance with the procedures of this Part 8, including mandatory mediation. Contractor shall have the burden to demonstrate in any litigation that it has complied with all requirements of this Part 8. All unresolved Claims of Contractor shall be waived and released unless Contractor has complied with the time limits of the Contract Documents, and litigation is served and filed within 180 Days after the Date of Substantial Completion approved in writing by Owner. This requirement cannot be waived except by an explicit, written waiver signed by Owner and Contractor. The pendency of a mediation, which shall mean the time period between a party's receipt of a written mediation demand and the date of the initial mediation session, shall stay this deadline for serving and filing a lawsuit. The deadline may also be stayed for an additional period by agreement of the parties or court order. Neither Contractor nor a Subcontractor, whether claiming under a bond or lien statute or otherwise, shall be entitled to attorneys’ fees directly or indirectly from Owner (but may recover attorneys’ fees from the bond or statutory retainage fund itself to the extent allowable under law).

8.04 **CLAIMS PROCESS**

A. **Notice and Claims**: Any Notice and any Claim of Contractor, whether under the Contract or otherwise, must be made pursuant to and in strict accordance with the applicable provisions of the Contract Documents. No act, omission, or knowledge, actual or constructive, of Owner or anyone for whose acts Owner is responsible shall in any way be deemed to be a waiver of the requirement for timely written Notice and a timely written Claim unless Owner and Contractor sign an explicit, unequivocal written waiver. The fact that Owner and Contractor may consider, discuss, or negotiate a Claim that has or may have been procedurally or substantively defective or untimely under the Contract shall not constitute a waiver of the provisions of the Contract Documents unless Owner and Contractor sign an explicit, unequivocal written waiver. Contractor acknowledges and agrees that Contractor's failure to timely submit required Notices and/or timely submit Claims has a substantial impact upon and prejudices Owner, including but not limited to its inability to fully investigate or verify the Claim, mitigate damages, choose alternative options, adjust the budget, delete or modify the impacted Work, and/or monitor time, cost and quantities.

B. **Claim must cover all costs and be documented**: A Claim shall be deemed to cover all changes in cost and time (including direct, indirect, impact, and consequential) to which Contractor (and Subcontractors) may be entitled and may not contain reservations of rights without Owner's written approval; any such unapproved reservations of rights shall be without effect. Any requests by Contractor for an adjustment in both the Contract Sum and Contract Time that arise out of the same event(s) shall be submitted together. A Claim must be fully substantiated and documented. At a minimum, a Claim shall contain the following information:
1. **Factual statement of Claim:** A detailed factual statement of the Claim for additional compensation and/or time, if any, providing all necessary dates, locations, and items of Work affected by the Claim, that confirms not only that Contractor suffered the damages claimed, but that the damages claimed were actually a result of the act, event, or condition complained of;

2. **Dates:** The date on which event(s) arose which gave rise to the Claim;

3. **Owner and A/E employee’s knowledgeable about Claim:** The name of each employee of Owner and/or A/E believed to be knowledgeable about the Claim;

4. **Support from Contract Documents:** The specific provisions of the Contract Documents that support the Claim;

5. **Identification of other supporting information:** The identification of any documents and the substance of any oral communications that support the Claim;

6. **Copies of supporting documentation:** Data and copies of any identified documents, other than the Contract Documents, that support the Claim, including without limitation a complete explanation as to why the relief sought is not within the scope of the Contract Documents;

7. **Details on Claim for Contract Time:** If an adjustment in the Contract Time is sought, the specific days and dates for which it is sought; the specific reasons Contractor believes an extension in the Contract Time should be granted, and Contractor's analysis of its Progress Schedule to demonstrate the reason for the extension in Contract Time showing cause and analysis of the resultant delay to the critical path and other information required by the Contract Documents and Section 01 32 13, Project Schedule;

8. **Details on Claim for adjustment of Contract Sum:** If an adjustment in the Contract Sum is sought, the exact amount sought and a breakdown of that amount into the categories and with the detail required by Section 7.02; and

9. **Statement certifying Claim:** A statement certifying, under penalty of perjury, that the Claim is made in good faith, that the supporting cost and pricing data are true and accurate to the best of Contractor's knowledge and belief, that the Claim is fully supported by the accompanying data, and that the amount requested accurately reflects the adjustment in the Contract Sum or Contract Time for which Contractor believes Owner is responsible.

**C. False Claims:** Contractor shall not make any negligent or fraudulent misrepresentations, concealments, errors, omissions, or inducements to Owner in the formation or performance of this Contract. If Contractor or a Subcontractor submits false or frivolous substantiation or a Claim to Owner, which for purposes of this Section 8.01C is defined as substantiation or a Claim based in whole or in part upon a materially incorrect fact, statement, representation, assertion, or record, Owner shall be entitled to collect from Contractor by offset or otherwise (without prejudice to any right or remedy of Owner) any and all costs and expenses, including investigation and consultant costs, incurred by Owner in investigating, responding to, and defending against such false or frivolous substantiation or Claim.

**D. Notification of surety:** Owner may, but is not obligated to, notify Contractor’s surety, if any, of the nature and amount of any claim it may assert against Contractor. If the claim relates to a possibility of Contractor's default, Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.
E. **Liens:** If a Claim relates to or is the subject of a lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice and filing deadlines.

F. **All Claims must be submitted for final resolution within the time period specified by applicable law:** Owner and Contractor shall commence all Claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of this Part 8 and within the time period specified by applicable law.

G. **Waiver of rights:** Any Claim of Contractor against Owner shall be conclusively deemed to have been waived by Contractor unless made in accordance with the requirements of Part 8.

H. **Owner may investigate:** To assist in the review of a Claim, Owner may at any time visit the Project site, communicate directly with Subcontractors, or request additional information (including requesting an audit as authorized below) in order to fully evaluate the issues raised by the Claim.

I. **Owner may audit Claims:** All Claims filed against Owner shall be subject to audit at any time following the filing of the Claim. Failure of Contractor or Subcontractors of any tier to permit Owner access to the books and records of Contractor or Subcontractors of any tier, or to maintain and retain sufficient records to allow Owner to verify all or a portion of the Claim, shall constitute a waiver of the Claim and shall bar any recovery.

J. **Contractor to make documents promptly available:** In support of Owner’s audit of any Claim, Contractor and any Subcontractor shall, upon request, promptly make available to Owner within seven Days of Owner’s request, at the office of Contractor or any requested Subcontractor during normal business hours, at least the following documents and other documents requested by Owner; failure to fully comply with this requirement shall constitute a material breach of contract and waiver of any Claim:

1. Daily time sheets and supervisor’s daily reports;
2. Collective bargaining agreements;
3. Insurance, welfare, and benefits records;
4. Payroll registers;
5. Earnings records;
6. Payroll tax forms;
7. Material invoices, requisitions, and delivery confirmations;
8. Material cost distribution worksheet;
9. Equipment records (list of company equipment, rates, etc.);
11. Contracts between Contractor and each of its Subcontractors, and all lower-tier Subcontractor contracts and supplier contracts;
12. Subcontractors’ and agents’ payment certificates;
13. Cancelled checks (payroll and vendors);

14. Job cost reports, including job cost summary and job cost detail reports, related labor and equipment reports, and monthly totals;

15. Job payroll ledger;

16. Planned resource loading schedules and summaries;

17. General ledger;

18. Cash disbursements journal;

19. Financial statements for all years during performance of the Work. In addition, Owner may require, if it deems it appropriate, additional financial statements for 3 years preceding execution of the Work;

20. Depreciation records on all company equipment whether these records are maintained by the company involved, its accountant, or others;

21. If a source other than depreciation records is used to develop costs for Contractor's internal purposes in establishing the actual cost of owning and operating equipment, all such other source documents;

22. All non-privileged documents which relate to each and every Claim together with all documents which support the amount of any adjustment in the Contract Sum or Contract Time sought by each Claim;

23. Work sheets or software used to prepare and establish the cost components for items of the Claim, including but not limited to labor, benefits and insurance, materials, equipment, Subcontractors, all documents that establish the time periods, individuals involved, the hours for the individuals, and the rates for the individuals;

24. Work sheets, software, and all other documents used by Contractor to prepare its bid;

25. The above items for its Subcontractors; and

26. Any other information in any form or media not expressly protected from discovery by applicable law.

K. Contractor to cooperate and provide facilities for audit: The audit may be performed by employees or representatives of Owner. Contractor and its Subcontractors shall provide adequate facilities acceptable to Owner for the audit during normal business hours. Contractor and all Subcontractors shall make a good faith effort to cooperate with Owner's auditors.

L. Reciprocal RCW 42.56 rights: Contractor agrees, on behalf of itself and Subcontractors, that any invocation of RCW 42.56 at any time by Contractor or a Subcontractor, or their respective representatives, shall initiate an equivalent right to disclosures from Contractor and Subcontractors for the benefit of Owner. Failure to fully comply with these requirements shall constitute a material breach of the Contract and shall constitute a waiver of all Claims by Contractor and any Subcontractor that does not fully comply.
PART 9 - TERMINATION OF THE WORK

9.01 TERMINATION BY OWNER FOR CAUSE

A. 7 Day Notice to Terminate for Cause: Owner may, upon 7 Days written notice to Contractor and to its surety, terminate (without prejudice to any right or remedy of Owner) the Work, or any part of it, for cause upon the occurrence of any one or more of the following events:

1. Contractor fails to prosecute Work: Contractor fails to prosecute the Work or any portion thereof with sufficient diligence to ensure Substantial Completion of the Work within the Contract Time;

2. Contractor bankrupt: Contractor is adjudged bankrupt, makes a general assignment for the benefit of its creditors, or a receiver is appointed on account of its insolvency;

3. Contractor fails to correct Work: Contractor fails in a material way to replace or correct Work not in conformance with the Contract Documents;

4. Contractor fails to supply workers or materials: Contractor repeatedly fails to supply skilled workers or proper materials or equipment;

5. Contractor failure to pay Subcontractors or labor: Contractor repeatedly fails to make prompt payment due to Subcontractors or for labor;

6. Contractor violates laws: Contractor materially disregards or fails to comply with laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction; or

7. Contractor in material breach of Contract: Contractor is otherwise in material breach of any provision of the Contract Documents.

B. Owner’s actions upon termination: Upon termination, Owner may at its option:

1. Take possession of Project site: Take possession of the Project site and take possession of or use all materials, equipment, tools, and construction equipment and machinery thereon owned by Contractor to maintain the orderly progress of, and to finish, the Work;

2. Accept assignment of Subcontracts: Accept assignment of subcontracts pursuant to Section 5.20; and

3. Finish the Work: Finish the Work by whatever other reasonable method it deems expedient.

C. Surety’s role: Owner’s rights and duties upon termination are subject to the prior rights and duties of the surety, if any, obligated under any bond provided in accordance with the Contract Documents.

D. Contractor’s required actions: When Owner terminates the Work in accordance with this section, Contractor shall take the actions set forth in paragraph 9.02B, and shall not be entitled to receive further payment until the Work is accepted.

E. Contractor to pay for unfinished Work: Contractor shall not be entitled to receive further payment until the Work is finished. If the unpaid balance of the Contract Sum exceeds the cost of finishing the Work, including compensation for A/E’s services and expenses made necessary thereby and any other extra costs or damages incurred by Owner in completing the Work, or as a result of
Contractor’s actions, such excess shall be paid to Contractor. If such costs exceed the unpaid balance, Contractor shall pay the difference to Owner. These obligations for payment shall survive termination.

F. Contractor and Surety still responsible for Work performed: Termination of the Work in accordance with this section shall not relieve Contractor or its surety of any responsibilities for Work performed.

G. Conversion of “Termination for Cause” to “Termination for Convenience”: If Owner terminates Contractor for cause and it is later determined that none of the circumstances set forth in paragraph 9.01A exist, then such termination shall be deemed a termination for convenience pursuant to Section 9.02.

9.02 TERMINATION BY OWNER FOR CONVENIENCE

A. Owner Notice of Termination for Convenience: Owner may, upon written notice, terminate (without prejudice to any right or remedy of Owner) the Work, or any part of it, for the convenience of Owner.

B. Contractor response to termination Notice: Unless Owner directs otherwise, after receipt of a written notice of termination for either cause or convenience, Contractor shall promptly:

1. Cease Work: Stop performing Work on the date and as specified in the notice of termination;

2. No further orders or Subcontracts: Place no further orders or subcontracts for materials, equipment, services or facilities, except as may be necessary for completion of such portion of the Work as is not terminated;

3. Cancel orders and Subcontracts: Cancel all orders and subcontracts, upon terms acceptable to Owner, to the extent that they relate to the performance of Work terminated;

4. Assign orders and Subcontracts to Owner: Assign to Owner all of the right, title, and interest of Contractor in all orders and subcontracts;

5. Take action to protect the Work: Take such action as may be necessary or as directed by Owner to preserve and protect the Work, Project site, and any other property related to this Project in the possession of Contractor in which Owner has an interest; and

6. Continue performance not terminated: Continue performance only to the extent not terminated.

C. Terms of adjustment in Contract Sum if Contract terminated: If Owner terminates the Work or any portion thereof for convenience, Contractor shall be entitled to make a request for an equitable adjustment for its reasonable direct costs incurred prior to the effective date of the termination, plus reasonable allowance for overhead and profit on Work performed prior to termination, plus the reasonable administrative costs of the termination, but shall not be entitled to any other costs or damages, whatsoever, provided however, the total sum payable upon termination shall not exceed the Contract Sum reduced by prior payments. Contractor shall be required to make its request in accordance with the provisions of Part 7.

D. Owner to determine whether to adjust Contract Time: If Owner terminates the Work or any portion thereof for convenience, the Contract Time shall be adjusted as determined by Owner.
9.03 TERMINATION BY CONTRACTOR FOR CAUSE

A. Contractor termination: Except as provided by RCW 60.28.080, Contractor may terminate the Contract for any of the following reasons:

1. Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped permanently;

2. An act of government, such as a declaration of national emergency, that requires all Work to be stopped permanently;

3. Because Owner has improperly not made payment of undisputed amounts within the time stated in the Contract Documents; or

4. The Work is stopped for a period of 60 consecutive Days through no act or fault of Contractor, a Subcontractor, or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with Contractor,

B. Contractor termination procedure: If one of these reasons exists, Contractor may, upon seven Days’ written Notice to Owner (during which period Owner has the opportunity to cure), terminate the Contract and recover from Owner payment for Work executed in accordance with the Contract Documents, including reasonable overhead and profit on Work executed and costs incurred by reason of such termination. The total recovery of Contractor shall not exceed the unpaid balance of the Contract Sum.

PART 10 - MISCELLANEOUS PROVISIONS

10.01 GOVERNING LAW

Applicable law and venue: The Contract Documents and the rights of the parties herein shall be governed by the internal laws of the state of Washington, without regard to its choice-of-law provisions. Venue shall be in the county in which the Project is located, unless otherwise specified.

10.02 SUCCESSORS AND ASSIGNS

Bound to successors; Assignment of Contract: Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to the partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party shall assign the Contract without written consent of the other, except that Contractor may assign the Work for security purposes to a bank or lending institution authorized to do business in the state of Washington. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations set forth in the Contract Documents. If a majority of the ownership or the control of Contractor is acquired by a third party, and such acquisition reasonably imperils performance or creates a conflict of interest that Owner, in its sole discretion, cannot reasonably reconcile, then Owner may terminate this Contract at any time for cause under Section 9.01.

10.03 MEANING OF WORDS

Meaning of words used in Contract Documents: Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings. Reference to standard Specifications, manuals, or codes of any technical society, organization, or association, or to the code of any governmental authority, whether such reference is specific or by implication, shall be to the latest
standard specification, manual, or code in effect on the date for submission of bids, except as may be otherwise specifically stated. Wherever in the Drawings and Specifications an article, device, or piece of equipment is referred to in the singular manner, such reference shall apply to as many such items as are shown on the Drawings, or required to complete the installation.

10.04 RIGHTS AND REMEDIES

A. No waiver of rights: Waiver of any provisions of the Contract Documents must be in writing and authorized by Owner. No other waiver is valid on behalf of Owner. No action, delay in acting, or failure to act by Owner or A/E shall constitute a waiver of a right or duty afforded under the Contract Documents, nor shall action, delay in acting, or failure to act constitute approval or an acquiescence in a breach therein, or otherwise prejudice the right of Owner to enforce a right or remedy at any subsequent time, except as may be specifically agreed in writing.

B. Rights under Contract do not limit other rights: Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

C. If portion of Contract is void, remainder is enforceable: If any portion of this Contract is held to be void or unenforceable, the remainder of the Contract shall be enforceable without such portion.

10.05 CONTRACTOR REGISTRATION AND COMPLIANCE

A. Contractor must be registered and licensed: Pursuant to RCW 39.06, Contractor shall be registered and licensed as required by the laws of the State of Washington, including but not limited to RCW 18.27. Contractor shall also have a current state unified business identifier number; have industrial insurance coverage for Contractor’s employees working in Washington as required in Title 51 RCW; have an employment security department number as required in Title 50 RCW; have a state excise tax registration number as required in Title 82 RCW; and not be disqualified from bidding on any public works contract under RCW 39.06.010 (unregistered or unlicensed contractors) or RCW 39.12.065(3) (prevailing wage violations).

B. Employer contributions: Pursuant to RCW 50.24, "Contributions by Employers," in general and RCW 50.24.130 in particular, Contractor shall pay contributions for wages for personal services performed under this Contract or arrange for a bond acceptable to the Commissioner.

C. Apprenticeship requirements: If the Contract Sum for the Project exceeds one million dollars, Contractor shall comply with all applicable apprenticeship requirements.

10.06 TIME COMPUTATIONS

Computing time: When computing any period of time, the day of the event from which the period of time begins shall not be counted. The last day is counted unless it falls on a weekend or legal holiday, in which event the period runs until the end of the next day that is not a weekend or holiday. When the period of time allowed is less than 7 days, intermediate Saturdays, Sundays, and legal holidays are excluded from the computation.

10.07 RECORDS RETENTION

Six year records retention period: The wage, payroll, and cost records of Contractor, and its Subcontractors, and all records subject to audit in accordance with Section 8.03, shall be retained for a period of not less than 6 years after the date of Final Acceptance.
10.08 THIRD-PARTY AGREEMENTS

No third party relationships created: The Contract Documents shall not be construed to create a contractual relationship of any kind between: A/E and Contractor; Owner and any Subcontractor; or any persons other than Owner and Contractor.

10.09 ANTITRUST ASSIGNMENT

Contractor assigns overcharge amounts to Owner: Owner and Contractor recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact usually borne by the purchaser. Therefore, Contractor hereby assigns to Owner any and all claims for such overcharges as to goods, materials, and equipment purchased in connection with the Work performed in accordance with the Contract Documents, except as to overcharges which result from antitrust violations commencing after the Contract Sum is established and which are not passed on to Owner under a Change Order. Contractor shall put a similar clause in its Subcontracts, and require a similar clause in its sub-Subcontracts, such that all claims for such overcharges on the Work are passed to Owner by Contractor.

10.10 HEADINGS AND CAPTIONS

Headings for convenience only: All headings and captions used in these General Conditions are only for convenience of reference, and shall not be used in any way in connection with the meaning, effect, interpretation, construction, or enforcement of the General Conditions, and do not define the limit or describe the scope or intent of any provision of these General Conditions.

10.11 INDEPENDENT CONTRACTOR

Contractor is independent contractor: Contractor shall be and operate as an independent contractor in the performance of the Work and shall have complete control over and responsibility for all personnel performing the Work. Contractor is not authorized to enter into any agreements or undertakings for or on behalf of Owner or to act as or be an agent or employee of Owner.

10.12 OWNER'S ROLE

Owner's role is limited. Owner will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely Contractor's responsibility under the Contract Documents. The presence of Owner at the Project site shall not in any manner be construed as assurance that the Work is being completed in compliance with the Contract Documents, nor as evidence that any requirement of the Contract Documents of any kind, including Notice, has been met or waived. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Owner will not have control over or charge of and will not be responsible for acts or omissions of Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

END OF SECTION 00 72 00
Good Faith Survey
Veterinary Teaching Hospital (0818)
Washington State University
Pullman, Washington

February 10, 2016

Prepared by:

Stephan Gilley
Environmental Control Technician III
WSU Environmental Health and Safety
AHERA Building Inspector #15-BI-008 (exp. October 14, 2016)
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- Appendix D – Asbestos Chain of Custody Forms and Laboratory Analytical Results
- Appendix E – Laboratory Accreditations and Certificates
- Appendix F – Building Inspector Training Certificate
- Appendix G – Previous Survey Information
1 INTRODUCTION

Washington State University (WSU) Environmental Health and Safety (EH&S) conducted a good faith asbestos survey of the Veterinary Teaching Hospital (VTH) on December 30, 2015 and January 21, 2016. The Veterinary Teaching Hospital is a two-story building built in 1996 at the south end of WSU’s Pullman campus. The majority of the approximately 129,000 gross square feet of space is used for surgical rooms, medical laboratories, animal treatment areas, and administrative offices by the WSU Department of Veterinary Clinical Sciences. This survey was conducted to meet good faith survey requirements for construction, renovation, demolition and maintenance projects at VTH with the following limitations.

1.1 Limitations of the Assessment

The conclusions within this report are professional opinions based solely upon visual site observations and interpretations of analytical data as described in this report. The survey excluded areas of the building which were inaccessible and would have caused damage to the building if sampled. Locations where inspectors would have been exposed to chemical or physical hazards were not tested (e.g., inside fume hoods with active experiments, operating HVAC or building mechanical systems, etc). Typical construction techniques can render portions of the structure inaccessible. As a result, additional asbestos-containing materials (ACM) may be present in inaccessible areas (e.g., wall cavities, within energized systems). Suspect regulated materials within inaccessible areas should be presumed to contain asbestos until characterized. The following specific areas were also excluded from this survey:

- Ground floor: Rooms 9 and 21
- Elevator shaft and pit

The opinions presented herein apply to the site conditions existing at the time of the investigation, and interpretation of current regulations pertaining to asbestos and lead. Opinions and recommendations provided herein may not apply to future conditions that may exist at the site. Regulatory requirements in effect at the time of the work should be verified prior to any work that impacts regulated materials. This report represents the findings of this survey only, and is not intended to establish scope or contractual terms supporting regulated material abatement.

2 METHODOLOGY

This good faith survey was conducted by Stephan Gilley and Matthew McKibbin with EH&S, AHERA Building Inspectors #15-BI-008 and #151417 (exp. October 14, 2016 and April 30, 2016) in December 2015 and January of 2016. Our asbestos survey was performed in accordance with good faith survey requirements outlined in WAC 296-62-07721.

In order to identify suspect ACM, EH&S conducted a walk-through survey of accessible portions of VTH. However, not all concealed areas or sub-surface suspect materials may have been surveyed (see Limiting Conditions in Section 1.1). Approximate quantities of suspect materials were estimated by field observations, measurements and scaled building drawings provided by WSU Facilities Services. Quantities given are intended for order of magnitude information only.

2.1 Asbestos Bulk Sampling

Suspect ACM was grouped into homogeneous sampling areas (HSA) and categorized according to 40 CFR 763, as thermal systems insulation (TSI), surfacing material, or miscellaneous material. The sampling plan included, at a minimum, the collection and analysis of samples as follows:
Thermal System Insulation

- In a distributive manner, a minimum of three samples of each HSA that was not presumed to contain asbestos.
- At least one bulk sample from each homogeneous area of patched TSI if the patch was less than 6 square feet.

Surfacing Material

- In a distributive manner, a minimum of three samples collected from each homogeneous area that was 1,000 square feet or less.
- A minimum of five samples collected from each homogeneous area that was greater than 1,000 square feet but less than or equal to 5,000 square feet.
- A minimum of seven samples collected from each homogeneous area that was greater than 5,000 square feet.

Miscellaneous Material

- In a distributive manner as deemed sufficient by the Inspector. At least one sample was collected of each suspect miscellaneous material not presumed to contain asbestos.

Non-Suspect Materials

- Fiberglass, wood, metal, or other generally recognized non-ACM were not sampled.

Asbestos bulk samples and chain-of-custody forms were delivered to NVL Laboratories (NVL) in Seattle, Washington for analysis. Each sample was analyzed by Polarized Light Microscopy (PLM)/dispersion staining in accordance with EPA Method 600/R-93/116. The detection limit for this type of analysis is approximately one percent (by volume). Materials containing more than one percent asbestos are considered ACM.

In addition to the samples collected on December 30, 2015 and January 21, 2016, three flooring samples were collected by Matthew McKibbin of WSU EH&S on November 1, 2013 as part of a floor renovation project in the 1221 suite. The three gray textured flooring samples were analyzed by Environmental Hazards Services of Richmond, Virginia by Polarized Light Microscopy (PLM)/dispersion staining in accordance with EPA Method 600/R-93/116. Results are included in this survey.

A limited asbestos survey was conducted by Terra Graphics Environmental Engineering, Inc. on December 8, 2006 to support a construction project. Two ceiling tile and three fireproofing samples were collected from Room 1111 E and analyzed by NVL. Each sample was analyzed by Polarized Light Microscopy (PLM)/dispersion staining in accordance with EPA Method 600/R-93/116. Results are included in this survey.

2.2 Limited Lead Paint/Coatings Sampling

The Consumer Product Safety Commission (CPSC) set a limit on lead content in paint and surface coatings of 0.06% (600 ppm) in 1978. The limit was further reduced to 0.009% (90 ppm) in 2009. However, the current limits do not apply toward industrial paints such as that used on mechanical equipment, water tanks, boats, bridges, and parking stripes.

This lead survey was performed to assist employers in efforts to comply with the Washington Labor and Industries (LNI) lead standard for the construction industry (WAC 296-155-176) during renovation/demolition activities. Paint evaluation was limited to large homogeneous surfaces, industrial equipment and exterior paints not regulated by the CPSC for lead content. Representative paints were analyzed by a Niton portable x-ray fluorescence (XRF) spectrometer. Calibration was conducted per manufacturer’s
guidance. XRF results are reported in milligrams per square centimeter (mg/cm²) and paint chip results are reported in parts per million (ppm). Any detection of lead in paint is reported as a lead-containing paint.

3 RESULTS
The following section details the results of asbestos sampling conducted by WSU EH&S. Asbestos and lead sample locations are provided on Figures 1 through 3.

3.1 Visual Inspection
VTH is an irregular shaped two-story structure with roof-top mechanical penthouse built in 1996. The first floor houses the WSU Veterinary Clinic which includes office spaces, surgical suites, pathology laboratories, seminar rooms, animal clinics, and a pharmacy. The ground floor houses the sterilization facility, staff dressing rooms, and storage areas. Structural components include concrete masonry load-bearing walls and steel-concrete decking. One centrally located passenger elevator services the two floors of the building and the mechanical penthouse.

Interior finishes generally consist of gypsum wallboard walls and suspended ceiling grids. Flooring consists of vinyl tile and sheet vinyl in office and laboratory areas. Poured terrazzo flooring is located in the reception area and main hallways. Various floor coatings are applied to the concrete floor of the large animal care area located on the south portion of the first floor. The penthouse roof area consists of unfinished concrete and concrete masonry. The exterior is finished with brick facades and concrete.

The original rolled-on roof consists of a top silver coat layer, rolled-on felts with tar, black foam insulation, perlite board, and an asphaltic vapor barrier adhered to the concrete deck.

3.2 Asbestos
None of the materials sampled during this survey and previous surveys contain detectable quantities of asbestos.

Photographs of common building finishes are found in Appendix A. Appendix B details asbestos survey sample numbers, material descriptions, sample locations and laboratory analytical results. A summary of homogeneous material sampling is provided in Appendix C. Previous survey information is provided in Appendix G.

3.3 Lead Paints and Coatings
The lead paint/coatings survey included testing interior and exterior components of VTH. Eight representative areas were analyzed by a Niton portable x-ray fluorescence (XRF) spectrometer. No lead was detected in the representative areas. XRF sample locations and descriptions are found in Appendix D.
4 CONCLUSIONS

A copy of this report must be provided to any entity bidding on work in VTH. A copy of this report must also be on site during any demolition, renovation and/or construction activities at the site.

4.1 Asbestos-containing Materials

Regulated ACMs were not identified in this survey. Contractors should use caution during construction even after asbestos abatement activities, as concealed ACM that has not previously been evaluated for asbestos may be encountered. Inaccessible concealed spaces (e.g., wall and ceiling spaces enclosed by wallboard, internal components of energized systems etc. have not been surveyed for ACM, and should be presumed to contain asbestos until destructive sampling is performed in those areas.

4.2 Lead-containing Paints/Coatings

Lead-containing paints were not identified during this survey. Materials that have been shown to contain detectable levels of lead are regulated by LNI due to the potential for occupational exposure to lead if these materials are disturbed. Projects that may disturb lead require employers to evaluate worker/project personnel exposure to lead and prevent exposure above the permissible exposure limit (PEL).
Figure 1
Ground Floor Sample Locations

LEGEND
P##### = Asbestos bulk sample location
Figure 2
First Floor Sample Locations

LEGEND
P##### = Asbestos bulk sample location
P##### = Asbestos bulk sample collected by WSU EH&S on November 1, 2013
X-## = XRF lead paint sample location
Figure 3
Penthouse/Roof Sample Locations

Legend
P##### = Asbestos bulk sample location
APPENDIX A
Photographic Log
<table>
<thead>
<tr>
<th>Photo No.</th>
<th>Location:</th>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>First floor corridor</td>
<td>Typical finishes in vet clinic</td>
</tr>
<tr>
<td>2</td>
<td>First floor</td>
<td>Typical 2 foot by 4 feet pin-hole and etch pattern suspended ceiling tiles.</td>
</tr>
<tr>
<td>Photo No.</td>
<td>Location:</td>
<td>Description:</td>
</tr>
<tr>
<td>----------</td>
<td>-----------</td>
<td>--------------</td>
</tr>
<tr>
<td>3</td>
<td>Large animal treatment area on first floor</td>
<td>Gray spray-applied fireproofing is applied to structural steel members and steel decking found above the wallboard ceilings and suspended ceilings in the large animal treatment area (south portion of first floor)</td>
</tr>
<tr>
<td>4</td>
<td>Large animal treatment area (1000C)</td>
<td>Gray poured textured flooring is located throughout the large animal care area</td>
</tr>
<tr>
<td>Photo No.</td>
<td>Location:</td>
<td>Description:</td>
</tr>
<tr>
<td>----------</td>
<td>-----------</td>
<td>--------------</td>
</tr>
<tr>
<td>5</td>
<td>Offices, laboratories, and treatment areas throughout VTH.</td>
<td>Gray speckled sheet vinyl flooring.</td>
</tr>
<tr>
<td>6</td>
<td>Hallways, laboratories, and office spaces throughout VTH.</td>
<td>12-inch white with blue fleck vinyl floor tiles.</td>
</tr>
</tbody>
</table>
### APPENDIX B

**Table Summary of Asbestos Sampling and Analytical Results**

**Veterinary Teaching Hospital**

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Building Name</th>
<th>Building #</th>
<th>Sample Location</th>
<th>Material</th>
<th>Material Description/color</th>
<th>Type</th>
<th>Location</th>
<th>Quantity</th>
<th>Comments</th>
<th>Sample Results</th>
<th>ACM?</th>
<th>Homogenous Material Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>P03020</td>
<td>VTH</td>
<td>0818</td>
<td>1009</td>
<td>Flooring</td>
<td>Layer 1: 12-inch white with blue flecks vinyl floor tile, Layer 2: Yellow mastic</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>Layer 1: ND, Layer 2: ND, Layer 3: ND</td>
<td>No</td>
<td>Dominant floor tile found in corridors and some offices on ground and first floors</td>
</tr>
<tr>
<td>P03023</td>
<td>VTH</td>
<td>0818</td>
<td>1221C</td>
<td>Flooring</td>
<td>Layer 1: Light gray speckled sheet vinyl floor tile, Layer 2: Gray-brown mastic</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>Layer 1: ND, Layer 2: ND</td>
<td>No</td>
<td>Dominant floor tile found in corridors and some offices on ground and first floors</td>
</tr>
<tr>
<td>P03024</td>
<td>VTH</td>
<td>0818</td>
<td>1208</td>
<td>Flooring</td>
<td>Layer 1: 12-inch white with blue flecks vinyl floor tile, Layer 2: Yellow mastic</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>Layer 1: ND, Layer 2: ND</td>
<td>No</td>
<td>Dominant floor tile found in corridors and some offices on ground and first floors</td>
</tr>
<tr>
<td>P03025</td>
<td>VTH</td>
<td>0818</td>
<td>1000 C</td>
<td>Fireproofing</td>
<td>Gray spray-applied fireproofing</td>
<td>Surf.</td>
<td>30,000</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Applied to structural steel members and decking in large animal treatment area (south half of first floor)</td>
</tr>
<tr>
<td>P03026</td>
<td>VTH</td>
<td>0818</td>
<td>1000 C</td>
<td>Fireproofing</td>
<td>Gray spray-applied fireproofing</td>
<td>Surf.</td>
<td>30,000</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Applied to structural steel members and decking in large animal treatment area (south half of first floor)</td>
</tr>
<tr>
<td>P03027</td>
<td>VTH</td>
<td>0818</td>
<td>1000 C</td>
<td>Fireproofing</td>
<td>Gray spray-applied fireproofing</td>
<td>Surf.</td>
<td>30,000</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Applied to structural steel members and decking in large animal treatment area (south half of first floor)</td>
</tr>
<tr>
<td>P03028</td>
<td>VTH</td>
<td>0818</td>
<td>1000 C</td>
<td>Ceiling tile</td>
<td>White solid 2 ft. by 4 ft. suspended ceiling tile</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Large animal treatment area (south half of first floor)</td>
</tr>
<tr>
<td>P03029</td>
<td>VTH</td>
<td>0818</td>
<td>1000 C</td>
<td>Ceiling tile</td>
<td>White solid 2 ft. by 4 ft. suspended ceiling tile</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Large animal treatment area (south half of first floor)</td>
</tr>
<tr>
<td>P03032</td>
<td>VTH</td>
<td>0818</td>
<td>1000 E</td>
<td>Flooring</td>
<td>Layer 1: 12-inch white with blue flecks vinyl floor tile, Layer 2: Yellow mastic</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>Layer 1: ND, Layer 2: ND</td>
<td>No</td>
<td>Dominant floor tile found in corridors and some offices on ground and first floors</td>
</tr>
<tr>
<td>P03033</td>
<td>VTH</td>
<td>0818</td>
<td>1308</td>
<td>Ceiling tile</td>
<td>White pin-hole with etch pattern 2 ft. by 4 ft. suspended ceiling tile</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Dominant ceiling tile found throughout</td>
</tr>
</tbody>
</table>

**Veterinary Teaching Hospital (VTH) Location:**

**1000 C**: 1000 C

**1000 E**: 1000 E

**1000 F**: 1000 F

**1000 B**: 1000 B

**1221 C**: 1221 C

**1208**: 1208

**1002**: 1002

**Visiting Teaching Hospital (VTH) Location:**

**1000 C**: 1000 C

**1000 E**: 1000 E

**1000 F**: 1000 F

**1000 B**: 1000 B

**1221 C**: 1221 C

**1208**: 1208

**1002**: 1002
<table>
<thead>
<tr>
<th>Sample #</th>
<th>Building Name</th>
<th>Building #</th>
<th>Sample Location</th>
<th>Material</th>
<th>Material Description/color</th>
<th>Type</th>
<th>Location Quantity</th>
<th>Quantity Description</th>
<th>Comments</th>
<th>Sample Results</th>
<th>ACM?</th>
<th>Homogenous Material Location</th>
</tr>
</thead>
</table>
| P03034   | VTH           | 0818       | 1610           | Wallboard system | Layer 1: White joint compound  
Layer 2: White gypsum wallboard | Misc. | - | SF |  - | Layer 1: ND  
Layer 2: ND | No | Partition walls and hallways throughout VTH |
| P03035   | VTH           | 0818       | 1211           | Fireproofing | Gray spray-applied fireproofing | Surf. | 30,000 | SF |  - | ND | No | Applied to structural steel members and decking in large animal treatment area (south half of first floor) |
| P03036   | VTH           | 0818       | 1123           | Flooring | Layer 1: Light gray speckled sheet vinyl  
Layer 2: Gray-brown mastic | Misc. | - | SF |  - | Layer 1: ND  
Layer 2: ND | No | Dominant sheet vinyl flooring found throughout most offices, surgical suites and clinic areas |
| P03037   | VTH           | 0818       | 1123           | Ceiling tile | White pin-hole with etch pattern 2 ft. by 4 ft. suspended ceiling tile | Misc. | - | SF |  - | ND | No | Dominant ceiling tile found throughout |
| P03044   | VTH           | 0818       | 10 N           | Flooring | Layer 1: White terrazzo  
Layer 2: Gray terrazzo | Misc. | - | SF |  - | Layer 1: ND  
Layer 2: ND | No | Hallways and stairwell throughout VTH |
| P03045   | VTH           | 0818       | 10             | Wallboard system | Layer 1: Yellow mastic  
Layer 2: White joint compound  
Layer 3: White gypsum wallboard | Misc. | - | SF |  - | Layer 1: ND  
Layer 2: ND  
Layer 3: ND | No | Partition walls and hallways throughout VTH |
| P03046   | VTH           | 0818       | 10 W           | Wallboard system | Layer 1: Yellow mastic  
Layer 2: White joint compound  
Layer 3: White gypsum wallboard | Misc. | - | SF |  - | Layer 1: ND  
Layer 2: ND  
Layer 3: ND | No | Partition walls and hallways throughout VTH |
| P03047   | VTH           | 0818       | 27 A           | Flooring | Layer 1: Light gray speckled sheet vinyl  
Layer 2: Orange mastic | Misc. | - | SF |  - | Layer 1: ND  
Layer 2: ND | No | Dominant sheet vinyl flooring found throughout most offices, surgical suites and clinic areas |
| P03048   | VTH           | 0818       | 35             | Flooring | Layer 1: White with multi-color speckle sheet vinyl  
Layer 2: Yellow mastic  
Layer 3: Gray paper | Misc. | 400 | SF |  - | Layer 1: ND  
Layer 2: ND  
Layer 3: ND | No | Locker rooms and custodial closets |
| P03049   | VTH           | 0818       | 49             | Flooring | Layer 1: Light gray speckled sheet vinyl  
Layer 2: Orange mastic | Misc. | - | SF |  - | Layer 1: ND  
Layer 2: ND | No | Dominant sheet vinyl flooring found throughout most offices, surgical suites and clinic areas |
| P03050   | VTH           | 0818       | 1221 B         | Flooring | Layer 1: Purple sheet vinyl flooring  
Layer 2: White mastic | Misc. | 80 | SF |  - | Layer 1: ND  
Layer 2: ND | No | 1221B |
| P03051   | VTH           | 0818       | 1027 custodial | Flooring | Layer 1: White with multi-color speckle sheet vinyl  
Layer 2: White mastic  
Layer 3: Gray paper | Misc. | 400 | SF |  - | Layer 1: ND  
Layer 2: ND  
Layer 3: ND | No | Locker rooms and custodial closets |
| P03052   | VTH           | 0818       | 1620           | HVAC system | Gray duct mastic | Misc. | - | SF |  - | ND | No | 1620 (HVAC closet) |
| P03053   | VTH           | 0818       | Roof           | Roofing | Layer 1: Silver coat  
Layer 2: Tan fibrous  
Layer 3: Roll-on roofing/felt tar  
Layer 4: Black foam insulation with paper  
Layer 5: Perlite board | Misc. | 100,000 | SF |  - | Layer 1: ND  
Layer 2: ND  
Layer 3: ND  
Layer 4: ND  
Layer 5: ND | No | Roof |
| P03054   | VTH           | 0818       | Roof           | Roofing | Layer 1: Silver coat  
Layer 2: Tan fibrous  
Layer 3: Roll-on roofing/felt tar  
Layer 4: Black foam insulation with paper  
Layer 5: Perlite board | Misc. | 100,000 | SF |  - | Layer 1: ND  
Layer 2: ND  
Layer 3: ND  
Layer 4: ND  
Layer 5: ND | No | Roof |
<p>| P03055   | VTH           | 0818       | Roof           | Roofing | Black roof penetration mastic | Misc. | - | SF |  - | ND | No | Roof (Penetrations and Expansion joint/patch material) |</p>
<table>
<thead>
<tr>
<th>Sample #</th>
<th>Building Name</th>
<th>Building #</th>
<th>Sample Location</th>
<th>Material</th>
<th>Material Description/color</th>
<th>Type</th>
<th>Location Quantity</th>
<th>Quantity Descriptor</th>
<th>Comments</th>
<th>Sample Results</th>
<th>ACM?</th>
<th>Homogenous Material Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>P03056</td>
<td>VTH</td>
<td>0818</td>
<td>Roof</td>
<td>Roofing</td>
<td>Layer 1: Silver coat</td>
<td>Misc.</td>
<td>100,000</td>
<td>SF</td>
<td>-</td>
<td>Layer 1: ND</td>
<td>No</td>
<td>Roof at curb flashing</td>
</tr>
<tr>
<td>P03057</td>
<td>VTH</td>
<td>0818</td>
<td>Roof</td>
<td>Roofing</td>
<td>Mineral coated roofing felt</td>
<td>Misc.</td>
<td>100</td>
<td>SF</td>
<td>-</td>
<td>Layer 1: ND</td>
<td>No</td>
<td>Near roof access (Roof walkway)</td>
</tr>
<tr>
<td>P03068</td>
<td>VTH</td>
<td>1622</td>
<td>Flooring</td>
<td>Roofing</td>
<td>Layer 1: Blue speckled sheet vinyl</td>
<td>Misc.</td>
<td>100</td>
<td>SF</td>
<td>-</td>
<td>Layer 1: ND</td>
<td>No</td>
<td>Room 1622</td>
</tr>
<tr>
<td>P03069</td>
<td>VTH</td>
<td>1622</td>
<td>Flooring</td>
<td>Roofing</td>
<td>Layer 1: Mineral coated roofing felt</td>
<td>Misc.</td>
<td>100</td>
<td>SF</td>
<td>Found below sample P03068</td>
<td>Layer 1: ND</td>
<td>No</td>
<td>Room 1622</td>
</tr>
<tr>
<td>P00798</td>
<td>VTH</td>
<td>0818</td>
<td>Flooring</td>
<td>Flooring</td>
<td>Gray poured textured flooring</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Large animal treatment area including corridors 1000C and 1000D</td>
</tr>
<tr>
<td>P00799</td>
<td>VTH</td>
<td>0818</td>
<td>1221</td>
<td>Flooring</td>
<td>Gray poured textured flooring</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Large animal treatment area including corridors 1000C and 1000D</td>
</tr>
<tr>
<td>P00800</td>
<td>VTH</td>
<td>0818</td>
<td>1221 C</td>
<td>Flooring</td>
<td>Gray poured textured flooring</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Large animal treatment area including corridors 1000C and 1000D</td>
</tr>
<tr>
<td>06113-01</td>
<td>VTH</td>
<td>0818</td>
<td>1111 E</td>
<td>Ceiling tile</td>
<td>2’x4’ suspended ceiling tile</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Large animal treatment area (south half of first floor)</td>
</tr>
<tr>
<td>06113-02</td>
<td>VTH</td>
<td>0818</td>
<td>1111 E</td>
<td>Ceiling tile</td>
<td>2’x4’ suspended ceiling tile</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Large animal treatment area (south half of first floor)</td>
</tr>
<tr>
<td>06113-03</td>
<td>VTH</td>
<td>0818</td>
<td>1111 E</td>
<td>Fireproofing</td>
<td>Gray spray-applied fireproofing</td>
<td>Surf.</td>
<td>30,000</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Applied to structural steel members and decking in large animal treatment area (south half of first floor)</td>
</tr>
<tr>
<td>06113-04</td>
<td>VTH</td>
<td>0818</td>
<td>1111 E</td>
<td>Fireproofing</td>
<td>Gray spray-applied fireproofing</td>
<td>Surf.</td>
<td>30,000</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Applied to structural steel members and decking in large animal treatment area (south half of first floor)</td>
</tr>
<tr>
<td>06113-05</td>
<td>VTH</td>
<td>0818</td>
<td>1111 E</td>
<td>Fireproofing</td>
<td>Gray spray-applied fireproofing</td>
<td>Surf.</td>
<td>30,000</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Applied to structural steel members and decking in large animal treatment area (south half of first floor)</td>
</tr>
<tr>
<td>B7308</td>
<td>VTH</td>
<td>0818</td>
<td>1111 E</td>
<td>31A</td>
<td>2’x4’ White suspended ceiling tile</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Dominant ceiling tile found throughout</td>
</tr>
<tr>
<td>B7309</td>
<td>VTH</td>
<td>0818</td>
<td>1111 E</td>
<td>10N</td>
<td>2’x4’ White suspended ceiling tile</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Dominant ceiling tile found throughout</td>
</tr>
<tr>
<td>B7310</td>
<td>VTH</td>
<td>0818</td>
<td>1111 E</td>
<td>1023</td>
<td>2’x4’ White suspended ceiling tile</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Dominant ceiling tile found throughout</td>
</tr>
</tbody>
</table>

PREVIOUS SAMPLING: TERRAGRAPHICS ENVIRONMENTAL ENGINEERING, INC. - DECEMBER 19, 2006

PREVIOUS SAMPLING: WSU Facility Operations – April 14, 2004
<table>
<thead>
<tr>
<th>Sample #</th>
<th>Building Name</th>
<th>Building #</th>
<th>Sample Location</th>
<th>Material</th>
<th>Material Description/color</th>
<th>Type</th>
<th>Location Quantity</th>
<th>Quantity Descriptor</th>
<th>Comments</th>
<th>Sample Results</th>
<th>ACM?</th>
<th>Homogenous Material Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>B7311</td>
<td>VTH</td>
<td>0818</td>
<td>1111 E</td>
<td>1214</td>
<td>2’x4’ White suspended ceiling tile</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Dominant ceiling tile found throughout</td>
</tr>
<tr>
<td>B7312</td>
<td>VTH</td>
<td>0818</td>
<td>1111 E</td>
<td>1000B</td>
<td>2’x4’ White suspended ceiling tile</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Dominant ceiling tile found throughout</td>
</tr>
<tr>
<td>B7313</td>
<td>VTH</td>
<td>0818</td>
<td>1111 E</td>
<td>1000B</td>
<td>2’x4’ White suspended ceiling tile</td>
<td>Misc.</td>
<td>-</td>
<td>SF</td>
<td>-</td>
<td>ND</td>
<td>No</td>
<td>Dominant ceiling tile found throughout</td>
</tr>
</tbody>
</table>

Notes:
- ND = Asbestos was not detected in sample
- SF = Square feet
- Misc. = Miscellaneous material
- Surf. = Surfacing material
APPENDIX C
Table Summary of Homogeneous Sampling Areas
<table>
<thead>
<tr>
<th>Sample #’s</th>
<th>Homogenous Material Description</th>
<th>Location(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P03033</td>
<td>White pin-hole with etch pattern 2 ft. by 4 ft. suspended ceiling tile</td>
<td>Dominant ceiling tile throughout VTH</td>
</tr>
<tr>
<td>P03037</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7308**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7309**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7310**</td>
<td></td>
<td></td>
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<tr>
<td>B7311**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7312**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7313**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03026</td>
<td>White solid 2 ft. by 4 ft. suspended ceiling tile</td>
<td>Ceiling tiles in large animal treatment corridors (1000 °C)</td>
</tr>
<tr>
<td>P03029</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06113-01*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06113-02*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03020</td>
<td>12-inch white with blue flecks vinyl floor tile with yellow mastic</td>
<td>Dominant floor tile found in corridors and some offices on ground and first floors</td>
</tr>
<tr>
<td>P03024</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03032</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03023</td>
<td>Light gray speckled sheet vinyl flooring with brown or orange mastic</td>
<td>Dominant sheet vinyl flooring found throughout most offices, surgical suites and clinic areas</td>
</tr>
<tr>
<td>P03036</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03047</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03049</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03044</td>
<td>White terrazzo</td>
<td>Basement and main floor hallways</td>
</tr>
<tr>
<td>P03050</td>
<td>Purple sheet vinyl flooring with white mastic</td>
<td>Room 1221B</td>
</tr>
<tr>
<td>P03048</td>
<td>White sheet vinyl flooring with multi-color specs, gray paper backing and yellow mastic</td>
<td>Locker rooms and custodial closets</td>
</tr>
<tr>
<td>P03051</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03068</td>
<td>Blue sheet vinyl flooring with yellow mastic on white/tan vinyl sheet tile and black mastic</td>
<td>Room 1622</td>
</tr>
<tr>
<td>P03069</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03098</td>
<td>Gray poured textured flooring</td>
<td>Large animal treatment area including corridors 1000C and 1000D</td>
</tr>
<tr>
<td>P03099</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03070</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03019</td>
<td>Gypsum wallboard/joint compound system</td>
<td>Partition walls and hallways and some ceilings throughout VTH</td>
</tr>
<tr>
<td>P03021</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03022</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03030</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03031</td>
<td>4” Gray vinyl cove base with yellow mastic</td>
<td>Partition walls and hallways throughout VTH</td>
</tr>
<tr>
<td>P03032</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03033</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03034</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03035</td>
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<tr>
<td>P03045</td>
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<td></td>
</tr>
<tr>
<td>P03046</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03019</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03021</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03022</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03030</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03031</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03025</td>
<td>Gray spray-applied fireproofing</td>
<td>Large animal treatment area (south half of first floor)</td>
</tr>
<tr>
<td>P03026</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03027</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03035</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06113-03*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06113-04*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06113-05*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03052</td>
<td>Gray duct mastic</td>
<td>Room 1620</td>
</tr>
<tr>
<td>P03053</td>
<td>Silver coat/rolled-on roofing felt-tan/black foam insulation with paper/cheese board</td>
<td>Roof</td>
</tr>
<tr>
<td>P03054</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03056</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P03055</td>
<td>Black roof penetration mastic</td>
<td>Roof penetrations and expansion joint/patch</td>
</tr>
<tr>
<td>P03057</td>
<td>Mineral coated roofing felt</td>
<td>Roof walkway</td>
</tr>
</tbody>
</table>

Notes:  
** Sample collected by WSU Facility Operations in a report dated April 14, 2004
### APPENDIX D
Table Summary of Lead Paint Sampling

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Building Name</th>
<th>Building #</th>
<th>Sample Location (Room #)</th>
<th>Paint Color</th>
<th>Substrate</th>
<th>Component</th>
<th>XRF results (mg/cm²)</th>
<th>Lead-containing</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-01</td>
<td>VTH</td>
<td>0818</td>
<td>1025</td>
<td>Gray</td>
<td>Metal</td>
<td>Door casing</td>
<td>0.0</td>
<td>No</td>
</tr>
<tr>
<td>X-02</td>
<td>VTH</td>
<td>0818</td>
<td>1025</td>
<td>White</td>
<td>Drywall</td>
<td>Wall</td>
<td>0.0</td>
<td>No</td>
</tr>
<tr>
<td>X-03</td>
<td>VTH</td>
<td>0818</td>
<td>1206/1204</td>
<td>White</td>
<td>CMU</td>
<td>Wall</td>
<td>0.0</td>
<td>No</td>
</tr>
<tr>
<td>X-04</td>
<td>VTH</td>
<td>0818</td>
<td>South exterior</td>
<td>Dark brown</td>
<td>Metal</td>
<td>Parking bollard</td>
<td>0.0</td>
<td>No</td>
</tr>
<tr>
<td>X-05</td>
<td>VTH</td>
<td>0818</td>
<td>1211</td>
<td>White</td>
<td>Concrete</td>
<td>Column</td>
<td>0.0</td>
<td>No</td>
</tr>
<tr>
<td>X-06</td>
<td>VTH</td>
<td>0818</td>
<td>1211 (exterior)</td>
<td>Gray</td>
<td>Metal</td>
<td>Rollup door frame</td>
<td>0.0</td>
<td>No</td>
</tr>
<tr>
<td>X-07</td>
<td>VTH</td>
<td>0818</td>
<td>1203</td>
<td>White</td>
<td>Concrete</td>
<td>Column</td>
<td>0.0</td>
<td>No</td>
</tr>
<tr>
<td>X-08</td>
<td>VTH</td>
<td>0818</td>
<td>East exterior</td>
<td>Brown</td>
<td>Metal</td>
<td>Exterior Handrail</td>
<td>0.0</td>
<td>No</td>
</tr>
</tbody>
</table>

**Notes:**

a) Results by x-ray fluorescence (XRF) analysis are reported in milligrams per square centimeter (mg/cm²)
b) CMU = concrete masonry unit
APPENDIX E
Asbestos Chain of Custody Forms and Laboratory Analytical Results
January 29, 2016

Matt McKibbin
Washington State University EH&S
PO Box 641172
Pullman, WA 99164-1172

RE: Bulk Asbestos Fiber Analysis; NVL Batch # 1602338.00

Client Project: 8479-2015
Location: Veterinary Teaching Hospital

Dear Mr. McKibbin,

Enclosed please find test results for the 33 sample(s) submitted to our laboratory for analysis on 1/26/2016.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with both EPA 600/M4-82-020, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and EPA 600/R-93/116 Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

Lori Tseng, PLM Analyst

Enc.: Sample Results
 Clients: Washington State University EH&S
Address: PO Box 641172
Pullman, WA 99164-1172

Attention: Mr. Matt McKibbin
Project Location: Veterinary Teaching Hospital

Lab ID: 16169182  Client Sample #: P03019
Location: Veterinary Teaching Hospital

Layer 1 of 3 Description: Yellow soft mastic
Non-Fibrous Materials: Other Fibrous Materials:
Mastic/Binder, Fine particles Cellulose <1%

Layer 2 of 3 Description: White compacted powdery material with paint
Non-Fibrous Materials: Other Fibrous Materials:
Calcereous binder, Paint Cellulose 2%

Layer 3 of 3 Description: White chalky material with paper
Non-Fibrous Materials: Other Fibrous Materials:
Gypsum/Binder, Binder/Filler Cellulose 15%
Glass fibers 4%

Lab ID: 16169183  Client Sample #: P03020
Location: Veterinary Teaching Hospital

Layer 1 of 2 Description: Light gray vinyl tile
Non-Fibrous Materials: Other Fibrous Materials:
Vinyl/Binder, Calcareous particles Cellulose <1%

Layer 2 of 2 Description: Yellow soft mastic
Non-Fibrous Materials: Other Fibrous Materials:
Mastic/Binder, Fine particles Synthetic fibers 2%

Lab ID: 16169184  Client Sample #: P03021
Location: Veterinary Teaching Hospital

Layer 1 of 3 Description: Yellow/gray soft mastic
Non-Fibrous Materials: Other Fibrous Materials:
Mastic/Binder, Fine particles Cellulose 2%

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.

Sampled by: Client
Analyzed by: Welly Hsieh  Date: 01/28/2016
Reviewed by: Lori Tseng  Date: 01/29/2016

Lori Tseng, PLM Analyst

Page 2 of 21
# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

**Client:** Washington State University EH&S  
**Address:** PO Box 641172  
Pullman, WA 99164-1172  

**Attention:** Mr. Matt McKibbin  
**Project Location:** Veterinary Teaching Hospital  

**Batch #: 1602338.00**  
**Client Project #: 8479-2015**  
**Date Received:** 1/26/2016  
**Samples Received:** 33  
**Samples Analyzed:** 33  
**Method:** EPA/600/R-93/116 & EPA/600/M4-82-020

### Layer 2 of 3
**Description:** White textured powdery material with paint  
- **Non-Fibrous Materials:**  
  - Calcareous binder, Paint  
- **Other Fibrous Materials:**  
  - Cellulose 3%  
  - Asbestos Type: None Detected ND

### Layer 3 of 3
**Description:** White chalky material with paper  
- **Non-Fibrous Materials:**  
  - Gypsum/Binder, Binder/Filler  
- **Other Fibrous Materials:**  
  - Cellulose 16%  
  - Asbestos Type: None Detected ND

### Layer 1 of 2
**Description:** Yellow soft mastic  
- **Non-Fibrous Materials:**  
  - Mastic/Binder, Fine particles  
- **Other Fibrous Materials:**  
  - Cellulose <1%  
  - Asbestos Type: None Detected ND

### Layer 2 of 3
**Description:** White compacted powdery material with paint  
- **Non-Fibrous Materials:**  
  - Calcareous binder, Paint  
- **Other Fibrous Materials:**  
  - Cellulose 2%  
  - Asbestos Type: None Detected ND

### Layer 3 of 3
**Description:** White chalky material with paper  
- **Non-Fibrous Materials:**  
  - Gypsum/Binder, Binder/Filler  
- **Other Fibrous Materials:**  
  - Cellulose 17%  
  - Glass fibers 5%  
  - Asbestos Type: None Detected ND

### Layer 1 of 2
**Description:** Gray sheet vinyl  
- **Non-Fibrous Materials:**  
  - Vinyl/Binder, Calcareous particles  
- **Other Fibrous Materials:**  
  - Cellulose <1%  
  - Asbestos Type: None Detected ND

---

**Lab ID:** 16169185  
**Client Sample #:** P03022  
**Location:** Veterinary Teaching Hospital

**Layer 1 of 3**  
**Description:** Yellow soft mastic  
- **Non-Fibrous Materials:**  
  - Mastic/Binder, Fine particles  
- **Other Fibrous Materials:**  
  - Cellulose <1%  
  - Asbestos Type: None Detected ND

**Layer 2 of 3**  
**Description:** White compacted powdery material with paint  
- **Non-Fibrous Materials:**  
  - Calcareous binder, Paint  
- **Other Fibrous Materials:**  
  - Cellulose 2%  
  - Asbestos Type: None Detected ND

**Layer 3 of 3**  
**Description:** White chalky material with paper  
- **Non-Fibrous Materials:**  
  - Gypsum/Binder, Binder/Filler  
- **Other Fibrous Materials:**  
  - Cellulose 17%  
  - Glass fibers 5%  
  - Asbestos Type: None Detected ND

---

**Lab ID:** 16169186  
**Client Sample #:** P03023  
**Location:** Veterinary Teaching Hospital

**Layer 1 of 2**  
**Description:** Gray sheet vinyl  
- **Non-Fibrous Materials:**  
  - Vinyl/Binder, Calcareous particles  
- **Other Fibrous Materials:**  
  - Cellulose <1%  
  - Asbestos Type: None Detected ND

---

**Sampled by:** Client  
**Analyzed by:** Welly Hsieh  
**Reviewed by:** Lori Tseng  
**Date:** 01/28/2016 01/29/2016

Lori Tseng, PLM Analyst

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.
**Bulk Asbestos Fibers Analysis**

**By Polarized Light Microscopy**

| Client: Washington State University EH&S |
| Address: PO Box 641172, Pullman, WA 99164-1172 |
| Attention: Mr. Matt McKibbin |
| Project Location: Veterinary Teaching Hospital |

**Batch #: 1602338.00**

Client Project #: 8479-2015

Date Received: 1/26/2016

Samples Received: 33

Samples Analyzed: 33

Method: EPA/600/R-93/116 & EPA/600/M4-82-020

---

| Layer 2 of 2 | Description: Gray fibrous backing with mastic |
| Non-Fibrous Materials: | Other Fibrous Materials: % |
| Binder/Filler, Mastic/Binder, Fine particles | Cellulose 38% |
| | Glass fibers 24% |

**Asbestos Type: %** None Detected ND

| Lab ID: 16169187 | Client Sample #: P03024 |
| Location: Veterinary Teaching Hospital |

| Layer 1 of 2 | Description: Light gray vinyl tile |
| Non-Fibrous Materials: | Other Fibrous Materials: % |
| Vinyl/Binder, Calcareous particles | Cellulose <1% |

| Layer 2 of 2 | Description: Yellow soft mastic |
| Non-Fibrous Materials: | Other Fibrous Materials: % |
| Mastic/Binder, Fine particles | Cellulose 2% |

**Asbestos Type: %** None Detected ND

| Lab ID: 16169188 | Client Sample #: P03025 |
| Location: Veterinary Teaching Hospital |

| Layer 1 of 1 | Description: Gray lumpy material |
| Non-Fibrous Materials: | Other Fibrous Materials: % |
| Binder/Filler, Fine particles, Perlite | Cellulose 46% |

**Asbestos Type: %** None Detected ND

| Lab ID: 16169189 | Client Sample #: P03026 |
| Location: Veterinary Teaching Hospital |

| Layer 1 of 1 | Description: Gray lumpy material with paint |
| Non-Fibrous Materials: | Other Fibrous Materials: % |
| Binder/Filler, Fine particles, Perlite, Paint | Cellulose 42% |

**Asbestos Type: %** None Detected ND

---

**Sampled by:** Client

**Analyzed by:** Welly Hsieh

**Reviewed by:** Lori Tseng

**Date:** 01/28/2016

**Date:** 01/29/2016

Lori Tseng, PLM Analyst

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.
Bulk Asbestos Fibers Analysis
By Polarized Light Microscopy

Client: Washington State University EH&S
Address: PO Box 641172
Pullman, WA 99164-1172

Attention: Mr. Matt McKibbin
Project Location: Veterinary Teaching Hospital

Lab ID: 16169190  Client Sample #: P03027
Location: Veterinary Teaching Hospital
Layer 1 of 1  Description: Gray lumpy material with paint
Non-Fibrous Materials: 
Binder/Filler, Fine particles, Perlite
Paint
Other Fibrous Materials: % 
Cellulose  43%
Asbestos Type: % 
None Detected ND

Lab ID: 16169191  Client Sample #: P03028
Location: Veterinary Teaching Hospital
Layer 1 of 1  Description: Gray compressed fibrous material with paint
Non-Fibrous Materials: 
Binder/Filler, Fine particles, Perlite
Glass beads, Paint
Other Fibrous Materials: % 
Glass fibers  72%
Asbestos Type: % 
None Detected ND

Lab ID: 16169192  Client Sample #: P03029
Location: Veterinary Teaching Hospital
Layer 1 of 1  Description: Gray compressed fibrous material with paint
Non-Fibrous Materials: 
Binder/Filler, Fine particles, Perlite
Glass beads, Paint
Other Fibrous Materials: % 
Glass fibers  74%
Asbestos Type: % 
None Detected ND

Lab ID: 16169193  Client Sample #: P03030
Location: Veterinary Teaching Hospital
Layer 1 of 3  Description: Yellow/off-white soft mastic
Non-Fibrous Materials: 
Mastic/Binder, Calcareous particles
Other Fibrous Materials: % 
None Detected  ND
Asbestos Type: % 
None Detected ND

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.
Bulk Asbestos Fibers Analysis
By Polarized Light Microscopy

Client: Washington State University EH&S
Address: PO Box 641172
Pullman, WA 99164-1172

Attention: Mr. Matt McKibbin
Project Location: Veterinary Teaching Hospital

Samples Received: 33

By Polarized Light Microscopy

Batch #: 1602338.00
Client Project #: 8479-2015
Date Received: 1/26/2016
Samples Analyzed: 33
Method: EPA/600/R-93/116 & EPA/600/M4-82-020

Layer 2 of 3
Description: White compacted powdery material with paint
Non-Fibrous Materials: Other Fibrous Materials:
Calcareous binder, Paint Cellulose 2%

Asbestos Type: %
None Detected ND

Layer 3 of 3
Description: White chalky material with paper
Non-Fibrous Materials: Other Fibrous Materials:
Gypsum/Binder, Binder/Filler Cellulose 18%
Glass fibers 5%

Asbestos Type: %
None Detected ND

Lab ID: 16169194  Client Sample #: P03031
Location: Veterinary Teaching Hospital

Layer 1 of 2
Description: Beige/off-white soft mastic
Non-Fibrous Materials: Other Fibrous Materials:
Mastic/Binder, Calcareous particles Cellulose <1%

Asbestos Type: %
None Detected ND

Layer 2 of 2
Description: White chalky material with paper and paint
Non-Fibrous Materials: Other Fibrous Materials:
Gypsum/Binder, Binder/Filler, Paint Cellulose 17%
Metal foil Glass fibers 6%

Asbestos Type: %
None Detected ND

Lab ID: 16169195  Client Sample #: P03032
Location: Veterinary Teaching Hospital

Layer 1 of 2
Description: Light gray vinyl tile
Non-Fibrous Materials: Other Fibrous Materials:
Vinyl/Binder, Calcareous particles Cellulose <1%

Asbestos Type: %
None Detected ND

Layer 2 of 2
Description: Yellow soft mastic
Non-Fibrous Materials: Other Fibrous Materials:
Mastic/Binder, Fine particles Cellulose 2%

Asbestos Type: %
None Detected ND

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Sampled by: Client
Analyzed by: Welly Hsieh  Date: 01/28/2016
Reviewed by: Lori Tseng  Date: 01/29/2016

Lori Tseng, PLM Analyst

Page 6 of 21
Bulk Asbestos Fibers Analysis

Client: Washington State University EH&S
Address: PO Box 641172
Pullman, WA 99164-1172

Attention: Mr. Matt McKibbin
Project Location: Veterinary Teaching Hospital

Batch #: 1602338.00
Client Project #: 8479-2015
Date Received: 1/26/2016
Samples Received: 33
Samples Analyzed: 33
Method: EPA/600/R-93/116 & EPA/600/M4-82-020

Lab ID: 16169196  Client Sample #: P03033
Location: Veterinary Teaching Hospital
Layer 1 of 1  Description: Gray compressed fibrous material with paint
  Non-Fibrous Materials:  Other Fibrous Materials:%
  Binder/Filler, Fine particles, Perlite  Cellulose  45%
  Glass beads, Paint  Glass fibers  31%

Lab ID: 16169197  Client Sample #: P03034
Location: Veterinary Teaching Hospital
Layer 1 of 2  Description: White compacted powdery material
  Non-Fibrous Materials:  Other Fibrous Materials:%
  Calcareous binder  Cellulose  <1%
Layer 2 of 2  Description: Off-white chalky material with paper and paint
  Non-Fibrous Materials:  Other Fibrous Materials:%
  Gypsum/Binder, Binder/Filler, Paint  Cellulose  21%

Lab ID: 16169198  Client Sample #: P03035
Location: Veterinary Teaching Hospital
Layer 1 of 1  Description: Gray lumpy material
  Non-Fibrous Materials:  Other Fibrous Materials:%
  Binder/Filler, Fine particles, Perlite  Cellulose  41%
  Mica  Synthetic fibers  2%

Lab ID: 16169199  Client Sample #: P03036
Location: Veterinary Teaching Hospital

Sampled by: Client
Analyzed by: Welly Hsieh  Date: 01/28/2016
Reviewed by: Lori Tseng  Date: 01/29/2016
Lori Tseng, PLM Analyst

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.
### Client: Washington State University EH&S
Address: PO Box 641172
Pullman, WA 99164-1172

**Attention: Mr. Matt McKibbin**
Project Location: Veterinary Teaching Hospital

---

**Bulk Asbestos Fibers Analysis**
By Polarized Light Microscopy

---

**Batch #: 1602338.00**
Client Project #: 8479-2015
Date Received: 1/26/2016
Samples Received: 33
Samples Analyzed: 33
Method: EPA/600/R-93/116 & EPA/600/M4-82-020

---

<table>
<thead>
<tr>
<th>Layer 1 of 2</th>
<th>Description</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gray vinyl tile</td>
<td>Vinyl/Binder, Calcareous particles</td>
<td>Cellulose &lt;1%</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Layer 2 of 2</th>
<th>Description</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tan/gray soft mastic</td>
<td>Mastic/Binder, Fine particles</td>
<td>Cellulose 2%</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

---

**Lab ID: 16169200**
Client Sample #: P03037
Location: Veterinary Teaching Hospital

<table>
<thead>
<tr>
<th>Layer 1 of 1</th>
<th>Description</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gray compressed fibrous material with paint</td>
<td>Binder/Filler, Fine particles, Perlite</td>
<td>Cellulose 42%</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

Glass beads, Paint  Glass fibers 30%

---

**Lab ID: 16169201**
Client Sample #: P03044
Location: Veterinary Teaching Hospital

<table>
<thead>
<tr>
<th>Layer 1 of 2</th>
<th>Description</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White brittle material</td>
<td>Binder/Filler, Fine particles, Mineral grains</td>
<td>None Detected ND</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

Layer 2 of 2
Description: Gray brittle material

<table>
<thead>
<tr>
<th>Layer 2 of 2</th>
<th>Description</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gray brittle material</td>
<td>Mineral/Binder</td>
<td>None Detected ND</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

---

**Lab ID: 16169202**
Client Sample #: P03045
Location: Veterinary Teaching Hospital

<table>
<thead>
<tr>
<th>Layer 1 of 3</th>
<th>Description</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yellow soft mastic</td>
<td>Mastic/Binder, Fine particles</td>
<td>Synthetic fibers 2%</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

---

**Sampled by:** Client  
**Analyzed by:** Welly Hsieh  
**Reviewed by:** Lori Tseng

**Date:** 01/28/2016  
**Date:** 01/29/2016

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.
**Client:** Washington State University EH&S  
**Address:** PO Box 641172  
Pullman, WA 99164-1172  

**Attention:** Mr. Matt McKibbin  
Project Location: Veterinary Teaching Hospital

---

### Layer 2 of 3
**Description:** White/off-white compacted powdery material  

<table>
<thead>
<tr>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials</th>
<th>Asbestos Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcareous binder</td>
<td>Cellulose</td>
<td>None Detected</td>
<td>ND</td>
</tr>
</tbody>
</table>

### Layer 3 of 3
**Description:** White chalky material with paper  

<table>
<thead>
<tr>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials</th>
<th>Asbestos Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gypsum/Binder, Binder/Filler</td>
<td>Cellulose</td>
<td>None Detected</td>
<td>ND</td>
</tr>
<tr>
<td>Glass fibers</td>
<td>4%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

### Lab ID: 16169203  
**Client Sample #:** P03046  
**Location:** Veterinary Teaching Hospital  

#### Layer 1 of 3
**Description:** Yellow/off-white soft mastic  

<table>
<thead>
<tr>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials</th>
<th>Asbestos Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mastic/Binder, Fine particles</td>
<td>Cellulose</td>
<td>None Detected</td>
<td>ND</td>
</tr>
</tbody>
</table>

#### Layer 2 of 3
**Description:** White compacted powdery material with paint  

<table>
<thead>
<tr>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials</th>
<th>Asbestos Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcareous binder, Paint</td>
<td>Cellulose</td>
<td>None Detected</td>
<td>ND</td>
</tr>
</tbody>
</table>

#### Layer 3 of 3
**Description:** White chalky material with paper  

<table>
<thead>
<tr>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials</th>
<th>Asbestos Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gypsum/Binder, Binder/Filler</td>
<td>Cellulose</td>
<td>None Detected</td>
<td>ND</td>
</tr>
<tr>
<td>Glass fibers</td>
<td>4%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

### Lab ID: 16169204  
**Client Sample #:** P03047  
**Location:** Veterinary Teaching Hospital  

#### Layer 1 of 2
**Description:** Light gray vinyl tile  

<table>
<thead>
<tr>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials</th>
<th>Asbestos Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vinyl/Binder, Calcareous particles</td>
<td>Cellulose</td>
<td>None Detected</td>
<td>ND</td>
</tr>
</tbody>
</table>

---

**Sampled by:** Client  
**Analyzed by:** Welly Hsieh  
**Reviewed by:** Lori Tseng  
**Date:** 01/29/2016  
**Date:** 01/28/2016  

---

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# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

**Client:** Washington State University EH&S  
**Address:** PO Box 641172  
Pullman, WA 99164-1172  

**Attention:** Mr. Matt McKibbin  
Project Location: Veterinary Teaching Hospital

---

**Batch #: 1602338.00**  
Client Project #: 8479-2015  
Date Received: 1/26/2016  
Samples Received: 33  
Samples Analyzed: 33  
Method: EPA/600/R-93/116 & EPA/600/M4-82-020

---

<table>
<thead>
<tr>
<th>Layer 2 of 2</th>
<th>Description</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials: %</th>
<th>Asbestos Type: %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yellow/brown soft mastic</td>
<td>Mastic/Binder, Fine particles</td>
<td>Cellulose 2%</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

**Lab ID:** 16169205  
**Location:** Veterinary Teaching Hospital  
**Client Sample #:** P03048

<table>
<thead>
<tr>
<th>Layer 1 of 2</th>
<th>Description</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials: %</th>
<th>Asbestos Type: %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Light gray sheet vinyl</td>
<td>Vinyl/Binder, Calcareous particles</td>
<td>Cellulose &lt;1%</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Layer 2 of 2</th>
<th>Description</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials: %</th>
<th>Asbestos Type: %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gray fibrous backing with mastic</td>
<td>Binder/Filler, Mastic/Binder, Fine particles</td>
<td>Cellulose 37%</td>
<td>None Detected ND</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Glass fibers 23%</td>
<td></td>
</tr>
</tbody>
</table>

**Lab ID:** 16169206  
**Location:** Veterinary Teaching Hospital  
**Client Sample #:** P03049

<table>
<thead>
<tr>
<th>Layer 1 of 2</th>
<th>Description</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials: %</th>
<th>Asbestos Type: %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Light gray vinyl tile</td>
<td>Vinyl/Binder, Calcareous particles</td>
<td>Cellulose 2%</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Layer 2 of 2</th>
<th>Description</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials: %</th>
<th>Asbestos Type: %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Brown soft mastic</td>
<td>Mastic/Binder, Fine particles</td>
<td>Cellulose &lt;1%</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

**Lab ID:** 16169207  
**Location:** Veterinary Teaching Hospital  
**Client Sample #:** P03050

<table>
<thead>
<tr>
<th>Layer 1 of 2</th>
<th>Description</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials: %</th>
<th>Asbestos Type: %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Purple/light gray vinyl tile</td>
<td>Vinyl/Binder, Calcareous particles</td>
<td>Cellulose &lt;1%</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

---

**Sampled by:** Client  
**Analyzed by:** Welly Hsieh  
**Reviewed by:** Lori Tseng  
**Date:** 01/28/2016  
**Date:** 01/29/2016

---

*Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.*
# Bulk Asbestos Fibers Analysis

**By Polarized Light Microscopy**

**Client:** Washington State University EH&S  
**Address:** PO Box 641172  
Pullman, WA 99164-1172

**Attention:** Mr. Matt McKibbin  
**Project Location:** Veterinary Teaching Hospital

**Batch #: 1602338.00**  
**Client Project #: 8479-2015**  
**Date Received:** 1/26/2016  
**Samples Received:** 33  
**Samples Analyzed:** 33  
**Method:** EPA/600/R-93/116 & EPA/600/M4-82-020

<table>
<thead>
<tr>
<th>Layer 1 of 3</th>
<th>Description:</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Light gray soft mastic</td>
<td>Vinyl/Binder, Fine particles</td>
<td>Cellulose 10%</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<th>Description:</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yellow/off-white soft mastic</td>
<td>Mastic/Binder, Fine particles</td>
<td>Cellulose 3%</td>
<td>None Detected ND</td>
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</table>

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<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gray fibrous backing with mastic</td>
<td>Binder/Filler, Fine particles</td>
<td>Cellulose 38%</td>
<td>None Detected ND</td>
</tr>
</tbody>
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<table>
<thead>
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<th>Layer 3 of 3</th>
<th>Description:</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dark gray vinyl</td>
<td>Vinyl/Binder, Binder/Filler</td>
<td>None Detected ND</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>Layer 1 of 1</th>
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<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
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<tbody>
<tr>
<td></td>
<td>Light gray soft mastic</td>
<td>Mastic/Binder, Fine particles</td>
<td>Cellulose 10%</td>
<td>None Detected ND</td>
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<table>
<thead>
<tr>
<th>Layer 1 of 5</th>
<th>Description:</th>
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<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Built-up black asphaltic material with silver paint</td>
<td>Asphalt/Binder, Fine particles</td>
<td>Cellulose 5%</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

---

**Sampled by:** Client  
**Analyzed by:** Welly Hsieh  
**Reviewed by:** Lori Tseng  
**Date:** 01/28/2016  
**Date:** 01/29/2016

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.
## Bulk Asbestos Fibers Analysis

**By Polarized Light Microscopy**

- **Batch #: 1602338.00**
- **Client Project #: 8479-2015**
- **Date Received:** 1/26/2016
- **Samples Received:** 33
- **Samples Analyzed:** 33
- **Method:** EPA/600/R-93/116 & EPA/600/M4-82-020

### Client Information
- **Client:** Washington State University EH&S
- **Address:** PO Box 641172
  Pullman, WA 99164-1172
- **Attention:** Mr. Matt McKibbin
- **Project Location:** Veterinary Teaching Hospital

### Sample Description

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
<th>Metallic Paint</th>
<th>Glass Fibers</th>
<th>Synthetic Fibers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layer 2 of 5</td>
<td>Tan fibrous material</td>
<td></td>
<td>21%</td>
<td>10%</td>
</tr>
<tr>
<td>Layer 3 of 5</td>
<td>Black asphaltic fibrous material</td>
<td>4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Layer 4 of 5</td>
<td>Black foamy material</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Layer 5 of 5</td>
<td>Dark gray fibrous material</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Asbestos Type

- **Layer 2:** None Detected ND
- **Layer 3:** None Detected ND
- **Layer 4:** None Detected ND
- **Layer 5:** None Detected ND

### Non-Fibrous Materials

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
<th>Binder/Filler, Fine particles, Perlite</th>
<th>Asphalt/Binder, Binder/Filler, Fine particles</th>
<th>Binder/Filler, Styrofoam</th>
<th>Cellulose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layer 2 of 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>78%</td>
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<tr>
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<td></td>
<td>84%</td>
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</tr>
<tr>
<td>Layer 5 of 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>42%</td>
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### Lab ID: 16169211
- **Client Sample #: P03054**
- **Location:** Veterinary Teaching Hospital

### Sampled by:
- **Client**

### Analyzed by:
- Welly Hsieh

### Reviewed by:
- Lori Tseng

**Note:** If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.
**Bulk Asbestos Fibers Analysis**

**By Polarized Light Microscopy**

Client: Washington State University EH&S  
Address: PO Box 641172  
Pullman, WA 99164-1172

**Attention: Mr. Matt Mckibbin**

Project Location: Veterinary Teaching Hospital

---

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
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<tbody>
<tr>
<td>2</td>
<td>Tan fibrous material</td>
<td></td>
<td>Cellulose 76%</td>
<td>None Detected ND</td>
</tr>
<tr>
<td>3</td>
<td>Black asphaltic fibrous material</td>
<td></td>
<td>Cellulose 81%</td>
<td>None Detected ND</td>
</tr>
<tr>
<td>4</td>
<td>Black foamy material</td>
<td></td>
<td>Glass fibers 4%</td>
<td>None Detected ND</td>
</tr>
<tr>
<td>5</td>
<td>Dark gray fibrous material</td>
<td></td>
<td>Glass fibers 32%</td>
<td>None Detected ND</td>
</tr>
</tbody>
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**Lab ID: 16169212**  
**Client Sample #:** P03055  
Location: Veterinary Teaching Hospital

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
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<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Black asphaltic material with paint</td>
<td></td>
<td>Cellulose 8%</td>
<td>None Detected ND</td>
</tr>
</tbody>
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**Lab ID: 16169213**  
**Client Sample #:** P03056  
Location: Veterinary Teaching Hospital

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
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<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Black asphaltic material with silver paint</td>
<td></td>
<td>Synthetic fibers 21%</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

---

**Note:** If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.
**Bulk Asbestos Fibers Analysis**

By Polarized Light Microscopy

Client: Washington State University EH&S  
Address: PO Box 641172  
Pullman, WA 99164-1172

Attention: Mr. Matt McKibbin  
Project Location: Veterinary Teaching Hospital

---

**Layer 2 of 4**  
**Description:** Black asphaltic fibrous material  
Asphalt/Binder, Binder/Filler, Fine particles  
Non-Fibrous Materials:  
Other Fibrous Materials:%  
Asbestos Type: %  
Glass fibers 57%  
None Detected ND

**Layer 3 of 4**  
**Description:** Black tar  
Asphalt/Binder, Fine particles  
Non-Fibrous Materials:  
Other Fibrous Materials:%  
Asbestos Type: %  
None Detected ND

**Layer 4 of 4**  
**Description:** Black asphaltic material with mineral grains  
Asphalt/Binder, Binder/Filler, Fine particles  
Non-Fibrous Materials:  
Other Fibrous Materials:%  
Asbestos Type: %  
Synthetic fibers 18%  
None Detected ND

---

**Layer 1 of 1**  
**Description:** Black asphaltic material with silver paint and granules  
Asphalt/Binder, Binder/Filler, Fine particles  
Non-Fibrous Materials:  
Other Fibrous Materials:%  
Asbestos Type: %  
Synthetic fibers 27%  
None Detected ND

---

**Lab ID:** 16169214  
**Client Sample #:** P03057  
Location: Veterinary Teaching Hospital

---

**Sampled by:** Client  
**Analyzed by:** Welly Hsieh  
**Reviewed by:** Lori Tseng  
**Date:** 01/28/2016  
**Date:** 01/29/2016

---

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.
**Company**: Washington State University EH&S  
**Address**: PO Box 641172  
Pullman, WA 99164-1172  

**Project Manager**: Mr. Matt McKibbin  
**Phone**: (509) 335-3041  
**Direct**: (509) 335-5311  

**NVL Batch Number**: 1602338.00  
**TAT**: 5 Days  
**AH**: No  
**Due Date**: 2/2/2016  
**Time**: 10:00 AM  
**Fax**: (509) 335-4442  
**Email**: mrmckibbin@wsu.edu  

---

**Project Name/Number**: 8479-2015  
**Project Location**: Veterinary Teaching Hospital  

**Subcategory**: PLM Bulk  
**Item Code**: ASB-02  
**EPA 600/R-93-116 Asbestos by PLM <bulk>**

---

**Total Number of Samples**: 33  
**Rush Samples**: 

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<th>A/R</th>
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<td>P03020</td>
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<td>16169184</td>
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<tr>
<td>4</td>
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**Print Name**:  
**Signature**:  
**Company**:  
**Date**:  
**Time**:  

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**Office Use Only**

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<th>Date</th>
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<td>NVL</td>
<td>1/26/16</td>
<td>1000</td>
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<tr>
<td>Analyzed by</td>
<td>Welly Hsieh</td>
<td>NVL</td>
<td>1/28/16</td>
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**Results Called by**

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**Special Instructions**:  

**Date**: 1/26/2016  
**Time**: 2:53 PM  
**Entered By**: Maxwell Raymond  

---

Date: 1/26/2016  
Time: 2:53 PM  
Entered By: Maxwell Raymond
**Company**  Washington State University EH&S

**Address**  PO Box 641172
Pullman, WA 99164-1172

**Project Manager**  Mr. Matt McKibbin
**Phone**  (509) 335-3041
**Direct**  (509) 335-5311

_**NVL Batch Number**_  1602338.00  
_**TAT**_  5 Days  
_**AH**_  No  
_**Rush TAT**_  
_**Due Date**_  2/2/2016  
_**Time**_  10:00 AM  
_**Email**_  mrmckibbin@wsu.edu  
_**Fax**_  (509) 335-4442

---

**Project Name/Number:**  8479-2015  
**Project Location:**  Veterinary Teaching Hospital

---

**Subcategory**  PLM Bulk  
**Item Code**  ASB-02  
**EPA 600/R-93-116 Asbestos by PLM <bulk>**

---

**Total Number of Samples**  33  
**Rush Samples**  

<table>
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**Print Name**  
**Signature**

**Company**

**Date**

**Time**

**Sampled by**  Client

**Relinquished by**  Federal Express

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**Office Use Only**

<table>
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<th>Company</th>
<th>Date</th>
<th>Time</th>
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</thead>
<tbody>
<tr>
<td><strong>Received by</strong></td>
<td>Justin Shearer</td>
<td>NVL</td>
<td>1/26/16</td>
<td>1000</td>
</tr>
<tr>
<td><strong>Analyzed by</strong></td>
<td>Welly Hsieh</td>
<td>NVL</td>
<td>1/28/16</td>
<td>8:16 AM</td>
</tr>
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</table>

**Special Instructions:**  

**Fax:**  
**Emailed:**

---

Date: 1/26/2016  
Time: 2:53 PM  
Entered By: Maxwell Raymond

---

**Page**: page 16 of 21
# ASBESTOS CHAIN OF CUSTODY

**Company:** Washington St. University EH&S  
**Address:** PO Box 641172  
**Pullman, WA 99164**  
**Phone:** 509-335-5604

**Project Manager:** Matt McKibbin  
**Cell:** 509-730-5548  
**Email:** mrmckibbin@wsu.edu, stephan.gilley@wsu.edu

## Project Name/Number

- **8479-2015**

## Project Location

- Veterinary Teaching Hospital

## Sample Information

<table>
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<th>Description</th>
<th>A/R</th>
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<td></td>
</tr>
<tr>
<td>P03044-P03057</td>
<td>see sampling data sheet</td>
<td></td>
</tr>
</tbody>
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## Sampling Information

- **Sampled by:** Stephan Gilley  
- **Relinquish by:** Stephan Gilley

## Office Use Only

- **Print Name:** [Signature]  
- **Date:** 1/25/16  
- **Time:** 08:20

---

4708 Aurora Ave N, Seattle, WA 98103  |  p 206.547.0100  |  f 206.634.1936  |  www.nvllabs.com

page 17 of 21
February 2, 2016

Matt McKibbin
Washington State University EH&S
PO Box 641172
Pullman, WA 99164-1172

RE: Bulk Asbestos Fiber Analysis; NVL Batch # 1602505.00

Client Project: 8479-2015
Location: VTH: Room 1622 (blue SVF)

Dear Mr. McKibbin,

Enclosed please find test results for the 2 sample(s) submitted to our laboratory for analysis on 1/28/2016.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with both EPA 600/M4-82-020, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and EPA 600/R-93/116 Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

Nick Ly, Technical Director

Enc.: Sample Results
### Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

---

**Client:** Washington State University EH&S  
**Address:** PO Box 641172  
Pullman, WA 99164-1172

**Attention:** Mr. Matt McKibbin  
Project Location: VTH: Room 1622 (blue SVF)

---

**Batch #: 1602505.00**  
Client Project #: 8479-2015  
Date Received: 1/28/2016  
Samples Received: 2  
Samples Analyzed: 2  
Method: EPA/600/R-93/116  
& EPA/600/M4-82-020

---

### Lab ID: 16170361  
**Client Sample #:** P03068  
**Location:** VTH: Room 1622 (blue SVF)

| Layer 1 of 2 |  
| Description: | Blue sheet vinyl |  
| Non-Fibrous Materials: |  
| Vinyl/Binder, Binder/Filler |  
| Other Fibrous Materials: |  
| Asbestos Type: | ND |  
| None Detected | ND |

| Layer 2 of 2 |  
| Description: | Yellow/white soft mastic |  
| Non-Fibrous Materials: |  
| Mastic/Binder |  
| Other Fibrous Materials: |  
| Asbestos Type: | ND |  
| Synthetic fibers | 3% |  
| Cellulose | 1% |

---

### Lab ID: 16170362  
**Client Sample #:** P03069  
**Location:** VTH: Room 1622 (blue SVF)

| Layer 1 of 2 |  
| Description: | White/tan sheet vinyl |  
| Non-Fibrous Materials: |  
| Vinyl/Binder, Binder/Filler |  
| Other Fibrous Materials: |  
| Asbestos Type: | ND |  
| None Detected | ND |

| Layer 2 of 2 |  
| Description: | Yellow soft mastic with gray soft material |  
| Non-Fibrous Materials: |  
| Mastic/Binder, Binder/Filler, Calcareous particles |  
| Other Fibrous Materials: |  
| Asbestos Type: | ND |  
| Cellulose | 3% |  
| Synthetic fibers | 2% |

---

**Sampled by:** Client  
**Analyzed by:** Lori Tseng  
**Reviewed by:** Nick Ly  
**Date:** 02/01/2016  
**Date:** 02/02/2016  
**Date:** Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.
Project Name/Number: 8479-2015  
Project Location: VTH: Room 1622 (blue SVF)

Subcategory  PLM Bulk  
Item Code  ASB-02  
EPA 600/R-93-116 Asbestos by PLM <bulk>

Total Number of Samples  2  
Rush Samples  

<table>
<thead>
<tr>
<th>Lab ID</th>
<th>Sample ID</th>
<th>Description</th>
<th>A/R</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16170361</td>
<td>P03068</td>
<td>A</td>
</tr>
<tr>
<td>2</td>
<td>16170362</td>
<td>P03069</td>
<td>A</td>
</tr>
</tbody>
</table>

Sampled by  | Signature | Company | Date | Time |
-------------------|-----------|---------|------|------|
Client            |           |         |      |      |

Relinquished by  | Federal Express

Received by  | Signature | Company | Date | Time |
-------------------|-----------|---------|------|------|
Maxwell Raymond   |           | NVL     | 1/28/16 | 0945 |

Analyzed by  | Signature | Company | Date | Time |
-------------------|-----------|---------|------|------|
Lori Tseng       |           | NVL     | 2/1/16 | 3:50 PM |

Results Called by  
Faxed  | Emailed |
-------------------|---------|

Office Use Only

Date: 1/28/2016  
Time: 5:23 PM  
Entered By: Justin Shearer
**ASBESTOS CHAIN OF CUSTODY**

**Company:** Washington St. University EH&S  
**Address:** PO Box 641172  
**Pullman, WA 99164**  
**Phone:** 509-335-5604

**Project Manager:** Matt McKibbin  
**Cell:** 509-730-5548  
**Email:** mrmckibbin@wsu.edu, stephan.gilley@wsu.edu

**Project Name/Number:** 8479-2015  
**Project Location:** VTH: Room 1622 (blue SVF)

- PCM Air (NIOSH 7400)
- TEM (NIOSH 7402)
- TEM (AHERA)
- TEM (EPA Level II Modified)
- PLM (EPA 600/R-93-116)
- EPA 400 Points (600/R-93-116)
- EPA 1000 Points (600/R-93-116)
- PLM Gravimetry (600/R-93-116)
- Asbestos in Vermiculite (600/R-04/004)
- Asbestos in Sediment (EPA 1900 Points)
- Asbestos Friable/Non-Friable (EPA 600/R-93/116)
- Other

**Reporting Instructions:** Email

**Total Number of Samples:** 2

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Description</th>
<th>A/R</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P03068 blue sheet vinyl flooring</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>P03069 white/tan sheet vinyl flooring</td>
<td></td>
</tr>
</tbody>
</table>

**Print Name:** Stephan Gilley  
**Signature:** 
**Company:** WSU EH&S  
**Date:** 1-27-16  
**Time:** 12:32

**Sampled by:** Stephan Gilley  
**Relinquish by:** Stephan Gilley

**Office Use Only**

**Received by:**  
**Signature:**  
**Company:**  
**Date:** 11/28/16  
**Time:** 9:45 AM

**Analyzed by:**  
**Called by:**  
**Faxed/Email by:**

---

Contact Information:

**4708 Aurora Ave N, Seattle, WA 98103**  
**p 206.547.0100**  
**f 206.634.1936**  
**www.nvlabs.com**

*Page 4 of 4*
APPENDIX F
Laboratory Accreditations and Certificates
Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP

VOLUNTARY LABORATORY ACCREDITATION PROGRAM

For the National Voluntary Laboratory Accreditation Program

2015-09-25 through 2016-09-20

Effective Dates

This laboratory is accredited in accordance with the recognized international Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to Joint ISO/IEC-IAF Communiqué dated January 2009).

NVLAP LAB CODE: 10263-0

NVLAP Laboratories, Inc.

Seattle, WA

For the National Voluntary Laboratory Accreditation Program

[Signature]

United States Department of Commerce
National Institute of Standards and Technology
ASBESTOS FIBER ANALYSIS

Bulk Asbestos Analysis

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>18/A01</td>
<td>EPA 600/M4-82-020: Interim Method for the Determination of Asbestos in Bulk Insulation Samples</td>
</tr>
<tr>
<td>18/A03</td>
<td>EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials</td>
</tr>
</tbody>
</table>

NVLAP LAB CODE 102063-0

For the National Voluntary Laboratory Accreditation Program

Effective 2015-09-25 through 2016-09-30
APPENDIX G
Building Inspector Training Certificate
MICRIST ENVIRONMENTAL RESOURCE

Recognizes

Stephan A. Gilley

Michael D. Thomas - Administrator

Michael D. Thomas - Principal Instructor

In Successful Course Completion of

AHERA Certified Asbestos Building Inspector Training

In Accordance with TSCA Title II & State of Montana DEQ, Trained: Oct. 12-14, 2015 in Post Falls, ID

Certification Valid through October 14, 2016 Certification Number: BI-15-008

The above student has completed training as required for accreditation under Administrative Rule of Montana Title 17, Chapter 74, Subchapter 3 (ARM 17.74. 368(h))

MICRIST Environmental - P. O. Box 2424, Victorville, CA 92393 (209) 818-0455

Montana DEQ - 1520 East 6th Ave P.O. Box 200901 Helena MT 59620-0901
APPENDIX H
Previous Survey Information
MEMORANDUM

To: Lee Jones  
Washington State University  
McCluskey Services Building  
Grimes Way  
Pullman, WA 99164-1150

From: Dennis Sasse, TerraGraphics Environmental Engineering, Inc.

Date: December 19, 2006

Subject: DRAFT - Limited “Good faith” asbestos inspection and lead-based paint survey results for the room 1111E in the Veterinary Teaching Hospital (818), Washington State University (WSU), Pullman, WA. WSU reference #2605-2007

Job Code: 06113 – Vet Hospital 1111E

This draft memorandum summarizes the results of the limited “Good faith” asbestos inspection as defined in Washington Administrative Code (WAC) 296-62 and lead-based paint survey of room 1111E in the Veterinary Teaching Hospital (818), Washington State University (WSU) in Pullman, WA. The scope area that was surveyed is shown on the map in Appendix A. A final copy of this memo will be forwarded when final signed laboratory results are available.

EXECUTIVE SUMMARY

On December 8, 2006, Dennis Sasse of TerraGraphics Environmental Engineering, Inc. (TerraGraphics) performed a limited “Good faith” asbestos inspection and lead-based paint survey of the locations mentioned above. Mr. Jones provided TerraGraphics with a drawing that detailed the locations to be surveyed (Appendix A). Only materials expected to be impacted by the renovations were evaluated. TerraGraphics’ understanding is that this survey is being performed to support proposed construction activities. Five (5) samples were collected and analyzed for asbestos. WSU asbestos sample records were also evaluated. Five (5) locations were sampled for lead in painted coatings.
Asbestos

No material sampled contains greater than 1% asbestos. No material sampled is regulated as an asbestos-containing material (ACM).

Lead, lead-based paint, lead-based coatings

No paints or painted coatings sampled were identified as lead-based paints.

All other painted coatings in the scope area should be considered lead-containing. Lead-based paint is defined as paint having concentrations of lead greater than 1.0 mg/cm² by XRF, 5,000 ppm (mg/Kg) or 0.5% by approved laboratory methods. Lead-containing paints have detectable concentrations of lead that are lower than levels that are considered lead-based paints.
SITE RECONNAISSANCE AND SAMPLING SUMMARY

The survey area included room 1111E in the Veterinary Teaching Hospital (818) on the WSU campus in Pullman, WA. TerraGraphics understands this survey is being performed to support proposed construction related activities.

Asbestos

The WSU asbestos database (http://www.ehs.wsu.edu/Asbestos/adbhome.asp) was consulted on December 8, 2006 to determine if previous sampling had been performed in the scope area. Previously collected asbestos sample data was not available for locations within the scope area of this survey.


A total of five (5) samples consisting of different types of suspect building materials that could potentially contain asbestos were collected and analyzed. Asbestos samples were collected and submitted to an EPA certified laboratory (NVL Laboratories, Inc Seattle, WA) for analysis using EPA method 600/R-93/116 or Polarized Light Microscopy (PLM). When a sample contains more than one layer of material, the laboratory separates the sample, analyzes each layer, and produces results for each layer. See Table 1 below for a summary of laboratory results, see Appendix A for a sample location map, and see Appendix B for complete laboratory analysis results.

- No material sampled contains greater than 1% asbestos. No material sampled is regulated as an ACM.

Table 1. Laboratory Analysis Asbestos Summary

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Material</th>
<th>Location</th>
<th>Asbestos Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>06113-01</td>
<td>2' x 4' suspended ceiling tile</td>
<td>1111E</td>
<td>ND</td>
</tr>
<tr>
<td>06113-02</td>
<td>2' x 4' suspended ceiling tile</td>
<td>1111E</td>
<td>ND</td>
</tr>
<tr>
<td>06113-03</td>
<td>Fireproofing</td>
<td>1111E</td>
<td>ND</td>
</tr>
<tr>
<td>06113-04</td>
<td>Fireproofing</td>
<td>1111E</td>
<td>ND</td>
</tr>
<tr>
<td>06113-05</td>
<td>Fireproofing</td>
<td>1111E</td>
<td>ND</td>
</tr>
</tbody>
</table>

*ND - No Asbestos Detected (See Appendix B for Complete Laboratory Analysis Results)

Lead, lead-based paint, lead-based coatings

Five (5) locations were sampled for lead in painted coatings. This sampling was meant to provide WSU and any potential contractors with representative data regarding the amount of lead in painted coatings within the scope area.
NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100, Fax: 206.534.1930
www.nvlabs.com

Bulk Asbestos Fibers Analysis
By Polarized Light Microscopy

Batch #: 2616841.00
Client Project #: 06113
Date Received: 12/14/2006
Samples Received: 5
Samples Analyzed: 5
Method: EPA/600/R-93/116

<table>
<thead>
<tr>
<th>Lab ID: 26116309</th>
<th>Client Sample #: 06113-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: WSU Vet Teaching School 1111E</td>
<td></td>
</tr>
<tr>
<td>Layer 1 of 1 Description: Light gray compressed fibrous material with paint</td>
<td></td>
</tr>
<tr>
<td>Non-Fibrous Materials:</td>
<td>Other Fibrous Materials:</td>
</tr>
<tr>
<td>Fine particles, Binder/Filler, Perlite</td>
<td>Cellulose: 40%</td>
</tr>
<tr>
<td>Glass beads, Paint</td>
<td>Glass fibers: 15%</td>
</tr>
<tr>
<td>Asbestos Type: None Detected ND</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lab ID: 26116310</th>
<th>Client Sample #: 06113-02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: WSU Vet Teaching School 1111E</td>
<td></td>
</tr>
<tr>
<td>Layer 1 of 1 Description: Light gray compressed fibrous material with paint</td>
<td></td>
</tr>
<tr>
<td>Non-Fibrous Materials:</td>
<td>Other Fibrous Materials:</td>
</tr>
<tr>
<td>Fine particles, Binder/Filler, Perlite</td>
<td>Cellulose: 40%</td>
</tr>
<tr>
<td>Glass beads, Paint</td>
<td>Glass fibers: 15%</td>
</tr>
<tr>
<td>Asbestos Type: None Detected ND</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lab ID: 26116311</th>
<th>Client Sample #: 06113-03</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: WSU Vet Teaching School 1111E</td>
<td></td>
</tr>
<tr>
<td>Layer 1 of 1 Description: Light gray fibrous material</td>
<td></td>
</tr>
<tr>
<td>Non-Fibrous Materials:</td>
<td>Other Fibrous Materials:</td>
</tr>
<tr>
<td>Fine particles, Binder/Filler, Vermiculite, Perlite</td>
<td>Cellulose: 35%</td>
</tr>
<tr>
<td>Asbestos Type: None Detected ND</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lab ID: 26116312</th>
<th>Client Sample #: 06113-04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: WSU Vet Teaching School 1111E</td>
<td></td>
</tr>
<tr>
<td>Layer 1 of 1 Description: Light gray fibrous material</td>
<td></td>
</tr>
<tr>
<td>Non-Fibrous Materials:</td>
<td>Other Fibrous Materials:</td>
</tr>
<tr>
<td>Fine particles, Binder/Filler, Vermiculite</td>
<td>Cellulose: 35%</td>
</tr>
<tr>
<td>Asbestos Type: None Detected ND</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lab ID: 26116313</th>
<th>Client Sample #: 06113-05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: WSU Vet Teaching School 1111E</td>
<td></td>
</tr>
</tbody>
</table>

Sampled by: Client
Analyzed by: Nadia Prysyazhnyuk Date: 12/15/2006

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-8%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.
Client: TerraGraphics Environmental Engineering  
Address: 121 S. Jackson Street  
Moscow, ID 83843

Attention: Mr. Dennis Sasse  
Project Location: WSU Vet Teaching School 1111E

<table>
<thead>
<tr>
<th>Layer 1 of 1</th>
<th>Description: Light gray fibrous material</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-Fibrous Materials:</td>
</tr>
<tr>
<td></td>
<td>Fine particles, Binder/Filler, Vermiculite</td>
</tr>
<tr>
<td></td>
<td>Perlite</td>
</tr>
<tr>
<td>Other Fibrous Materials:</td>
<td>Cellulose 35%</td>
</tr>
<tr>
<td>Asbestos Type:</td>
<td>None Detected</td>
</tr>
</tbody>
</table>

Batch #: 2616841.00  
Client Project #: 06113  
Date Received: 12/14/2006  
Samples Received: 5  
Samples Analyzed: 5  
Method: EPA/600R-83/118

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos: (1%=0-3%, 5%=1-9%, 10%=5-16%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.
November 8, 2013

Attention: Blaine McMahan

Subject: Good Faith Survey
Replace Rubber Flooring
Veterinary Teaching Hospital / McCoy Hall
Washington State University, Pullman, Washington
Work Order No.: 6274-2012

From: Matthew McKibbin
Industrial Hygienist
WSU Environmental Health and Safety
AHERA Building Inspector #141107 (exp. March 27, 2014)

Intensive care unit animal stalls 1, 2, 3, and 4 and the adjacent corridor (room 1212) in the Veterinary Teaching Hospital (VTH) will be renovated to accommodate new flooring. In addition, animal stalls A8, A9, B7 and B8 in rooms 174 and 175 of McCoy Hall will be renovated. Sampling was conducted by Washington State University (WSU) Environmental Health and Safety (EH&S) on November 1, 2013 in support of the project.

SCOPE OF WORK
EH&S was provided with a Scope of Work document by Centennial Contractors Enterprises, Inc, dated September 5, 2013. EH&S understands the scope of work is limited to the following:

VTH
• Remove and replace existing floor coating in ICU stalls 1, 2, 3, 4 and adjacent corridor room 1212 (the Project Area).
• Remove and replace existing rolling gates in ICU stalls to accommodate new floor height.
• Miscellaneous renovations to doors, transitions and wall accessories within the Project Area.

McCoy Hall
• Miscellaneous renovations to wall and gate mounted accessories in stalls A8, A9, B7 and B8 of rooms 174 and 175 (the Project Area)
• Modify existing concrete floor finish for improved drainage
• Install new poured flooring

The scope of services for the limited regulated materials assessment was limited to the following tasks:

• Perform a limited “Good Faith” asbestos survey of the Project Area to identify the presence, location, and quantity of asbestos-containing materials (ACM) and presumed asbestos-containing material (PACM) that may be impacted by the proposed project.
• Perform the asbestos survey in accordance with the “Good Faith” asbestos survey requirements in the Washington Administrative Code (WAC) 296-62-07721, and in accordance with the requirements of USEPA AHERA/ASHARA 40 CFR 763.
• Analyze samples by a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory for the presence and quantity of asbestos. Samples are analyzed using polarized light microscopy (PLM) Environmental Protections Agency (EPA) Method 600/R-93/116.
• Sampling of representative paints for lead using x-ray fluorescence (XRF) device was not provided by EH&S. Results of paint sampling for lead content were provided to the Contractor by Blaine McMahan of CPD under separate communications.
### TABLE 1
**SUMMARY OF ASBESTOS SAMPLING**
**VETERINARY TEACHING HOSPITAL AND MCCOY HALL**

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Building Name</th>
<th>Building #</th>
<th>Sample Location (Room #)</th>
<th>Material</th>
<th>Material Description</th>
<th>Type</th>
<th>Location Quantity</th>
<th>Quantity Descriptor</th>
<th>Sample Results</th>
<th>ACM?</th>
</tr>
</thead>
<tbody>
<tr>
<td>P00798</td>
<td>Veterinary Teaching Hospital</td>
<td>0813</td>
<td>1221E</td>
<td>Poured flooring</td>
<td>Gray poured textured flooring</td>
<td>Misc.</td>
<td>1,000</td>
<td>SF</td>
<td>NAD</td>
<td>No</td>
</tr>
<tr>
<td>P00799</td>
<td>Veterinary Teaching Hospital</td>
<td>0813</td>
<td>1221</td>
<td>Poured flooring</td>
<td>Gray poured textured flooring</td>
<td>Misc.</td>
<td>1,000</td>
<td>SF</td>
<td>NAD</td>
<td>No</td>
</tr>
<tr>
<td>P00800</td>
<td>Veterinary Teaching Hospital</td>
<td>0813</td>
<td>1221C</td>
<td>Poured flooring</td>
<td>Gray poured textured flooring</td>
<td>Misc.</td>
<td>1,000</td>
<td>SF</td>
<td>NAD</td>
<td>No</td>
</tr>
</tbody>
</table>

**Notes:**
- a) All asbestos analytical results are reported as percent asbestos per volume of bulk material sampled, as determined by U.S EPA Method 600/R-95/116.
- b) SF = Square feet
- c) NAD = No asbestos detected
- d) Misc. = Miscellaneous material
- e) **Bold** type indicates samples that contain asbestos
Asbestos Bulk Analysis Report

Client: Washington State University - Pullman
P.O. BOX 641172
Pullman, WA 99164

Received Date: 11/06/2013
Analyzed Date: 11/06/2013
Reported Date: 11/07/2013

Project/Test Address: VTH; McCoy Flooring; Pullman, WA

Client Number: 49-3308

Fax Number: 509-335-4442

<table>
<thead>
<tr>
<th>Lab Sample Number</th>
<th>Client Sample Number</th>
<th>Layer Type</th>
<th>Lab Gross Description</th>
<th>Asbestos</th>
<th>Other Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>13-11-00691-001</td>
<td>P00798</td>
<td>Dark Gray Cementitious; Homogeneous</td>
<td>NAD</td>
<td>1% Wollastonite 99% Non-Fibrous</td>
<td></td>
</tr>
<tr>
<td>13-11-00691-002</td>
<td>P00799</td>
<td>Dark Gray Cementitious; Homogeneous</td>
<td>NAD</td>
<td>1% Wollastonite 99% Non-Fibrous</td>
<td></td>
</tr>
<tr>
<td>13-11-00691-003</td>
<td>P00800</td>
<td>Dark/Light Gray Cementitious; Inhomogeneous</td>
<td>NAD</td>
<td>1% Wollastonite 99% Non-Fibrous</td>
<td></td>
</tr>
</tbody>
</table>
To: Mike Sturko
Date: April 14, 2004
From: Steve Pea

Subject: Good faith building inspection for materials containing asbestos for the ceiling tile replacement project in the Veterinary Teaching Hospital building #0818; Log #298709.

Mike Sturko,

At the request of the Facilities Operations Construction Services, Facilities Operations has completed a regulated materials survey in anticipation for the proposed project for damaged ceiling tile replacement in the Veterinary Teaching Hospital building #0818. This survey was limited to an evaluation of the presence of asbestos containing materials in the immediate area where the project will take place. The object of the survey was to evaluate the presence of asbestos materials to be impacted by the project that was given to me on work request #CY562. The results are listed below.

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Sample Location</th>
<th>Material Sampled</th>
<th>Analysis Summary Description</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>B7308</td>
<td>Basement Ceiling</td>
<td>Gray 2' x 4' Suspended Tile</td>
<td>Pale Gray Fib.; White Brittle</td>
<td>No Asbestos</td>
</tr>
<tr>
<td>B7309</td>
<td>Basement Ceiling</td>
<td>Gray 2' x 4' Suspended Tile</td>
<td>Pale Gray Fib.; White Brittle</td>
<td>No Asbestos</td>
</tr>
<tr>
<td>B7310</td>
<td>Rm 1023 Ceiling</td>
<td>Gray 2' x 4' Suspended Tile</td>
<td>Pale Gray Fib.; White Brittle</td>
<td>No Asbestos</td>
</tr>
<tr>
<td>B7311</td>
<td>Rm 1214 Ceiling</td>
<td>Gray 2' x 4' Suspended Tile</td>
<td>Pale Gray Fib.; White Brittle</td>
<td>No Asbestos</td>
</tr>
<tr>
<td>B7312</td>
<td>Floor 1: Ceiling</td>
<td>Gray 2' x 4' Suspended Tile</td>
<td>Pale Gray Fib.; White Brittle</td>
<td>No Asbestos</td>
</tr>
<tr>
<td>B7313</td>
<td>Floor 1: Ceiling</td>
<td>Gray 2' x 4' Suspended Tile</td>
<td>Pale Gray Fib.; White Brittle</td>
<td>No Asbestos</td>
</tr>
</tbody>
</table>

- Attachment #1 is a list of the materials sampled and the lab analysis report.
Sample Summary:

This investigation was performed to evaluate the potential presence of materials containing asbestos in the project areas in the Veterinary Teaching Hospital building #0818. There were six samples taken and analyzed. None of the samples taken showed asbestos materials as being present in the materials proposed to be disturbed within the project location. **These samples were taken of homogenous ceiling tiles randomly throughout the Veterinary Teaching Hospital building.** Finding no asbestos present in the materials sampled, I have determined that there are no ceiling tiles present in the Veterinary Teaching Hospital building containing asbestos materials. If materials not listed in this report are to be impacted by this project additional sampling must be conducted.

I trust that this report provides Washington State University Construction Services with the information required at this time. If you have questions about the information presented within this document, please contact me.

Sincerely,

Steve Pea
Certified Building Inspector
Washington State University
Facilities Operations - Utilities Division
335-9000
# Bulk Asbestos Sample Analysis Summary

**Client:** Washington State University - BA#73472  
Environmental Health and Safety  
P.O. Box 641172  
Pullman, WA 99164-1172

**Date of Receipt:** 08 Apr 2004  
**Date of Analysis:** 08 Apr 2004  
**Date of Report:** 09 Apr 2004

**Client Number:** 49-3308 D  
**EHS Project #:** 04-04-1063  
**Project:** CY562-818; Vet. Teching H

<table>
<thead>
<tr>
<th>EHS SAMPLE #</th>
<th>CLIENT SAMPLE #</th>
<th>LABORATORY GROSS DESCRIPTION</th>
<th>% Asbestos</th>
<th>Other Materials</th>
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</thead>
<tbody>
<tr>
<td>01</td>
<td>B7308/</td>
<td>Pale Gray Fib.; White Brittle</td>
<td>NAD</td>
<td>45% Cellulose</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>35% Fibrous Glass</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20% Non-Fibrous</td>
</tr>
<tr>
<td>02</td>
<td>B7309/</td>
<td>Pale Gray Fib.; White Brittle</td>
<td>NAD</td>
<td>45% Cellulose</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td>35% Fibrous Glass</td>
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<td></td>
<td>20% Non-Fibrous</td>
</tr>
<tr>
<td>03</td>
<td>B7310/</td>
<td>Pale Gray Fib.; White Brittle</td>
<td>NAD</td>
<td>45% Cellulose</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>35% Fibrous Glass</td>
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<td></td>
<td></td>
<td>20% Non-Fibrous</td>
</tr>
<tr>
<td>04</td>
<td>B7311/</td>
<td>Pale Gray Fib.; White Brittle</td>
<td>NAD</td>
<td>45% Cellulose</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20% Non-Fibrous</td>
</tr>
<tr>
<td>05</td>
<td>B7312/</td>
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<td>NAD</td>
<td>45% Cellulose</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>35% Fibrous Glass</td>
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<td></td>
<td></td>
<td></td>
<td>20% Non-Fibrous</td>
</tr>
<tr>
<td>06</td>
<td>B7313/</td>
<td>Pale Gray Fib.; White Brittle</td>
<td>NAD</td>
<td>45% Cellulose</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td>35% Fibrous Glass</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20% Non-Fibrous</td>
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</table>

**QC Sample:** M2-1998-2  
**QC Blank:** SRM 1866 Fiberglass  
**Reporting Limit:** 1% Asbestos  
**Method:** Polarized Light Microscopy, EPA Method 600/R-93/116 *  
** Analyst:** Mark Case

Reviewed by Authorized Signatory:  
Howard Varner, Laboratory Director  
Irma Paszewski, Quality Assurance Coordinator  
David Xu, MS, Senior Chemist  
Peng Jiang, MS, Senior Geologist  
Michael A. Mueller, Quality Assurance Manager
<table>
<thead>
<tr>
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<th>VT H</th>
<th>Date: 4-5-04</th>
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<tr>
<td>Floor:</td>
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<td>Room: Mess Hall 4R</td>
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<tr>
<td>Location:</td>
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<td>Wall: floor ceiling</td>
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<tr>
<td>Sample No:</td>
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<table>
<thead>
<tr>
<th>Pipe/Tank</th>
<th>HVAC</th>
<th>Roofing</th>
</tr>
</thead>
<tbody>
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<td>insulation</td>
<td>insulation</td>
<td>shingle</td>
</tr>
<tr>
<td>row</td>
<td>tape</td>
<td>rolled</td>
</tr>
<tr>
<td>fitting</td>
<td>popcorn</td>
<td>felt</td>
</tr>
<tr>
<td>transite pipe</td>
<td>textured</td>
<td>tar</td>
</tr>
<tr>
<td>gasket</td>
<td>glazed-on tile</td>
<td>transite shingle</td>
</tr>
<tr>
<td>tank insulation</td>
<td>mastic</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Flooring</th>
<th>Wall</th>
<th>Misc</th>
</tr>
</thead>
<tbody>
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<td>12 x 12 tile</td>
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<tr>
<td>9 x 9 tile</td>
<td>textured wall</td>
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<tr>
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<td>textured wall</td>
<td>window putty</td>
</tr>
<tr>
<td>mastic</td>
<td>transite panel</td>
<td>other:</td>
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<td>shingle</td>
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<td>tape</td>
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<td>fitting</td>
<td>popcorn</td>
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</tr>
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<td>transite pipe</td>
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</tr>
<tr>
<td>mastic</td>
<td>transite panel</td>
<td>other:</td>
</tr>
</tbody>
</table>

### Directions

1. Use a separate page for each building.
2. Fill out one section for each sample taken. Provide as much information as possible.
3. Use a unique sample number as provided by Facilities Operations administrative staff for each sample.

**NOTE:** if multiple samples are being taken of a homogenous material, use the same unique number, and place a letter qualifier behind it for each sample, i.e., B4032a, B4032b, B4032c, etc.
PART 1 GENERAL

1.01 SUMMARY

A. Contractor shall perform the entire Work in accordance with the Contract Documents.

B. Without limiting the requirements of the Contract Documents, the Work of the Contract can be summarized as follows:

1. The MRI facility in Room 1303A has had challenges with image background artifacts. The likely cause is a compromised radiofrequency (RF) shielding. This project will remove and replace the existing RF shielding for the room, which will require removal and replacement of existing penetrations, including mechanical and electrical components. The vendor of the new MRI will remove the existing MRI magnet and equipment and install new systems. The mechanical and electrical systems inside the existing RF shielding require removal and replacement to facilitate that work. The awarded General Contractor will be required to remove all associated utilities and perform architectural, structural, mechanical and electrical renovations. The Owner has selected an RF Shielding Company to work as a Subcontractor to the General Contractor. An allowance for this cost is provided in section 00 50 00 and shall be included in the General Contractor’s bid. The completed project will be a renovated MRI suite with new imaging equipment and a fully functioning RF shielding system.

C. Expected Owner-supplied Contractor-installed Work: None

D. Expected Work by Owner: None

1.02 SCHEDULE OF ALTERNATES – NOT USED

1.03 SCHEDULE OF ALLOWANCES

A. Without limiting the requirements of the Contract Documents, the Scope of the Allowances can be summarized as follows:

1. RF Shielding – ETS Lindgren: $232,046.00. See proposal attached at the end of this section.

1.04 SCHEDULE OF UNIT PRICES – NOT USED

1.05 GENERAL INFORMATION

A. Owner and Owner’s Designated Representative:

1. Owner: Board of Regents
   Washington State University
Pullman, WA 99164-1045

2. Owner’s Designated Representative:
   a. All Owner capital projects are administered by the Department of Facilities Services, Capital. Project specific designated representatives are listed within the Agreement.

3. Consulting Services: Owner has retained an Architect/Engineer to design the entire Project. The Architect/Engineer is identified below, as are others involved as members of the Owner team working on the Project:
   a. Architect/Engineer: Buffalo Design
   b. Mechanical Engineer: Veach Consulting Engineers LLC
   c. Electrical Engineer: Cross Engineers
   d. RF Shielding Testing & Design Consultants: ETS Lindgren

1.06 SPECIAL CONDITIONS

A. Site Access:
   1. Limited access as described on the Drawings.

B. Schedule and Phasing:
   1. Construction activities above 55 decibels will need to be coordinated by Owner’s representative, and may need to occur during off hours.

C. Owner Occupancy:
   1. Facility will remain occupied 24 hours a day 7 days a week.

D. Hazardous Material:
   1. See Good Faith Survey.

END OF SECTION 01 11 00
May 24, 2017

Attention: Chris Carlson

Budget: 106826 DAB
Rev 2 Date: 12/20/2018
Ph: 206-467-6306
chris@buffalodesign.com

WSU Veterinary Teaching Hospital 205 Ott Road #1002 Pullman, WA 99164

<table>
<thead>
<tr>
<th>Project:</th>
<th>Location:</th>
<th>Shield type:</th>
<th>MRI system:</th>
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</thead>
<tbody>
<tr>
<td>WSU Veterinary Teaching</td>
<td>205 Ott Road #1002</td>
<td>All copper Modular RF shield</td>
<td>Philips Ingenia 3.0T</td>
</tr>
<tr>
<td>Hospital</td>
<td>Pullman, WA 99164</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ETS-Lindgren, Inc. is in receipt of your request for proposal for the above-mentioned project. This proposal is based solely upon the information detailed below:

1) Site drawings project #28349-2015 11/29/18
2) Philips site drawings #N-WES180435.01 12/10/2018
3) ETS-Lindgren drawings: MD62094 Rev D 11/29/18
4) ETS Lindgren is providing our Premium All Copper MRCu Modular RF Shield. ETS Lindgren takes exception to all sections of a specification that differs from our standard all copper RF shielded enclosure used for MRI applications
5) REVISIONS: Rev 2 12/20/18

**Narrative:** The modular shield is self-supporting and independent of the parent room walls. For highest RF attenuation available all RF seams are constructed using a 1-3/4" wide compliant material bolted on 8" centers. The RF ceiling panels are supported either by external or internal wood or steel beams (max room width for use of the beams is 20’) or tension rods hung from the parent structure overhead. All interior wall framing and utility items can be attached to the interior surface of the shield. See structural load connection limitations in item 2 of the general exceptions. This system is available with ALL ETS-Lindgren upgrades.

**Assumptions:**

6) The area above the RF shield is clear of any obstructions that will hinder the placement of the approved steel support beams.
   a. The customer will be responsible to ensure a clear area above and if not remove any item that will interfere with the placement of the support beams.
7) That the floor foundation is properly prepared to accept the RF flooring system
   a. Finished flat to the requirements of the magnet manufacturer.
   b. If the Grout Floor option is selected then see Option 1 for GC required floor preparation.

**LABOR RATES:** All labor rates provided within this proposal reflect Lindgren’s standard open shop hourly rate. There are no provisions for prevailing wage or union scale labor cost. If this project is prevailing wage or union shop then Lindgren reserves the right to adjust our labor costs accordingly to provide for same.

Additional, relevant, information that has not provided to us at the time of this proposal may influence the final price. Therefore, ETS-Lindgren, Inc. proposes to: fabricate, deliver f.o.b. site, install (RF shield only), RF test, and warrant the following device(s):
### SECTION 1 – SCOPE OF WORK

#### Room #1303A

<table>
<thead>
<tr>
<th>RF Categories for Room</th>
<th>Item Description –</th>
<th>Notes &amp; Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shield size – nominal</td>
<td>• 19’-6”w x 23-5’ l x 11’-0”h</td>
<td>Modular Copper Shield</td>
</tr>
<tr>
<td>Warranty</td>
<td>5 year on shield, 1 year on components – see attachment</td>
<td></td>
</tr>
<tr>
<td>Shield frame fire rating</td>
<td>Pressure treated, ASTM E-84, NER-577 (rating stamp affixed)</td>
<td></td>
</tr>
<tr>
<td>RF floor</td>
<td>• ETS-Lindgren’s patented copper, epoxy/grout, water resistant, monolithic, INPLACE® RF floor system</td>
<td>(Please see option 2 for floor upgrades)</td>
</tr>
<tr>
<td>RF Ceiling</td>
<td>• Seismic external steel ceiling hanger support rods.</td>
<td></td>
</tr>
</tbody>
</table>
| RF door                | • ETS-Lindgren EVO AIR RF Double Door 6’ x 7” – Double Out Swing – Patient Door  
  o Air Compressor  
  o Standard Door Lock Hardware  
  o Flush profile threshold.  
  o Standard laminate  
  • 1 ea ETS-Lindgren EVO-AutoSeal™ (STC 44) Acoustic/RF Shielded Door. 4’ x 7” – In Swing – Patient Door  
  o Air Compressor  
  o Acoustical Rating STC 44  
  o Flush profile threshold.  
  o Standard Door Lock Hardware  
  o Standard laminate | (Please see option 1 for door upgrades) |
| RF Window(s)           | • Control Room View Window: Std. Aluminum frame  
  o 1 ea. 4’-0” x 4’-0” w/glass both side | Window sections over 4’x6’ will require a vertical or horizontal mullion spacer. |
| HVAC – wave guides     | • Wave guide Air Vents for:  
  o 10 sq ft as required. |
| Plumbing – wave guides | • 1 each: Med gas panel  
  o 2 each ½” & 1 each ¾” wave guides  
  • 1 each: 1-1/2” Sprinkler Wave guide Pipe |
| RF Electrical Filters – standard issue included in base price | • 3 – 30amp – Lighting  
  • 1 - 1amp - Dimmer  
  • 2 – 30amp – receptacles  
  • 2 – 30amp – Extra *  
  • 2 – 1amp – Fire Alarm (2 wires only) *  
  • 0 – 1amp – Thermostat (2 wires only)  
  • 0 – 1amp – Humidistat (2 wires only)  
  • 0 – 1amp – Nurse call system (2 wires)  
  • 1ea Ground Stud & 2 ea Ground Bus Bars  
  • 1ea – Ground Monitor – (Left on site for duration)  
  *Note: The lighting filters quoted are for standard LED lighting. Some LED systems may require additional or non-standard filters and will be quoted separately. The LED lighting manufacturer is responsible for specifying the quantity and type of electrical filter(s) required for their system and this site. | (Please see option 10 for addition filters pricing) |
| Magnet installation kit Philips | • 1 – RF door interlock switch  
  • 4 - Aluminum magnet support pads (S1)  
  • 2 - Aluminum patient support pads (S2)  
  • 1 – System Filter Box RF feedthrough (S9)  
  • 1- Helium Gas Exhaust Pipe RF feedthrough (S10)  
  • 1 – System Air Cooling Waveguide (S12)  
  • 1 – 24” x 24” Emergency Over Pressure RF feedthrough (S13)  
  • 1- Air Grid feedthrough for conditioned air (S14)  
  • 1 - 12” x 12” RF panel with 3” waveguide for future accessories. (S16)  
  • 1 - 4” waveguide for service (S17)  
  • 1- Aluminum Embed Floor Plate (Floor trench) (S24)  
  • 1 – Patient couch Anchors |
| Ambient Experience Halo| None |

*Note: The lighting filters quoted are for standard LED lighting. Some LED systems may require additional or non-standard filters and will be quoted separately. The LED lighting manufacturer is responsible for specifying the quantity and type of electrical filter(s) required for their system and this site.*
Magnetic shielding

- Rear Wall Silicon: M36 Silicon steel will be mounted to the parent structure.
- R&L Walls: M36 Silicon steel will be mounted to the parent structure.
- GC is to provide adequate wall support (typically 16ga. studs are adequate) lined with ½" plywood on the parent wall to receive the Remote Magnetic steel installation by Lindgren.
- Ceiling Silicon 8mm M36 Silicon – will come as pre-fabricated panels consisting of 4’x4’x½" plywood which will be mounted to the existing building structure.
- Support Grid - Lindgren will provide unistrut support grid 2 runs per 4’ silicon panel running the length of the silicon panel.
- GC is responsible to provide an adequate connection point to the existing building structure. Typically Unistrut running perpendicular to the width of the RF shield ceiling panel.
- Floor Toe Silicon: M36 Silicon steel will be placed beneath the RF Shield in from the rear.

Acoustic Kit

- Yes #8 Mineral Wool (Please see option 4 for acoustic upgrades)

Special application items

- 1- SuiteSentry FMDS Single Pole (By DD door)
- 1- SuiteSentry FMDS Entryway Dual Pole (Single Door)
- 14 – ETS-Lindgren ZXR-4000 LED Room Down Lights. (Installed by others)
- Empower MR Injector Penetration Plate (EI Philips)

Installation services provided

- Yes – factory trained and supervised open shop
- Three Mobilizations to site:
  1. Installation of Magnetic Shielding
  2. Installation of RF Shielding
  3. Shield close up and final RF test

RF testing services provided

- Yes – 2 each:
  1) Initial acceptance test at installation
  2) Final RF test at delivery of the magnet and close up of the shield. RF test report provided

Return trip to close shields

- Yes

Freight:

- FOB Origin Pre Paid & Charged Back

PE stamp & calculations

- YES - See option 9 (To be updated with silicon steel add)

SECTION 2: Pricing and acceptance

Price table for: One (1) Copper “Free Standing Modular” RF shield

<table>
<thead>
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<th>Schedule of Values</th>
<th>Taxable</th>
<th>Tax value of the line</th>
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<td>$13,079.21</td>
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<tr>
<td>Base Bid Labor</td>
<td>$41,374.00</td>
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<td>$3,412.50</td>
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<tr>
<td>Phase 1 - Steel Install Labor</td>
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<td>Freight</td>
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<td>$460.20</td>
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<td>Insurance allocation</td>
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<tr>
<td>Sub Total</td>
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<td>$17,553.59</td>
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<tr>
<td>Total Tax amount</td>
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<tr>
<td>Total Lump Sum Bid</td>
<td>$249,599.58</td>
<td></td>
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</table>
I have reviewed this proposal and I am aware that:

**SALES TAXES - GENERAL CONDITIONS**

- Unless specifically stated otherwise, prices quoted or stated do not include Federal, State, or Municipal sales, use, excise or other taxes measured, in whole or in part, by gross receipts. Any such taxes applicable to the sale, processing, assembling, installing, use of consumption of the goods or materials and/or any services or labor shall be the sole obligation of the customer and will be invoiced to the customer.
- "Customer agrees that applicable sales taxes will be those in effect within the pertinent jurisdiction at the time of invoicing by ETS-Lindgren”
- Any applicable exemptions to the above stated taxes should be made available to ETS-Lindgren prior to invoicing or sales tax will be charged to the state of destination. Any sales tax exemption certificates must correlate with the state of destination.
- A 3% surcharge will be added to all credit card orders over $5,000
- Options are listed in section 3 of this proposal. When required you must add sales tax for the total amount of the selected options.
- The General Terms and Conditions shown on the attached sheets “Terms and Conditions for ETS-Lindgren, Inc. (ESCO 2-2013) and Warranty ETS MD W2014-5-1 (Rev 8-2014)” are incorporated herein and made part of the quotation.

**ACCEPTED:**

Buyers acceptance of this proposal, whether written or oral, constitutes acknowledgement of the product descriptions, Quantities and terms/conditions contained herein.

Name: __________________________________________

Title: ____________________________________________

Date: ____________________________________________

---

**When entering into an agreement to purchase please use the following address to remit all invoiced amounts. Please note the invoice number on all checks.**

**Direct payment - Lockbox**

ETS-Lindgren, Inc.

P.O. Box 841147

Kansas City, MO 64184-1147

**Payment by Check (Overnight Courier Services):**

Commerce Bank

811 Main KC, LBX-841147

Kansas City, MO 64105

Phone: 1-800-207-0886

**Wire Transfer funds to:**

Bank: Commerce Bank

ABA#: 101000019

Account#: 208012547

Account Name: ETS-Lindgren, Inc.

**Payment by Wire Transfer (International):**

Bank: Commerce Bank

ABA#: 101000019

SWIFT#: CBKCUS44

8000 Foresth

St. Louis, MO 63105

Account#: 208012547

Account Name: ETS-Lindgren, Inc.

---

**Payment terms, delivery information, warranty, other.**

**WARRANTY:** See attachment

**PAYMENT TERMS:** 20% down upon order placement with multiple element billings net 30 days after invoice

**DELIVERY:** 4 - 6 weeks after receipt of customer approved drawings.

<table>
<thead>
<tr>
<th>Event</th>
<th>Engineering</th>
<th>Customer approval</th>
<th>Manufacturing</th>
<th>Delivery</th>
<th>Installation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days (working)</td>
<td>7-10</td>
<td>5-10</td>
<td>15-20</td>
<td>5</td>
<td>6-7 Days</td>
</tr>
</tbody>
</table>

**PRICE VALIDATION:**

- **Radio frequency shields without magnetic shielding:** Valid for a period 90 days from the date of this proposal.
- **Magnetic shields or radio frequency shields with magnetic shielding:** Valid for a period of 30 days from the date of this proposal.
- **Projects involving steel:** Acts of God, industrial disputes, disturbances, official measures, non-arrival of deliveries from suppliers and other unpredictable, unavoidable and serious events will release the contracting partners from their duty to perform for the duration of the disturbance and to the extent of their effect. This is also applicable where these events occur at a time with the contracting partner concerned is in default, unless the delay is caused intentionally or gross negligently. The contracting partner is obliged, as far as is reasonable to provide the necessary information immediately and in good faith to adjust their obligations to the changed conditions. Due to the unforeseen and unprecedented increases and variability in the North American steel industry, the price quoted herein is subject to change based upon the increases and/or surcharges that may be imposed after this date by the steel industry. Pricing can only be fixed and finalized at time of shipment.“

**NOTE:** No material manufacturing, partial shipments, nor any installation or scheduling services will commence until such time that Lindgren receives a properly executed contract, purchase order, or signature affixed to this proposal.
SECTION 3: AVAILABLE OPTIONAL EQUIPMENT, SERVICES, AND ENHANCEMENTS

The following optional items are designed to offer RF and magnetic shield enhancements to the customer over that of most other typical industry standard MRI shielding systems. NONE OF THE FOLLOWING OPTIONS ARE REQUIRED TO MEET THE BASIC REQUIREMENTS OF THE PROJECT AND ARE NOT MADE PART OF THE QUOTED PRICE UNLESS OTHERWISE NOTED. (Note: options/valued engineered items must be selected prior to the manufacture of the RF shield. Additional cost may be incurred if selected after this time).

Note: Sale tax is not included in the option price as listed. Calculate & add sales tax on the full amount of the option price.

Note: All pricing below in per room/shield.

<table>
<thead>
<tr>
<th>OPTIONS: 1 - 13</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>OPTION 1 &amp; 1A: RF door upgrades</td>
<td>OPTION 9: Provide state PE stamp</td>
</tr>
<tr>
<td>OPTION 2: RF floor upgrade</td>
<td>OPTION 10: RF electrical filters</td>
</tr>
<tr>
<td>OPTION 3: Clearshield™ RF windows</td>
<td>OPTION 11: Union labor</td>
</tr>
<tr>
<td>OPTION 4: Acoustic damping kit</td>
<td>OPTION 12: Magnetic Active Comp Sys.</td>
</tr>
<tr>
<td>OPTION 5: Air Alert: MRI in room atmospheric oxygen depletion monitor</td>
<td>OPTION 13: FMDS (Ferromagnetic Detection Systems)</td>
</tr>
<tr>
<td>OPTIONS 6 &amp; 6A: LED Light boxes &amp; Interior Lighting</td>
<td>OPTION 14: Tech Gate</td>
</tr>
<tr>
<td>OPTION 7: Interior furring studs</td>
<td>OPTION 15: BIM Modeling</td>
</tr>
<tr>
<td>OPTION 8: Magnet Anchors</td>
<td></td>
</tr>
</tbody>
</table>

1) **RF door upgrades**: The base price includes the selected RF door detailed within the scope of work. ETS-Lindgren offers a number of RF door upgrades. Our standard EVO RF door uses mechanical spring finger RF contacts. The EVO door line is available with a number of optional items and in enhanced STC ratings. Our EVO Auto Seal™ RF door uses a fully automatic RF sealing mechanism instead of the mechanical spring finger RF contacts. The EVO Auto Seal™ system offers superior attenuation performance and efficient user interface. The Auto Seal™ system requires customer furnished 120vac power for both the door and its associated compressor. [Note: Prices quoted are for EACH door selected.]

Option 1: All option prices assume that a standard EVO door is proposed in the base bid.

**EVO Door Options (Low Profile Threshold):**

Add EVO 34 STC34 door assembly: Add: $1,200.00 Accepted:__________

Add EVO 40 STC40 door assembly: Add: $2,400.00 Accepted:__________

Add EVO Magna lock safety locking system with programmable keypad: Add: $1,800.00 Accepted:__________

**EVO-Auto Seal™ door options (Flush Profile Threshold):**

Add EVO-AS 32 Auto-Seal STC32 door assembly: Add: $6,800.00 Accepted:__________

Add EVO-AS 44 Auto-Seal STC44 door assembly: Add: $0.00 Accepted: INCLUDED IN BASE BID

Add EVO Auto-Seal door assembly Door-Gard™ cipher security system: Note: To interface a fire alarm, oxygen monitor or other alarm devices to the EVO-Auto Seal door the Door-Gard™ option must be selected: Add: $2,250.00 Accepted:__________

Add EVO Vision Panel (24” x 24” window) Add: $2,000.00 Accepted:__________

Add Full Automatic door opener/closure device: Add: $6,800.00 Accepted:__________

1A) **SIVP: RF shielded door frame intravenous tubing pass-through system**: MRI patients that require continuous, uninterrupted IV line connections pose a difficult problem when an MRI study is required. Many infusion pumps and other mechanicals are not MRI compatible and as such cannot be moved into the exam room with the patient. When IV lines remain connected but outside of the exam room the staff must operate the MR with the radio frequency door in the opened position. This condition can allow local, electromagnetic interference to corrupt the diagnostic imaging produced by the MR scanner. ETS-Lindgren now offers a unique, RF shielded portal (SIVP) that allows uninterrupted IV lines and other non-ferrous patient connections to pass through the RF door frame with the RF door in a fully closed and RF tight condition. The SIVP allows for quick and simple insertion of multiple IV lines through our EVO-AS line of RF doors. With the SIVP option IV lines are protected from the active leaf of the RF door assembly and allow IV lines to remain intact. This EVO-AS door accessory eliminates the need to move unsafe or non-MRI compatible equipment into the MR exam room.

For option 1A – Only available on the EVO-AS door

Add to the total price: $3,295.00 Accepted:__________

- Note: The EVO-AS door line cannot be field upgraded to accept the SIVP option, it is only available as a factory installed item.
- Note: Standard SIVP slot design capacity is =< 11 standard 0.156”o.d. IV lines.
2) **RF floor upgrade**: Replace proposed non-waterproof, modular, wood core, compression clamp, RF floor with Lindgren’s patented copper, epoxy/grout, water resistant, INPLACE® RF floor system. The INPLACE® floor system is epoxy bonded directly to the parent structural slab. All copper seams are welded. Underlayment has self-leveling properties but is not intended to correct parent floor levelness, and is ready for customer furnished tile goods.

**Customer responsibilities:**
- Slab must be clean down to the bare surface by mechanical means (surface shot blast) to a surface profile of (3) CSP3.
- Do not apply any concrete sealer.
- The parent slab must be level to at least the minimum requirements of the magnet manufacturer or as stated in the RF shield submittal plans.
- If leveling is required, the customer is responsible for leveling using Ardex MC Rapid primer, Ardex K15 leveler with final bead blast to CSP3 finish.
- The installation of magnetic floor shielding may require additional preparation and/or modification to the floor slab, all slab preparation and modifications are by the customer. [Note: price quoted is for each floor selected]

<table>
<thead>
<tr>
<th>For Option 2 – ADD to the total price:</th>
</tr>
</thead>
<tbody>
<tr>
<td>For slabs on grade: $ 0.00</td>
</tr>
</tbody>
</table>

**Note for Magnetic Shielding:** If silicon steel is required on the floor, an additional 4” floor depression in the area to receive the silicon will be required to accommodate the epoxy grout floor system. Silicon steel will need to be shipped out early and be placed in the additional floor depression. Once placed the GC is responsible for providing a topping slab over the silicon. Additional pricing for shipping & installation of floor silicon will be required.

3) **Provide exterior RF shielded window units or sky light assembly**: Provide high visibility, RF shielded window(s) to match exterior wall windows. All windows to use high optical quality 304 stainless steel wire cloth in lieu of industry standard low optical quality copper or bronze screen. Exterior RF window assemblies are sold with interior surface safety glass only. [Note: LRFE will provide glass cut details if the customer elects to provide and install the require glass] $N/C = No Charge included in total price. (Control room RF window included in base price)

<table>
<thead>
<tr>
<th>For option 3 –</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Provide Clearshield™ window wall assembly: N/A</td>
</tr>
<tr>
<td>**Add Aluminum frame window/sky light assembly: Included in Base Price for Control Room View Window.</td>
</tr>
</tbody>
</table>

*Center mullion/mutton width is 3”. Does not require finishes by general contractor.  
**Center mullion/mutton width is 7-1/2” Requires finishes by general contractor.

4) **Add acoustic damping kit to RF shield wall and ceiling panel assemblies**: Increase the acoustic contribution of the RF shield to that of the MRI room’s general construction methods. The interior and exterior finished walls of the building provide the majority of the acoustic damping. The RF shield with the Lindgren Premium MR-CU acoustic kit shown below will add to the overall STC rating of the MR rooms walls and ceiling areas. Contact Lindgren or your architect for additional information concerning the design and installation of acoustic construction methods. [Note: price quoted is for each room selected]

<table>
<thead>
<tr>
<th>For Option 4 – Lindgren Premium MR-CU acoustic RF panel kit: (Premium copper shield only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acoustic performance: ASTM E90-09 - STC19 – band width 80Hz – 10KHz</td>
</tr>
<tr>
<td>MR gradient frequency performance in dB:</td>
</tr>
<tr>
<td>1/3 Octave Band Mid-band Freq (Hz)</td>
</tr>
<tr>
<td>800</td>
</tr>
<tr>
<td>1000</td>
</tr>
<tr>
<td>1250</td>
</tr>
<tr>
<td>1600</td>
</tr>
</tbody>
</table>

Acoustic Research Laboratory, Cedar Park, TX

ADD to the total price: $ 0.00 Accepted: INCLUDED IN BASE BID
5) **Air Alert: MRI in room atmospheric oxygen depletion monitor:** MRI rooms present a unique safety situation; a magnet that on average contains over 1,000 liters of cryogenic helium sealed in a radio frequency enclosure. This is equivalent to 26,700 cubic feet of gaseous helium. Under normal conditions internal atmospheric oxygen levels are of no concern. In an instant, internal atmospheric conditions could change dramatically. ETS-LINDGREN now offers AIR ALERT™ SAMPLE DRAW ATMOSPHERIC MONITORING SYSTEM. Air Alert™ is a self-contained oxygen deficiency detection system. It is designed for continuous remote monitoring of your MRI scan room. Air Alert provides oxygen depletion readings over a range of 0 to 25% (normal oxygen gas concentration is 20.9% of atmospheric volume) across a temperature span of -40° to 122° F, with an accuracy of ± 1% of full scale. Air Alert is not affected by changes in temperature, humidity, or barometric levels.

For option 5 –
Add Air Alert with dual alarm, user selectable, relay contacts (Item # OMS-255556): $3,495.00  
- Optional accessories:
  - Remote Horn Alert and Strobe Combo (Item # OMS-255553): $ 490.00 
  - Remote Display (Item # OMS-255552): $ 550.00

6) **Med-Vision Ceiling or Wall Mounted GDP RF Illuminated Display System:** The latest in lighting technology – graphic panel illuminators for MRI suite applications. GDP’s use high quality, long-life LED’s (Light Emitting Diodes) to illuminate your patient comfort images and are proven to be superior to all other forms of light boxes currently used in MRI suites today. LED’s eliminate high maintenance cost issues, providing an average life expectancy of >50,000 hours, and will not interfere with MR imaging. This new, in room, lighting system is designed for ceiling grid and/or wall mounted presentations or artificial windows and/or skylights.

**Note:** Mural transparencies are made part of this option. To select an image transparency; go to the following web site: http://www.mriledlighting.com
Select from the available images and submit the form. **Note:** The image is printed DIRECTLY to the GDP lens, it is not a transparency that are made part of this option. To select an image transparency; go to the following web site: http://www.mriledlighting.com
Select from the available images and submit the form. **Note:** The image is printed DIRECTLY to the GDP lens, it is not a transparency that is glued to a separate clear plastic lens. The finished lens will be shipped directly to the job site. Requires: Customer supplied switched 120 VAC power; **this is a custom-installed item.**

### Med-Vision Ceiling/Wall GDP

<table>
<thead>
<tr>
<th>Specifications: Ceiling/Wall GDP</th>
<th>Listing: UL48</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel Size: Ceiling: As selected x 1.17” deep</td>
<td>Power Wiring: Customer provided, twisted pair,</td>
</tr>
<tr>
<td>Wall: As selected x 1.25” deep</td>
<td>THHN wiring. All panels wired in parallel off of DC buss.</td>
</tr>
<tr>
<td>Construction: All aluminum, MRI-compatible</td>
<td>Facility RF Power Filter(s): included</td>
</tr>
<tr>
<td>Illumination: Multiple 1-Watt LED’s, white @6300k</td>
<td>Freight Fob Site: Included</td>
</tr>
<tr>
<td>DC Power Supply(s): 12vdc - Included</td>
<td>Dimmer: Not available</td>
</tr>
<tr>
<td>Other: Wall units provided with quick change image frames</td>
<td>Application/Mounting: Drop into standard lay-in acoustical ceiling grid, recessed. Direct mount to wall face.</td>
</tr>
</tbody>
</table>

### Price table for Med-Vision Ceiling mounted GDP

<table>
<thead>
<tr>
<th>2’ x 2’ panels</th>
<th>Area: L x W</th>
<th>P/N</th>
<th>List Price</th>
<th>2’ x 4’ panels</th>
<th>Area: L x W</th>
<th>P/N</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check to select</td>
<td>2’ x 2’</td>
<td>250542-1</td>
<td>$1,920.00</td>
<td>Check to select</td>
<td>2’ x 4’</td>
<td>250543-1</td>
<td>$2,950.00</td>
</tr>
<tr>
<td>Check to select</td>
<td>2’ x 4’</td>
<td>250542-2</td>
<td>$2,950.00</td>
<td>Check to select</td>
<td>4’ x 4’</td>
<td>250543-2</td>
<td>$5,420.00</td>
</tr>
<tr>
<td>Check to select</td>
<td>4’ x 4’</td>
<td>250542-4</td>
<td>$5,420.00</td>
<td>Check to select</td>
<td>4’ x 6’</td>
<td>250543-3</td>
<td>$7,880.00</td>
</tr>
<tr>
<td>Check to select</td>
<td>4’ x 6’</td>
<td>250542-6</td>
<td>$7,880.00</td>
<td>Check to select</td>
<td>4’ x 8’</td>
<td>250543-4</td>
<td>$10,350.00</td>
</tr>
<tr>
<td>Check to select</td>
<td>6’ x 6’</td>
<td>250542-9</td>
<td>$11,580.00</td>
<td>Check to select</td>
<td>4’ x 10’</td>
<td>250543-5</td>
<td>$12,820.00</td>
</tr>
</tbody>
</table>

### Round Ceiling

<table>
<thead>
<tr>
<th>4’ x 4’ panels</th>
<th>Area: L x W</th>
<th>P/N</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check to select</td>
<td>6’</td>
<td>250531</td>
<td>$10,350.00</td>
</tr>
<tr>
<td>Check to select</td>
<td>8’</td>
<td>250532</td>
<td>$18,250.00</td>
</tr>
<tr>
<td>Check to select</td>
<td>10’</td>
<td>250533</td>
<td>$28,150.00</td>
</tr>
<tr>
<td>Check to select</td>
<td>12’</td>
<td>250534</td>
<td>$39,600.00</td>
</tr>
</tbody>
</table>

### Price table for Med-Vision Wall mounted GDP

<table>
<thead>
<tr>
<th>Wall panels</th>
<th>Area: L x W</th>
<th>P/N</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check to select</td>
<td>30” x 40”</td>
<td>250535</td>
<td>$2,492.00</td>
</tr>
<tr>
<td>Check to select</td>
<td>3’ x 5’</td>
<td>250536</td>
<td>$4,125.00</td>
</tr>
<tr>
<td>Check to select</td>
<td>4’ x 4’</td>
<td>250537</td>
<td>$4,370.00</td>
</tr>
<tr>
<td>Check to select</td>
<td>4’ x 5’</td>
<td>250538</td>
<td>$5,350.00</td>
</tr>
<tr>
<td>Check to select</td>
<td>4’ x 6’</td>
<td>250539</td>
<td>$6,330.00</td>
</tr>
<tr>
<td>Check to select</td>
<td>4’ x 8’</td>
<td>250540</td>
<td>$8,740.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Multiple wall panel selection - same as 1st selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd; 3rd; _3rd; _4th</td>
</tr>
</tbody>
</table>

**Note:** The image is printed DIRECTLY to the GDP lens, it is not a transparency that is glued to a separate clear plastic lens. The finished lens will be shipped directly to the job site. Requires: Customer supplied switched 120 VAC power; **this is a custom-installed item.**
6A) Med-Vizion ZXR LED Room Down Lights: This high performance vertical light emitting diode (LED) down light is designed for use in magnetic resonance imaging environments. Exceptional LED life and reliability provide a maintenance-free lighting system.

<table>
<thead>
<tr>
<th>Specifications: Interior vertical can light</th>
<th>Listing: UL48/cUL/CE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp Size: 14.0&quot; X 6.0&quot; H x 7.75&quot; W</td>
<td>Power Cabling: By customer</td>
</tr>
<tr>
<td>Construction: All aluminum, MRI-compatible</td>
<td>Facility RF Filter: N/A</td>
</tr>
<tr>
<td>Illumination: Multiple 1-Watt LED's, while @3500°k or 4000°k</td>
<td>Dimmer: Included 0-10V</td>
</tr>
<tr>
<td>*DC Power Supplies: 48vdc - Included</td>
<td>**Application/Mounting: Suspension ceiling</td>
</tr>
<tr>
<td>Light output: 1500 lumens (150 watt equivalent)</td>
<td>Weight: 4.3lbs</td>
</tr>
<tr>
<td>Input power source: 120/240vac</td>
<td>Input Power: 36w @0.7amp</td>
</tr>
</tbody>
</table>

For Option 6A - ZXR LED room down light
For each lamp unit:
ADD to the total price: $0.00

For each additional circuit:
ADD to the total price: $1,500.00

Number of units: 14
Accepted: INCLUDED IN BASE Bid

7) Addition of interior furring studs for the attachment of room finishes:
ETS-Lindgren to provide and install fire treated wood furring studs 16” O.C. for the attachment of interior sheet rock. (Not inclusive of blocking, backing, framing for closets and/or soffits) The interior furring studs can be provided and installed by the General Contractor. Attachment points for the studs are provided by Lindgren and are part of the base bid. All interior finishes by the General Contractor. [Note: price quoted is for each room selected]

For Option 7 - ADD to the total price: $4,800.00
Accepted: 

8) Install magnet anchors: Although ETS-Lindgren is not responsible for the placement of magnet anchors; we provide this service to our customers as a means of efficiency in completion of the RF enclosure. The customer is responsible for the construction and preparation of the floor slab, as detailed by the magnet OEM, so that the anchors can be correctly installed. By accepting this no cost option the customer is confirming that the floor slab meets all of the conditions listed prior to the installation of the anchors.

For Option 8 -
- Anchor locations MUST be laid out by the magnet manufacturer
- Anchors must be installed during the initial installation of the RF shield
- The customer is to provide proper tooling to include but not limited to: hammer drill, correct hammer drill bit
- The customer is responsible for both the engineering and procurement of the anchors
- The customer is responsible for all pull-out testing. Any failure of the concrete is the specific responsibility of the customer.
- It is the customer’s responsibility to ensure that no item other than concrete is within the area and depth of each anchor
- The customer is responsible to ensure that the anchors remain electrically isolated from the building’s safety grounds
- We will not drill through reinforcing rods or any other structural or utility MEP item
- The customer will inspect the anchors after installation for proper set, elevation, and pullout
- The customer is responsible to maintain the integrity of the anchors up to and including the installation of the magnet
- On slabs where the anchors must be through bolted, ETS-Lindgren will only provide a “starter” hole, the depth of which is not to exceed 1”, in the surface of the parent slab; all other work will be by others. Engineering of Through slab anchorage and the provision of the engineered anchorage materials is by the customer inclusive of electrical isolation of the anchorage.

To set the magnet anchors: ADD to the total price - Included as required

9) Provide state PE stamp: The base price does not include state of installation PE stamp. The customer’s engineer of record typically reviews project drawings. Customer may purchase the PE stamp and calculations directly from Lindgren or employ a local engineer.

For Option 9 - ADD to the total price:
PE stamp from Lindgren: $0.00 per room
Accepted: INCLUDED IN BASE Bid

10) Add additional RF electrical filters:
The base bid price includes a standard package of electrical RF filters. The filters listed in the table can be used for either AC or DC lights, 120vac loads or other control services. Should the site require additional RF electrical filters please select from the list below and add to the total price: (Note: one filter per two line pair or individual two line circuit)

<table>
<thead>
<tr>
<th>Type filter</th>
<th>Price each</th>
<th>Typical use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 amp – 2 line</td>
<td>$674.00</td>
<td>Smoke/heat detectors</td>
</tr>
<tr>
<td>1 amp – 2 line low leakage</td>
<td>$650.00</td>
<td>Fire strobe, thermostats, nurse call, code blue</td>
</tr>
<tr>
<td>10 amp – 2 line</td>
<td>$668.00</td>
<td>ERD, spare</td>
</tr>
<tr>
<td>30 amp – 2 line</td>
<td>$650.00</td>
<td>Lighting, receptacles</td>
</tr>
<tr>
<td>Ethernet CAT5e/6 filter</td>
<td>$1,900.00</td>
<td>Digital phone/data/nurse call/code blue — note: CAT5e/6 filters do not have the capacity to provide power to connected digital devices. Customer will be responsible to provide some type of power injector to facilitate the CAT5e/6 filter.</td>
</tr>
<tr>
<td>LED dimmer filter</td>
<td>$650.00</td>
<td>Compatible with many LED dimmer modules</td>
</tr>
</tbody>
</table>
11) **Union Labor:** ETS-Lindgren is not a union shop. As such we do not provide union labor. If the unions claim the work of our trade (RF shielding installation) please call for pricing:

12) **Magnetic Active Compensation System (MACS):** MACS offers a maintenance free, dynamic method for shielding MRI systems from low frequency environmental AC/DC magnetic interference. All magnets are sensitive to abnormal fluctuations in environmental magnetic fields caused by moving vehicles, trains, elevators, electrical transformers, and other sources. The MACS provides a uniform solution at DC and through the low frequency spectrum, using a highly sophisticated electronic and magnetic compensation system.

- **12a) Add MACS system Helmholtz coil kit only:** If DC or other low frequency interference is suspected but not confirmed then adding just the MACS coil kit can reduce future down time of the magnet by approximately 2 days. This option also allows the coil kit to be concealed within the parent walls in lieu of surface mounting if installed after the magnet comes on line. For Option 12 – **Add** to the total price: ($will quote) Accepted: ________

For option 12a – **Add** to the total price: ($will quote) Accepted: ________

13) **Add Ferromagnetic Detection System:** The American College of Radiology and FGI now recommends the use of ferromagnetic detection systems in conjunction with a documented patient/personnel screening procedure. The latest in Ferromagnetic Detection technology offering unparalleled screening of equipment and personnel prior to entry within your MRI Suite. Designed with portability and siting flexibility in mind, allowing for easy incorporation into your existing safety protocol. Sensitivity levels can be adjusted to accommodate the specific level of protection incorporated in a facilities safety protocols. Unlike conventional metal ETS-Lindgren’s detectors, discriminate between ferrous and non-ferrous materials, mitigating false positive alarms that compromise the effectiveness of the system. Wall mount designs, single pole and dual pole as well hand held units. Includes siting, installation, training and calibration. **Requires: Customer supplied (1) 110V electrical outlets switched 120 VAC power** Hand held unit is battery powered.

- SuiteSentry™ The SuiteSentry system gives an alert on an approach of ferromagnetic materials into Zone IV, before reaching the threshold. The systems' highly-visual warning lights can be seen from both inside and outside the MRI room. The greater the threat, the further away the warning is activated. There is also an audio alarm, which is activated only upon reaching the threshold.

![SuiteSentry™ Single Pre-Screening](image-url)
The MRI Target Scanner PD240CH is a portable metal detector (FMDS) which combines high sensitivity to ferromagnetic metals with immunity to non-ferromagnetic metals.

The scanner has 3 analysis modes that are selectable via the easy-to-use keyboard interface.

**SuiteSentry™ FILM**

- Ferromagnetic Incident Log Manager
- Data analysis and tracking application
- Facilitates TJC compliance / HIPAA

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 13</td>
<td>ADD to the total price:</td>
<td></td>
</tr>
<tr>
<td>For SuiteSentry Entryway</td>
<td>Dual pole wall mounted units</td>
<td>$0.00</td>
</tr>
<tr>
<td>ADD: FILM</td>
<td>to above</td>
<td>Add: $0.00</td>
</tr>
<tr>
<td>For SuiteSentry Single pole</td>
<td>“Patient “Screener” system</td>
<td>Add: $0.00</td>
</tr>
<tr>
<td>For Handheld Target Scanner</td>
<td>PD240CH</td>
<td>Add: $4,950.00</td>
</tr>
</tbody>
</table>

Above includes shipping and installation if required. Does not include taxes.

14) **Tech Gate® II**

**TechGate® II** – Revolutionary MRI room doorway protection provides on-demand LED lit warning signage and barrier to entry. MRI conditional RF transmitters allow for push button gate deployment and retraction, providing physical protection to patients, staff and equipment by restricting access to the MRI room. Proprietary hinged break-away arm allows for rapid access in the event of emergency. Easily installed and powered by a standard wall outlet, TechGate® is the effective MRI safety measure for preventing unscreened access to the MRI suite.

Options available- Left hand or Right hand mount, External power supply, Extra Remote transmitters, Easy to install but installation by ETS is available.

For Option 14 – 1 Each Tech Gate II MRI Doorway Protection System. Includes 3 Remote transmitters.

ADD to the total price: $14,400.00 | Accepted: ____________
15) **BIM Modeling**: Provide 3D Building Information Modeling (BIM). BIM allows the customer to visualize the project in a 3-dimensional view during the planning stage to assist in the coordination of related trade work. This minimizes rework and promotes efficiencies within the planning efforts. Coordination takes place with our project manager or project engineer via phone.

ADD to the total price: $3,500.00  
Accepted: ____________

### SECTION 4: Notes: Applies to the Modular Free Standing RF shield systems where applicable:

1. **Note on structural supports for ETS-Lindgren Modular RF shield ceiling structures:**

   ETS-Lindgren’s standard, copper or galvanized steel, RF enclosures; as a default design; use integral external ceiling beams, set on 48 inch centers, for support of the overhead RF ceiling and attached interiors. For shields less then 17’ in width, a minimum clearance of 6 inches is required above the top of the shield and for shields between 17’ and 20’ in width, a minimum clearance of 8 inches above the shield is required for the application of the integral external beams. For situations where the available clearance above the shield is less then 6” (17’ width) or 8” (17’ – 20’ width), internal support beams may be used. The use of internal support beams will limit the available utility space between the finished ceiling and the top of the shield. The use of the integral beams allow for a customer applied ceiling load of 5lb/sqft. Placing the ceiling beams on 24inch centers increases the allowable applied ceiling loads to 15lbs/sqft. For shields in excess of 20 foot in width secondary supports may be necessary that are attached to the buildings structures above (see additional text below).

   For situations where neither external nor internal beams can be used the shield’s ceiling structure will be supported by tension suspension rods attached to the building’s structure overhead. In this situation it is the responsibility of the customer to provide unobstructed clearance to the required attachment points above. When existing utilities or other building structures impede the normal placement of suspension rods and sway braces for seismic conditions, it is the responsibility of the customer to: 1) relocate the obstructing device, item or structure or, 2) provide a suitable support under the obstructing device, item or structure. Under no circumstances will ETS-Lindgren anchor into or attach onto roof or deck structures that will not provide structurally sound anchorages. It is the responsibility of the customer to determine the structural capacity of the overhead attachment points. This also applies for areas where seismic anchorages are required. For seismic conditions where the lateral forces at the top of the shield are to be transferred to vertical walls, it is the responsibility of the customer to properly design and install structural wall assemblies capable of handling the applied lateral forces.

   **Addition of silicon steel magnetic shielding**: It is the responsibility of the customer to provide suitable structural supports within the parent walls and ceiling to accept the applied loads of the magnetic shielding (8 - 20 lbs/sqft). Lindgren will install the magnetic shielding directly to the provided supports using drill in anchors.

2. **RF Flooring Systems:**
   - For epoxy/grout RF floor: New concrete: Provide 7/8” slab depression. Slab must be clean down to the bear surface by surface shot blast to a surface profile of (3) CSP3. Do not apply any concrete sealer. Structural slab must not contain any hydrostatic water pressure.
   - For the modular wood core floor: Provide a 1-1/8” depression. Slab does not have to be prepared as with the epoxy/grout floor. Will require some customer applied floor patch to prepare the RF floor surface for finished piece goods.
   - **Note**: It is the responsibility of the customer to provide a flat and level parent floor surface. At a minimum, parent floors must be level to the requirements stated by the magnet manufacturer. The installation of the RF flooring assembly is not intended to render the interior floor flat and level.
   - **RF Doors**: Optional Auto-Seal RF doors available see option 1 below. (US patent #4786758) Note: RF doors are supplied unstained if wood veneer. AUTO SEAL RF door only available with P-lam. **Standard in-stock MR4 RF doors are available with white plastic laminate or northern oak plastic laminate or plain slice, Red Oak, Birch, Maple and Cherry veneers. Any other choice of plastic laminate is available for a $600.00 price adder. Any other choice of wood veneer is available with a four (4) week lead time and added price as quoted. The Auto Seal™ Sound Door carries an ASTM E90/E413 STC 40 sound rating. The optional MR4 Sound Door carries an ASTM E90/E413 STC34 sound rating.**

### Notes:

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
<th>Accepted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each additional remote transmitter</td>
<td>$320.00</td>
<td></td>
</tr>
<tr>
<td>Provide external power supply in lieu of outlet plug for hardwire power connection</td>
<td>$1,100.00</td>
<td></td>
</tr>
<tr>
<td>Provide installation and end user training (Outlet or hard wire connection provided by customer)</td>
<td>$3,000.00</td>
<td></td>
</tr>
<tr>
<td>ADD to the total price: $3,500.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. **Available Lindgren RF Floor Systems**

<table>
<thead>
<tr>
<th>RF Flooring System</th>
<th>Base bid or Optional</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monolithic Epoxy/Grout floor assembly</td>
<td>Optional: See option 2 for upgrade to this floor system</td>
<td>Water resistant, seamless, structurally bonded to parent floor, self-leveling properties, welded RF seams, 5/8” slab depression, does not present any biohazard due to rotting or mold or bacterial growth. Requires concrete surface with no sealers or curing compounds applied. Medium broom finish on slab.</td>
</tr>
<tr>
<td>Wood Core Modular RF floor assembly</td>
<td>Included in base price</td>
<td>Non-waterproof, floating floor (not bonded to parent floor), uses compressed paper product for insulation/leveling, mechanical clamp RF seams, wood core panels are not waterproof. Requires 1-1/8” slab depression for flush RF door threshold.</td>
</tr>
</tbody>
</table>

4. **Optional electrical filters**
   1. **Special application electrical services**: These items require that we are made aware of the total number of electrical conductors associated with each device and the electrical impedance characteristics of the power source. Where this information is lacking the required filters will not be provided and the customer may select the appropriate electrical filters from option 6.

5. **RF ATTENUATION: For the Modular shield**

<table>
<thead>
<tr>
<th>Manufacturer:</th>
<th>Philips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnetic Field</td>
<td>Electric Field</td>
</tr>
<tr>
<td>Min. Frequency</td>
<td>10 MHz</td>
</tr>
<tr>
<td>Min. Attenuation</td>
<td>80 dB</td>
</tr>
</tbody>
</table>

   **Note**: Testing of frequencies beyond as stated above or outside the realm of normal testing for this MRI may be subject to additional charges.

6. **RF TESTING**:
   1. **1st Test - Qualification Testing**: Shall be performed immediately after completion of the enclosure and prior to the installation of any architectural surfaces within the enclosure or about the exterior of the enclosure. No trade connections shall be made to the enclosure until the successful completion of this test process.
   2. **2nd Test - Acceptance Testing**: Shall be performed immediately after the installation of the selected MR system. This service includes reinstallation of magnet entry panel(s).

7. **RF windows**: All Lindgren RF windows are manufactured using precision aluminum frame extrusions. The RF screens are constructed from very fine, 304 stainless steel, wire cloth. All glazing is ¼” safety glass and conforms to all building codes. Most other RF shield manufactures construct their windows with cheap wood frames with copper or bronze screens secured with staples. This type of construction produces very poor optical quality.

8. **Piping or Plumbing systems**: Where appropriate piping or plumbing lines are provided with either a soldered tube connection or dielectric connector. Medical gas wave guides provide by ETS-Lindgren DO NOT need to be field sterilized. The medical gas wave guide feed through panel provided is design to allow customer supplied type K copper medical gas lines to pass unbroken through the wave guides. Note: DO NOT weld the threaded fitting to the brass wave guide; only solder the medical gas tube to the sweat connection. Ensure that the threaded connection is secured tight to the brass wave guide. Contact the ETS-Lindgren project manager for the proper connection of sink waste/vent lines to the provided wave guide.

**SECTION 5: Exceptions and general conditions to this proposal.**

**GENERAL EXCEPTIONS**:

1. **Seismic connections**: Lindgren does not provide nor engage in the general mounting or seismic mounting of any item, device, system or unit not directly manufactured and installed by Lindgren.

2. **Structural attachments**: The customer or his agent(s) will be responsible for providing and the installation of any and all attachment points/devices necessary to allow for transfer of the applied load of the shield materials and customer furnished interiors inclusive of sprinkler lines to the building structure. The type and quantity of the attachment points/devices must meet all local, seismic, and or OSHPD (California only) requirements and the approval of ETS-Lindgren. Lindgren will be responsible for the transfer of the shield load, using appropriate methods, to the customer’s furnished attachment points/devices. The design and installation of typical or seismic supports of sprinkler lines is the sole responsibility of the customer. Lindgren will provide threaded RF attachments through the RF shield ceiling frames with a threaded external dielectric connector for use by the sprinkler or other trades for load bearing connections through the RF shield. See Lindgren’s Engineering Note 9 for additional information concerning ceiling anchors.

3. **Specifications**: Lindgren takes exception to all sections of the specifications that differ from our standard all copper RF shielded enclosure systems used for MRI applications.

**SPECIFIC EXCEPTIONS**

This proposal does not include:

1. Any provisions for the installation of magnetic shielding unless otherwise noted.
2. PE stamp and calculations: Should ETS-Lindgren be required to provide stamped RF shield plans for review please select option 10.
3. Structural wall and ceiling supports for magnetic shielding
4. In-fill concrete structural slab
THE FOLLOWING GENERAL CONDITIONS APPLY TO THIS PROPOSAL:

Wood Products: The RF shielded enclosure is manufacture from wood products that carry either a Class A topically applied fire retardant or Class A pressure treated wood. It is the responsibility of the customer to identify to ETS-Lindgren if wood products are allowed by the local fire codes for installation within this project. ETS-Lindgren will bear no liability for additional expenses incurred if not so notified of the restriction in the use of treated wood products.

Fire Rated RF Doors: Lindgren RF Shielded Enclosure, Inc. MR4™ medical grade RF shielded door and frame units DO NOT carry a fire label. They are NOT 20-minute fire rated doors. ETS-Lindgren DOES offer an optional 20-minute fire rated door as part of our Auto-Seal II™ door line. If this facility requires the installation of a fired rated door at the location of the RF shielded door unit the customer must so notify ETS-Lindgren, Inc. of this requirement. ETS-Lindgren will bear no liability for additional expenses incurred if not so notified of the need for a fire rated door unit.

Working hours: Prices quoted reflect open shop, normal, first shift, working hours (8am - 6pm), Monday – Friday unless otherwise stated. Overtime work maybe preformed at the discretion of Lindgren's installation manager. Lindgren crews normally work after hours and weekends to expedite the installation of the shield. If there are restrictions that will prevent our crew from working after hours please inform us of the restrictions. Restricting the available working hours will both increase the cost and installation time of the RF shield. The quoted price does not account for additional monies to pay the premium hours for a contractor representative to be on site during after hours work.

Structural shoring: ETS-Lindgren will not be responsible for the structural shoring, reinforcement or other structural alterations necessary to unload, transport to the site of the work, or installation of the work. This is inclusive of all shielding materials or the necessary equipment to move and/or erect same.

Temporary utilities: The customer or the General Contractor shall be responsible for providing all necessary temporary lighting and electrical power. To include AC power for at least two welding machines (100a/208v) when necessary.

Trash removal: The customer or the General Contractor shall provide at least one trash container for the removal of waste crating materials. ETS-Lindgren shall be responsible for general cleaning of the site of our work and placing waste materials into the provided container.

Site Access: ETS-Lindgren shall be given free and clear access to the site of our work. It shall be the responsibility of the owner or his agents to prepare adequate site access and coordinate the activities of other trades within the area of our work.

Building permits: All local and/or state building permits are the responsibility of the owner or his agents

Tests and inspections: ETS-Lindgren shall not be responsible for the cost of any and all materials testing and inspections, other than RF testing of the enclosure. The customer shall retain all inspections and testing services.

Trade coordination: Coordinated work such as but not limited to: foundations, structural steel, fire proofing, insulation, exterior pre-cast, weather proofing, building inspections, etc. shall be completed to the extent that they will not effect the orderly completion of our work.

Weather proofing: The site of our work MUST be completely weather proof prior to the delivery or installation of any shielding materials.

Crane requirement: The site of the work is located at the ground floor level. The use of a crane to move RF shield materials is typically not necessary. This proposal DOES NOT include the cost of a crane to place shield materials to the site of the work.

Materials staging: This proposal assumes that all delivered materials will be staged in secured and weatherproof areas immediately adjacent to the site of our work. If this is not possible the customer may incur additional charges.

Fire proofing: ETS-Lindgren shall not be responsible for the removal or reinstalation of any fire proofing materials. Asbestos abatement of any kind will be the sole responsibility of the owner or his agents.

Finishes: The removal of any interior or exterior building finishes, glazing, or architectural surfaces shall be the responsibility of the owner or his agents.

Final plan review: The quoted price is subject to change once approved architectural building plans and magnetic equipment plans are made available for final review.
PART 1 GENERAL

1.01 SUMMARY

A. This Section includes the administrative and procedural requirements for executing changes in the Work. This Section is subject to and governed by the Agreement and General Conditions. In the event of any conflict, the Agreement and General Conditions will have a higher precedence as established in the General Conditions.

1.02 SUBMITTALS

A. Contractor shall submit a breakdown of its actual wage rates prior to commencement of construction activities. The breakdown must show:

1. Basic wage rate (Based on L&I Intent to Pay Prevailing Wages);
2. Fringe Package (Based on L&I Intent to Pay Prevailing Wages);
3. FUI (Federal Unemployment Insurance);
4. FICA (Federal Insurance Compensation Act);
5. SUI (State Unemployment Compensation Act);
6. Medicare; and
7. WC (Workers Compensation).

B. Contractor shall submit detailed supporting documentation to verify the above rates, if requested by Owner. All such rates shall be subject to audit.

C. Contractor shall submit prior to commencement of construction activities a list of all equipment that it anticipates will be used on the Project and the actual operating cost of each piece of equipment. The General Conditions describe allowable equipment charges. All costs shall be subject to audit.

1.03 CONTRACT CHANGE PROPOSAL PROCEDURES

A. Contractor shall maintain an Issues Log/ CCP Log as described in the General Conditions:

1. The action status shall indicate which party is currently responsible and when it is appropriate to submit a CCP to Owner. Contractor shall submit a Contract Change Proposal (CCP) with Substantiating Documentation, as described in subsection C below, to Owner within 7 Days of this action status change.

2. Upon final agreement and authorization by Owner a CCP may be incorporated into the Contract via Change Order and shall be reflected on the Issues Log.
B. Direction to perform Work:

1. Owner may directly order Work by a written Work Directive (WD). WDs may be unilateral or bilateral as described in the General Conditions and may be issued on a fixed price or on a "cost-not-to-exceed" basis. The WD may include the following:

   a. A detailed description of the proposed change, products, and location of modification to the Work;

   b. Supplementary or revised Drawings and/or Specifications; and

   c. Projected time for making the change and a statement as to whether overtime work is, or is not, acceptable.

C. Substantiating Documentation required with all CCPs:

1. Contractor shall provide back-up documentation required to substantiate any proposed change in the following format:

   a. CCP narrative, including:

      1) Description of proposed change. In order to allow for efficient review of a change proposal Contractor shall provide enough narrative to the line item breakdown to allow Owner to properly assess that the change is fair and reasonable;

      2) Cause of or reason for making change with a statement of why proposed change is not covered by Contract Documents

      3) Both credited and additive elements relating to a change in Contract Sum and/or Contract Time;

      4) A specific period of time during which Contractor’s pricing will be considered valid;

      5) Any schedule considerations that may trigger further impact to the Contract Time if acceptance of the proposed change if delayed beyond a specific date; and

      6) Date change Work is to be completed.

   b. Owner supplied Change Proposal Submittal Form.

   c. CCP Cost Estimate Detail Sheet(s), or other form acceptable to Owner, including:

      1) Line-item estimate detailing material, labor, equipment, Subcontractor, and supplier costs and quantities; and

      2) Subcontractor and supplier proposals with supporting line-item estimates.
d. CCP Progress Schedule with Contemporaneous Period Analysis detailing if any impact to the planned progress of the Work and critical path.

e. Other supporting documentation, as appropriate.

D. Correlation with Contractor's Submittals:

1. Application for Payment forms shall record each Unilateral and Bilateral Change Order as a separate item of Work.

2. The Progress Schedule shall be revised to reflect changes in the Contract Time.

3. Project Record shall incorporate all changed Work.

END OF SECTION 01 26 00
PART 1   GENERAL

1.01   SUMMARY

A. This Section includes procedures for preparation and submittal of Applications for Payment.

1.02   SUBMITTALS

A. Prior to submitting its first Application for Payment, Contractor shall:

1. Submit a preliminary Progress Schedule per Section 01 32 13 – Progress Schedule.

2. If requested, submit a projected monthly cash-flow analysis for the duration of the Project.

3. Submit an approved Intent to Pay Prevailing Wages form prior to commencing the Work. An approved Intent to Pay Prevailing Wages form must be on file with Owner for each classification of laborers, workers, or mechanics employed by Contractor or Subcontractors whose Work is included in an Application for Payment.

4. “Washington State Prevailing Wage Rates for Public Works Contracts/Whitman County” are made a part of the Contract Documents and are included at the end of this Section. It is Contractor’s responsibility to verify with the Washington State Department of Labor and Industries the most current and applicable prevailing wage rates for this Project.

5. Submit and receive approval of the Schedule of Values per Section 01 29 73 – Schedule of Values, and the General Conditions. All Applications for Payment shall be in the same format.

6. Submit a list of all Subcontractors with points of contact and other contact information, including phone number, email address, and mailing address.

7. Submit a list of all major material suppliers with points of contact and other contact information, including phone number, email address, and mailing address.

8. Submit Retainage Option Form to Owner for the disposition of retainage funds.

a. In accordance with Chapter 60.28 of the Revised Code of Washington (RCW), Owner shall reserve retainage not to exceed 5% of the monies earned by Contractor as a trust fund for the protection and payment of:

1) The claims of any person and/or Owner arising out of or relating to Work performed on the Project; and

2) The State with respect to taxes, fees, or penalties that may
be imposed and due from Contractor (see General Conditions).

b. Retainage will be released per Section 01 70 00 - Project Close-Out.

c. At the option of Contractor, the moneys reserved by Owner shall be:

1) Retained in a fund by Owner;
2) Bonded for all of the retainage using a bond form acceptable to Owner;
3) Placed in escrow with a bank or trust company by Owner.

   a) Escrow: If the retained funds are to be placed in escrow, Contractor will select the escrow agent, subject to approval by Owner. The selected agent must be a bank or trust company in the State of Washington.

   b) Escrow Agent: If Contractor elects the escrow option, an escrow agreement shall be executed by Contractor, Owner, and bank or trust company. Three copies of the agreement should be completed and executed by Contractor and returned to Owner for execution; Owner will forward copies to the bank or trust company for receipt, acceptance, and execution. The bank or trust company will retain one copy and return one copy each to Contractor and Owner. A completed and signed escrow agreement must be on file with Owner before Contractor's first Application for Payment is processed.

   c) Escrow Investments: The bank or trust company may invest the retained funds in bonds and other securities selected by Contractor, except stocks, subject to the written approval of Owner.

   d) The investments selected must mature on or prior to the date 45 Days following Final Acceptance of the Work. Interest on such investments may be paid to Contractor as it accrues.

   e) Escrow Costs and Fees: All escrow costs and fees shall be paid by Contractor.

   f) Release of Escrow Investments to Contractor: Retainage will be released per Section 01 70 00 - Project Close-Out. Once Contractor has fully complied with the Contract Documents and statute, Owner shall issue written instructions to the bank or trust company to release to Contractor the investment held in escrow.
B. Draft Application for Payment:

1. Contractor shall submit a draft, itemized Application for Payment within the last 7 Days of the month.

2. The draft application does not constitute a payment request and shall not be signed.

3. Contractor shall carefully check all extensions, totals, and required information for accuracy before submittal.

4. Contractor and Owner may meet to confer regarding the current progress of the Work and the amount of payment to which Contractor is entitled. Owner may request that Contractor provide supporting documentation substantiating its right to payment. Contractor is not entitled to make a final payment request, nor is any payment due Contractor, until such data is furnished. Contractor may include in its Application for Payment projected costs to the end of the month.

   a. Fill in the following information within Owner’s Application for Payment form:

      1) Percentage of Work completed based upon the approved schedule of values.

      2) List Change Orders approved by Owner prior to submission date. Use Owner’s designations. Do not bill for changed Work until a fully executed Change Order has been received.

      3) Certification of Participation WBE and MBEs, all certification types acceptable, supply this regardless of having firms to report upon.

      4) List all Subcontractors that have performed Work at the site during the pay period.

      5) If applicable, Apprentice/Journeyman Participation.

5. Contractor shall submit or make available for review the following prior to the draft Application for Payment:

   a. Project Record; (see Section 01 78 39 – Project Record)

   b. Updated Progress Schedule in native format (see section 01 32 13 – Progress Schedule);

   c. Contractor Quality Control Reports (see Section 01 45 00 - Quality Control); and

   d. Stored Materials: Requests for payment of stored materials may only be made for materials properly stored on or off-site and in full compliance with the General Conditions.
C. Application for Payment:

1. Contractor may not submit the approved Application for Payment (or payment will be withheld) until all requirements of the draft application for payment are met.

2. Upon approval of the Draft Application for Payment, contractor will be authorized to submit the agreed upon Application for Payment for processing and payment. This application for payment shall be signed by hand by a responsible officer of the Contractor and may be submitted in scanned format electronically.

3. Formal submittal must include all parts of the Application for Payment form.

4. Owner shall make progress payments in such amounts as it determines are properly due within 30 Days of receipt of a properly executed Application for Payment.

5. Owner shall notify Contractor in accordance with Chapter 39.76 RCW if the Application for Payment does not comply with the requirements of the Contract Documents.

D. Disputed Amounts: If Contractor believes it is entitled to payment for Work performed during the prior calendar month in addition to the agreed-upon amount, Contractor may, also within the same period, submit to Owner along with the approved Application for Payment a separate, written payment request specifying the exact additional amount claimed due, the category in the Schedule of Values in which the payment is claimed due, the specific Work for which the additional amount is due, and why the additional payment is due. Furthermore, for the submittal to be considered, Contractor and all Subcontractors shall file with Owner by the same date certified copies of all payroll records relating to the additional amount due, pursuant to WAC 296-127-320.

E. Payments to Subcontractors: Contractor shall pay each Subcontractor no later than 10 Days after receipt of payment from Owner the amount to which the Subcontractor is entitled. Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to lower-tier Subcontractors in a similar manner.

1. Applications for Payment shall not request payment for portions of the Work that Contractor does not intend to pay a Subcontractor, unless such Work has been performed by others whom Contractor intends to pay.

2. If, after making an Application for Payment but before paying a Subcontractor for its performance covered by the Application, Contractor discovers that part or all of the payment otherwise due to the Subcontractor is subject to withholding from the Subcontractor under the Subcontract (such as for unsatisfactory performance or non-payment of lower-tier Subcontractors), Contractor may withhold the amount as allowed under the Subcontract, but it shall:
a. Give the Subcontractor and Owner written notice of the withholding as soon as practicable once Contractor determines the cause for the withholding but before the due date of the Subcontractor payment;

b. Include the reasons for the withholding and the actions the Subcontractor must take to release the payment; and

c. Once Subcontractor has taken the required remedial actions, pay Subcontractor within 8 Days.

3. Owner may, at its sole option, issue joint checks to Contractor and to any Subcontractor. If Owner makes payments by joint check, such value shall be reflected on the next Application for Payment.

F. Application for Final Payment:

1. Application for Final Payment will be accepted for processing only after Contractor has completed the requirements of Final Completion as described in Section 01 70 00 – Project Close-Out.

G. Release of Retainage:

1. Retainage will be released per Section 01 70 00 - Project Close-Out.

END OF SECTION 01 29 00
Overtime Codes

Overtime calculations are based on the hourly rate actually paid to the worker. On public works projects, the hourly rate must be not less than the prevailing rate of wage minus the hourly rate of the cost of fringe benefits actually provided for the worker.

1. **ALL HOURS WORKED IN EXCESS OF EIGHT (8) HOURS PER DAY OR FORTY (40) HOURS PER WEEK SHALL BE PAID AT ONE AND ONE-HALF TIMES THE HOURLY RATE OF WAGE.**

   B. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

   C. The first two (2) hours after eight (8) regular hours Monday through Friday and the first ten (10) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other overtime hours and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

   D. The first two (2) hours before or after a five-eight (8) hour workweek day or a four-ten (10) hour workweek day and the first eight (8) hours worked the next day after either workweek shall be paid at one and one-half times the hourly rate of wage. All additional hours worked and all worked on Sundays and holidays shall be paid at double the hourly rate of wage.

   E. The first two (2) hours after eight (8) regular hours Monday through Friday and the first eight (8) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other hours worked Monday through Saturday, and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

   F. The first two (2) hours after eight (8) regular hours Monday through Friday and the first ten (10) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other overtime hours worked, except Labor Day, shall be paid at double the hourly rate of wage. All hours worked on Labor Day shall be paid at three times the hourly rate of wage.

   G. The first ten (10) hours worked on Saturdays and the first ten (10) hours worked on a fifth calendar weekday in a four-ten hour schedule, shall be paid at one and one-half times the hourly rate of wage. All hours worked in excess of ten (10) hours per day Monday through Saturday and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

   H. All hours worked on Saturdays (except makeup days if work is lost due to inclement weather conditions or equipment breakdown) shall be paid at one and one-half times the hourly rate of wage. All hours worked Monday through Saturday over twelve (12) hours and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

   I. All hours worked on Sundays and holidays shall also be paid at double the hourly rate of wage.

   J. The first two (2) hours after eight (8) regular hours Monday through Friday and the first ten (10) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked over ten (10) hours Monday through Saturday, Sundays and holidays shall be paid at double the hourly rate of wage.

   K. All hours worked on Saturdays and Sundays shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid at double the hourly rate of wage.

   M. All hours worked on Saturdays (except makeup days if work is lost due to inclement weather conditions) shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

   N. All hours worked on Saturdays (except makeup days) shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.
Overtime Codes Continued

1. O. The first ten (10) hours worked on Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays, holidays and after twelve (12) hours, Monday through Friday and after ten (10) hours on Saturday shall be paid at double the hourly rate of wage.

P. All hours worked on Saturdays (except makeup days if circumstances warrant) and Sundays shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid at double the hourly rate of wage.

Q. The first two (2) hours after eight (8) regular hours Monday through Friday and up to ten (10) hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked in excess of ten (10) hours per day Monday through Saturday and all hours worked on Sundays and holidays (except Christmas day) shall be paid at double the hourly rate of wage. All hours worked on Christmas day shall be paid at two and one-half times the hourly rate of wage.

R. All hours worked on Sundays and holidays shall be paid at two times the hourly rate of wage.

S. The first two (2) hours after eight (8) regular hours Monday through Friday and the first eight (8) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays and all other overtime hours worked, except Labor Day, shall be paid at double the hourly rate of wage. All hours worked on Labor Day shall be paid at three times the hourly rate of wage.

U. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays (except Labor Day) shall be paid at two times the hourly rate of wage. All hours worked on Labor Day shall be paid at three times the hourly rate of wage.

V. All hours worked on Sundays and holidays (except Thanksgiving Day and Christmas day) shall be paid at one and one-half times the hourly rate of wage. All hours worked on Thanksgiving Day and Christmas day shall be paid at double the hourly rate of wage.

W. All hours worked on Saturdays and Sundays (except make-up days due to conditions beyond the control of the employer) shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid at double the hourly rate of wage.

X. The first four (4) hours after eight (8) regular hours Monday through Friday and the first twelve (12) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked over twelve (12) hours Monday through Saturday, Sundays and holidays shall be paid at double the hourly rate of wage. When holiday falls on Saturday or Sunday, the day before Saturday, Friday, and the day after Sunday, Monday, shall be considered the holiday and all work performed shall be paid at double the hourly rate of wage.

Y. All hours worked outside the hours of 5:00 am and 5:00 pm (or such other hours as may be agreed upon by any employer and the employee) and all hours worked in excess of eight (8) hours per day (10 hours per day for a 4 x 10 workweek) and on Saturdays and holidays (except labor day) shall be paid at one and one-half times the hourly rate of wage. (except for employees who are absent from work without prior approval on a scheduled workday during the workweek shall be paid at the straight-time rate until they have worked 8 hours in a day (10 in a 4 x 10 workweek) or 40 hours during that workweek.) All hours worked Monday through Saturday over twelve (12) hours and all hours worked on Sundays and Labor Day shall be paid at double the hourly rate of wage.

Z. All hours worked on Saturdays and Sundays shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid the straight time rate of pay in addition to holiday pay.
2. **ALL HOURS WORKED IN EXCESS OF EIGHT (8) HOURS PER DAY OR FORTY (40) HOURS PER WEEK SHALL BE PAID AT ONE AND ONE-HALF TIMES THE HOURLY RATE OF WAGE.**

   B. All hours worked on holidays shall be paid at one and one-half times the hourly rate of wage.

   C. All hours worked on Sundays shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid at two times the hourly rate of wage.

   F. The first eight (8) hours worked on holidays shall be paid at the straight hourly rate of wage in addition to the holiday pay. All hours worked in excess of eight (8) hours on holidays shall be paid at double the hourly rate of wage.

   G. All hours worked on Sundays shall be paid at two times the hourly rate of wage. All hours worked on paid holidays shall be paid at two and one-half times the hourly rate of wage including holiday pay.

   H. All hours worked on Sundays shall be paid at two times the hourly rate of wage. All hours worked on holidays shall be paid at one and one-half times the hourly rate of wage.

   O. All hours worked on Sundays and holidays shall be paid at one and one-half times the hourly rate of wage.

   R. All hours worked on Sundays and holidays and all hours worked over sixty (60) in one week shall be paid at double the hourly rate of wage.

   U. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked over 12 hours in a day or on Sundays and holidays shall be paid at double the hourly rate of wage.

   W. The first two (2) hours after eight (8) regular hours Monday through Friday and the first eight (8) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other hours worked Monday through Saturday, and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage. On a four-day, ten-hour weekly schedule, either Monday thru Thursday or Tuesday thru Friday schedule, all hours worked after ten shall be paid at double the hourly rate of wage. The first eight (8) hours worked on the fifth day shall be paid at one and one-half times the hourly rate of wage. All other hours worked on the fifth, sixth, and seventh days and on holidays shall be paid at double the hourly rate of wage.

3. **ALL HOURS WORKED IN EXCESS OF EIGHT (8) HOURS PER DAY OR FORTY (40) HOURS PER WEEK SHALL BE PAID AT ONE AND ONE-HALF TIMES THE HOURLY RATE OF WAGE.**

   A. Work performed in excess of eight (8) hours of straight time per day, or ten (10) hours of straight time per day when four ten (10) hour shifts are established, or forty (40) hours of straight time per week, Monday through Friday, or outside the normal shift, and all work on Saturdays shall be paid at time and one-half the straight time rate. Hours worked over twelve hours (12) in a single shift and all work performed after 6:00 pm Saturday to 6:00 am Monday and holidays shall be paid at double the straight time rate of pay. Any shift starting between the hours of 6:00 pm and midnight shall receive an additional one dollar ($1.00) per hour for all hours worked that shift. The employer shall have the sole discretion to assign overtime work to employees. Primary consideration for overtime work shall be given to employees regularly assigned to the work to be performed on overtime situations. After an employee has worked eight (8) hours at an applicable overtime rate, all additional hours shall be at the applicable overtime rate until such time as the employee has had a break of eight (8) hours or more.

   C. Work performed in excess of eight (8) hours of straight time per day, or ten (10) hours of straight time per day when four ten (10) hour shifts are established, or forty (40) hours of straight time per week, Monday through Friday, or outside the normal shift, and all work on Saturdays shall be paid at one and one-half times the hourly rate of wage. All work performed after 6:00 pm Saturday to 5:00 am Monday and Holidays shall be paid at double the hourly rate of wage. After an employee has worked eight (8) hours at an applicable overtime rate, all additional hours shall be at the applicable overtime rate until such time as the employee has had a break of eight (8) hours or more.
3. E. All hours worked Sundays and holidays shall be paid at double the hourly rate of wage. Each week, once 40 hours of straight time work is achieved, then any hours worked over 10 hours per day Monday through Saturday shall be paid at double the hourly wage rate.

F. All hours worked on Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sunday shall be paid at two times the hourly rate of wage. All hours worked on paid holidays shall be paid at two and one-half times the hourly rate of wage including holiday pay.

H. All work performed on Sundays between March 16th and October 14th and all Holidays shall be compensated for at two (2) times the regular rate of pay. Work performed on Sundays between October 15th and March 15th shall be compensated at one and one half (1-1/2) times the regular rate of pay.

I. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. In the event the job is down due to weather conditions during a five day work week (Monday through Friday,) or a four day-ten hour work week (Tuesday through Friday,) then Saturday may be worked as a voluntary make-up day at the straight time rate. However, Saturday shall not be utilized as a make-up day when a holiday falls on Friday. All hours worked Monday through Saturday over twelve (12) hours and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

J. All hours worked between the hours of 10:00 pm and 5:00 am, Monday through Friday, and all hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

4. ALL HOURS WORKED IN EXCESS OF EIGHT (8) HOURS PER DAY OR FORTY (40) HOURS PER WEEK SHALL BE PAID AT ONE AND ONE-HALF TIMES THE HOURLY RATE OF WAGE.

A. All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at double the hourly rate of wage. All hours worked on Saturdays, Sundays and holidays shall be paid at double the hourly rate of wage.

B. All hours worked over twelve (12) hours per day and all hours worked on holidays shall be paid at double the hourly rate of wage.

C. On Monday through Friday, the first four (4) hours of overtime after eight (8) hours of straight time work shall be paid at one and one half (1-1/2) times the straight time rate of pay, unless a four (4) day ten (10) hour workweek has been established. On a four (4) day ten (10) hour workweek scheduled Monday through Thursday, or Tuesday through Friday, the first two (2) hours of overtime after ten (10) hours of straight time work shall be paid at one and one half (1-1/2) times the straight time rate of pay. On Saturday, the first twelve (12) hours of work shall be paid at one and one half (1-1/2) times the straight time rate of pay, except that if the job is down on Monday through Friday due to weather conditions or other conditions outside the control of the employer, the first ten (10) hours on Saturday may be worked at the straight time rate of pay. All hours worked over twelve (12) hours in a day and all hours worked on Sunday and Holidays shall be paid at two (2) times the straight time rate of pay.
4. D. All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at double the hourly rate of wage. All hours worked on Saturday, Sundays and holidays shall be paid at double the hourly rate of pay. Rates include all members of the assigned crew.

EXCEPTION:
On all multipole structures and steel transmission lines, switching stations, regulating, capacitor stations, generating plants, industrial plants, associated installations and substations, except those substations whose primary function is to feed a distribution system, will be paid overtime under the following rates:

The first two (2) hours after eight (8) regular hours Monday through Friday of overtime on a regular workday, shall be paid at one and one-half times the hourly rate of wage. All hours in excess of ten (10) hours will be at two (2) times the hourly rate of wage. The first eight (8) hours worked on Saturday will be paid at one and one-half (1-1/2) times the hourly rate of wage. All hours worked in excess of eight (8) hours on Saturday, and all hours worked on Sundays and holidays will be at the double the hourly rate of wage.

All overtime eligible hours performed on the above described work that is energized, shall be paid at the double the hourly rate of wage.

E. The first two (2) hours after eight (8) regular hours Monday through Friday and the first eight (8) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other hours worked Monday through Saturday, and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

On a four-day, ten-hour weekly schedule, either Monday thru Thursday or Tuesday thru Friday schedule, all hours worked after ten shall be paid at double the hourly rate of wage. The Monday or Friday not utilized in the normal four-day, ten hour work week, and Saturday shall be paid at one and one half (1½) times the regular shift rate for the first eight (8) hours. All other hours worked Monday through Saturday, and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

F. All hours worked between the hours of 6:00 pm and 6:00 am, Monday through Saturday, shall be paid at a premium rate of 20% over the hourly rate of wage. All hours worked on Sundays shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid at double the hourly rate of wage.

G. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked Monday through Saturday over twelve (12) hours and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

H. The first two (2) hours after eight (8) regular hours Monday through Friday and the first eight (8) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other overtime hours worked, except Labor Day, and all hours on Sunday shall be paid at double the hourly rate of wage. All hours worked on Labor Day shall be paid at three times the hourly rate of wage.

I. The First eight (8) hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked in excess of eight (8) per day on Saturdays shall be paid at double the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

J. The first eight (8) hours worked on a Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked in excess of eight (8) hours on a Saturday shall be paid at double the hourly rate of wage. All hours worked over twelve (12) in a day, and all hours worked on Sundays and Holidays shall be paid at double the hourly rate of wage.

K. All hours worked on a Saturday shall be paid at one and one-half times the hourly rate of wage, so long as Saturday is the sixth consecutive day worked. All hours worked over twelve (12) in a day Monday through Saturday, and all hours worked on Sundays and Holidays shall be paid at double the hourly rate of wage.
4. L. The first twelve (12) hours worked on a Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked on a Saturday in excess of twelve (12) hours shall be paid at double the hourly rate of pay. All hours worked over twelve (12) in a day Monday through Friday, and all hours worked on Sundays shall be paid at double the hourly rate of wage. All hours worked on a holiday shall be paid at one and one-half times the hourly rate of wage, except that all hours worked on Labor Day shall be paid at double the hourly rate of pay.

M. All hours worked on Sunday and Holidays shall be paid at double the hourly rate. Any employee reporting to work less than nine (9) hours from their previous quitting time shall be paid for such time at time and one-half times the hourly rate.

N. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays, and all work performed between the hours of midnight (12:00 AM) and eight AM (8:00 AM) every day shall be paid at double the hourly rate of wage.

O. All hours worked between midnight Friday to midnight Sunday shall be paid at one and one-half the hourly rate of wage. After an employee has worked in excess of eight (8) continuous hours in any one or more calendar days, all additional hours shall be at the applicable overtime rate until such time as the employee has had a break of six (6) hours or more. All hours worked on Holidays shall be paid at double the hourly rate of wage.

P. All hours worked on Holidays shall be paid at one and one-half times the hourly rate of wage.

Q. The first four (4) hours after eight (8) regular hours Monday through Friday and the first eight (8) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked over twelve (12) hours Monday through Saturday shall be paid at double the hourly rate. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

R. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage, so long as Saturday is the sixth consecutive day worked. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

R. Placeholder

5. Holiday Codes


5. Holiday Codes Continued


Benefit Code Key – Effective 8/31/2018 thru 3/2/2019

Holiday Codes Continued


Z. Holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday after Thanksgiving Day, And Christmas Day (7). If a holiday falls on Saturday, the preceding Friday shall be considered as the holiday. If a holiday falls on Sunday, the following Monday shall be considered as the holiday.

7. A. Holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday and Saturday after Thanksgiving Day, And Christmas Day (8). Any Holiday Which Falls On A Sunday Shall Be Observed As A Holiday On The Following Monday. If any of the listed holidays falls on a Saturday, the preceding Friday shall be a regular work day.

B. Holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday and Saturday after Thanksgiving Day, And Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

C. Holidays: New Year’s Day, Martin Luther King Jr. Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, And Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

D. Paid Holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Veteran’s Day, Thanksgiving Day, the Friday after Thanksgiving Day, And Christmas Day (8). Unpaid Holidays: President’s Day. Any paid holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any paid holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

E. Holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, And Christmas Day (7). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

F. Holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, the last working day before Christmas day and Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.


H. Holidays: New Year’s Day, Martin Luther King Jr. Day, Independence Day, Memorial Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, the Last Working Day before Christmas Day and Christmas Day (9). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

Holiday Codes Continued

I. Holidays: New Year’s Day, President’s Day, Independence Day, Memorial Day, Labor Day, Thanksgiving Day, The Friday After Thanksgiving Day, The Day Before Christmas Day And Christmas Day (9). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be
7. J. Holidays: New Year's Day, Independence Day, Memorial Day, Labor Day, Thanksgiving Day and Christmas Day (6). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

K. Holidays: New Year's Day, Memorial Day, Independence Day, Thanksgiving Day, the Friday and Saturday after Thanksgiving Day, And Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

L. Holidays: New Year's Day, Memorial Day, Labor Day, Independence Day, Thanksgiving Day, the Last Work Day before Christmas Day, And Christmas Day (7). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

M. Paid Holidays: New Year's Day, The Day after or before New Year's Day, President's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, And the Day after or before Christmas Day (10). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

N. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, And Christmas Day (7). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. When Christmas falls on a Saturday, the preceding Friday shall be observed as a holiday.


Q. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, And the Day after or before Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. If any of the listed holidays falls on a Saturday, the preceding Friday shall be observed as a regular work day.

R. Paid Holidays: New Year's Day, the day after or before New Year’s Day, President’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, And the Day after or before Christmas Day (10). If any of the listed holidays fall on Saturday, the preceding Friday shall be observed as the holiday. If any of the listed holidays falls on a Sunday, the day observed by the Nation shall be considered a holiday and compensated accordingly.

S. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day, the Day after Christmas, and A Floating Holiday (9). If any of the listed holidays falls on a Sunday, the day observed by the Nation shall be considered a holiday and compensated accordingly.

T. Paid Holidays: New Year's Day, the Day after or before New Year’s Day, President’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, And The Day after or before Christmas Day. (10). If any of the listed holidays falls on a Sunday, the day observed by the Nation shall be considered a holiday and compensated accordingly. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

V. Holidays: New Year's Day, President’s Birthday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, the day before or after Christmas, and the day before or after New Year’s Day. If any of the above listed holidays falls on a Sunday, the day observed by the Nation shall be considered a holiday and compensated accordingly.
Holiday Codes Continued


X. Holidays: New Year's Day, Day before or after New Year’s Day, Presidents’ Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, and the day before or after Christmas day. If a holiday falls on a Saturday or on a Friday that is the normal day off, then the holiday will be taken on the last normal workday. If the holiday falls on a Monday that is the normal day off or on a Sunday, then the holiday will be taken on the next normal workday.

Y. Holidays: New Year's Day, Presidents’ Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, and Christmas Day. (8) If the holiday falls on a Sunday, then the day observed by the federal government shall be considered a holiday and compensated accordingly.

Z. Holidays: New Year's Day, President’s Day, Independence Day, Memorial Day, Labor Day, Thanksgiving Day, The Friday After Thanksgiving Day, And Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

15. A. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, the day before Christmas Day and Christmas Day. (8) Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday.


Note Codes

8. D. Workers working with supplied air on hazmat projects receive an additional $1.00 per hour.

L. Workers on hazmat projects receive additional hourly premiums as follows - Level A: $0.75, Level B: $0.50, And Level C: $0.25.

M. Workers on hazmat projects receive additional hourly premiums as follows: Levels A & B: $1.00, Levels C & D: $0.50.

N. Workers on hazmat projects receive additional hourly premiums as follows - Level A: $1.00, Level B: $0.75, Level C: $0.50, And Level D: $0.25.
8. P. Workers on hazmat projects receive additional hourly premiums as follows - Class A Suit: $2.00, Class B Suit: $1.50, Class C Suit: $1.00, And Class D Suit $0.50.

Q. The highest pressure registered on the gauge for an accumulated time of more than fifteen (15) minutes during the shift shall be used in determining the scale paid.

R. Effective August 31, 2012 – A Traffic Control Supervisor shall be present on the project whenever flagging or spotting or other traffic control labor is being utilized. A Traffic Control Laborer performs the setup, maintenance and removal of all temporary traffic control devices and construction signs necessary to control vehicular, bicycle, and pedestrian traffic during construction operations. Flaggers and Spotters shall be posted where shown on approved Traffic Control Plans or where directed by the Engineer. All flaggers and spotters shall possess a current flagging card issued by the State of Washington, Oregon, Montana, or Idaho. These classifications are only effective on or after August 31, 2012.

S. Effective August 31, 2012 – A Traffic Control Supervisor shall be present on the project whenever flagging or spotting or other traffic control labor is being utilized. Flaggers and Spotters shall be posted where shown on approved Traffic Control Plans or where directed by the Engineer. All flaggers and spotters shall possess a current flagging card issued by the State of Washington, Oregon, Montana, or Idaho. This classification is only effective on or after August 31, 2012.

T. Effective August 31, 2012 – A Traffic Control Laborer performs the setup, maintenance and removal of all temporary traffic control devices and construction signs necessary to control vehicular, bicycle, and pedestrian traffic during construction operations. Flaggers and Spotters shall be posted where shown on approved Traffic Control Plans or where directed by the Engineer. All flaggers and spotters shall possess a current flagging card issued by the State of Washington, Oregon, Montana, or Idaho. This classification is only effective on or after August 31, 2012.

U. Workers on hazmat projects receive additional hourly premiums as follows – Class A Suit: $2.00, Class B Suit: $1.50, And Class C Suit: $1.00. Workers performing underground work receive an additional $0.40 per hour for any and all work performed underground, including operating, servicing and repairing of equipment. The premium for underground work shall be paid for the entire shift worked. Workers who work suspended by a rope or cable receive an additional $0.50 per hour. The premium for work suspended shall be paid for the entire shift worked. Workers who do “pioneer” work (break open a cut, build road, etc.) more than one hundred fifty (150) feet above grade elevation receive an additional $0.50 per hour.

V. In addition to the hourly wage and fringe benefits, the following depth and enclosure premiums shall be paid. The premium are to be calculated for the maximum depth and distance into an enclosure that a diver reaches in a day. The premiums are to be paid one time for the day and are not used in calculating overtime pay.

Depth premiums apply to depths of fifty feet or more. Over 50’ to 100’ - $2.00 per foot for each foot over 50 feet. Over 101’ to 150’ - $3.00 per foot for each foot over 101 feet. Over 151’ to 220’ - $4.00 per foot for each foot over 220 feet. Over 221’ - $5.00 per foot for each foot over 221 feet.

Enclosure premiums apply when divers enter enclosures (such as pipes or tunnels) where there is no vertical ascent and is measured by the distance travelled from the entrance. 25’ to 300’ - $1.00 per foot from entrance. 300’ to 600’ - $1.50 per foot beginning at 300’. Over 600’ - $2.00 per foot beginning at 600’.

W. Meter Installers work on single phase 120/240V self-contained residential meters. The Lineman/Groundmen rates would apply to meters not fitting this description.
The PREVAILING WAGES listed here include both the hourly wage rate and the hourly rate of fringe benefits. On public works projects, worker's wage and benefit rates must add to not less than this total. A brief description of overtime calculation requirements are provided on the Benefit Code Key.

Journey Level Prevailing Wage Rates for the Effective Date: 01/18/2019

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<td>Journey Level</td>
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<td>Janitor</td>
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<td>Whitman</td>
<td>Cabinet Makers (In Shop)</td>
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<td>Carpenters</td>
<td>Carpenter</td>
<td>$45.11</td>
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<td>Whitman</td>
<td>Carpenters</td>
<td>Floor Finisher</td>
<td>$45.11</td>
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<td>Whitman</td>
<td>Carpenters</td>
<td>Floor Layer</td>
<td>$45.11</td>
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<td>1B</td>
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<td>Whitman</td>
<td>Carpenters</td>
<td>Form Builder</td>
<td>$45.11</td>
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<td>Whitman</td>
<td>Carpenters</td>
<td>Scaffold Erecting &amp; Dismantling</td>
<td>$45.11</td>
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<td>Whitman</td>
<td>Divers &amp; Tenders</td>
<td>Assistant Tender</td>
<td>$51.92</td>
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<td>Divers &amp; Tenders</td>
<td>Dive Supervisor</td>
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<td>Divers &amp; Tenders</td>
<td>Diver on Standby</td>
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<td>Divers &amp; Tenders</td>
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<td>Diving Master</td>
<td>$64.41</td>
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<td>Whitman</td>
<td>Divers &amp; Tenders</td>
<td>Manifold Operator</td>
<td>$54.16</td>
<td>5A</td>
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<td>Whitman</td>
<td>Divers &amp; Tenders</td>
<td>Manifold Operator Mixed Gas</td>
<td>$58.16</td>
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<td>Whitman</td>
<td>Divers &amp; Tenders</td>
<td>Remote Operated Vehicle Operator</td>
<td>$54.16</td>
<td>5A</td>
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<td>Divers &amp; Tenders</td>
<td>Remote Operated Vehicle Tender/Technician</td>
<td>$51.92</td>
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<td>Whitman</td>
<td>Dredge Workers</td>
<td>Assistant Engineer</td>
<td>$56.44</td>
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<td>Dredge Workers</td>
<td>Assistant Mate (Deckhand)</td>
<td>$56.00</td>
<td>5D</td>
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<td>Dredge Workers</td>
<td>Boatmen</td>
<td>$56.44</td>
<td>5D</td>
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<td>Dredge Workers</td>
<td>Engineer Welder</td>
<td>$57.51</td>
<td>5D</td>
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<td>Whitman</td>
<td><strong>Dredge Workers</strong></td>
<td><strong>Leverman, Hydraulic</strong></td>
<td>$58.67</td>
<td>5D</td>
<td>3F</td>
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<td>Whitman</td>
<td><strong>Dredge Workers</strong></td>
<td><strong>Mates</strong></td>
<td>$56.44</td>
<td>5D</td>
<td>3F</td>
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<td>Whitman</td>
<td><strong>Dredge Workers</strong></td>
<td><strong>Oiler</strong></td>
<td>$56.00</td>
<td>5D</td>
<td>3F</td>
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<td>Whitman</td>
<td><strong>Drywall Applicator</strong></td>
<td><strong>Journey Level</strong></td>
<td>$45.11</td>
<td>5A</td>
<td>1B</td>
<td>8N</td>
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<td>Whitman</td>
<td><strong>Drywall Tapers</strong></td>
<td><strong>Journey Level</strong></td>
<td>$40.10</td>
<td>7E</td>
<td>1P</td>
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<td>Whitman</td>
<td><strong>Electrical Fixture Maintenance Workers</strong></td>
<td><strong>Journey Level</strong></td>
<td>$12.00</td>
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<tr>
<td>Whitman</td>
<td><strong>Electricians - Inside</strong></td>
<td><strong>Journeyman</strong></td>
<td>$52.67</td>
<td>7G</td>
<td>1E</td>
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<tr>
<td>Whitman</td>
<td><strong>Electricians - Motor Shop</strong></td>
<td><strong>Craftsman</strong></td>
<td>$15.37</td>
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<td>Whitman</td>
<td><strong>Electricians - Motor Shop</strong></td>
<td><strong>Journey Level</strong></td>
<td>$14.69</td>
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<td>Whitman</td>
<td><strong>Electricians - Powerline Construction</strong></td>
<td><strong>Cable Splicer</strong></td>
<td>$79.43</td>
<td>5A</td>
<td>4D</td>
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<tr>
<td>Whitman</td>
<td><strong>Electricians - Powerline Construction</strong></td>
<td><strong>Certified Line Welder</strong></td>
<td>$69.75</td>
<td>5A</td>
<td>4D</td>
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<tr>
<td>Whitman</td>
<td><strong>Electricians - Powerline Construction</strong></td>
<td><strong>Groundperson</strong></td>
<td>$46.28</td>
<td>5A</td>
<td>4D</td>
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<td>Whitman</td>
<td><strong>Electricians - Powerline Construction</strong></td>
<td><strong>Heavy Line Equipment Operator</strong></td>
<td>$69.75</td>
<td>5A</td>
<td>4D</td>
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<td>Whitman</td>
<td><strong>Electricians - Powerline Construction</strong></td>
<td><strong>Journey Level Lineperson</strong></td>
<td>$69.75</td>
<td>5A</td>
<td>4D</td>
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<td>Whitman</td>
<td><strong>Electricians - Powerline Construction</strong></td>
<td><strong>Line Equipment Operator</strong></td>
<td>$59.01</td>
<td>5A</td>
<td>4D</td>
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<td><strong>Electricians - Powerline Construction</strong></td>
<td><strong>Meter Installer</strong></td>
<td>$46.28</td>
<td>5A</td>
<td>4D</td>
<td>8W</td>
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<td>Whitman</td>
<td><strong>Electricians - Powerline Construction</strong></td>
<td><strong>Pole Sprayer</strong></td>
<td>$69.75</td>
<td>5A</td>
<td>4D</td>
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<td>Whitman</td>
<td><strong>Electricians - Powerline Construction</strong></td>
<td><strong>Powderperson</strong></td>
<td>$52.20</td>
<td>5A</td>
<td>4D</td>
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<td>Whitman</td>
<td><strong>Electronic Technicians</strong></td>
<td><strong>Journey Level</strong></td>
<td>$42.94</td>
<td>5I</td>
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<td>Whitman</td>
<td><strong>Elevator Constructors</strong></td>
<td><strong>Mechanic</strong></td>
<td>$91.24</td>
<td>7D</td>
<td>4A</td>
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<td>Whitman</td>
<td><strong>Elevator Constructors</strong></td>
<td><strong>Mechanic In Charge</strong></td>
<td>$98.51</td>
<td>7D</td>
<td>4A</td>
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<td>Whitman</td>
<td><strong>Fabricated Precast Concrete Products</strong></td>
<td><strong>Journey Level</strong></td>
<td>$12.00</td>
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<tr>
<td>Whitman</td>
<td><strong>Fabricated Precast Concrete Products</strong></td>
<td><strong>Journey Level - In-Factory Work Only</strong></td>
<td>$12.00</td>
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<td>Whitman</td>
<td><strong>Fence Erectors</strong></td>
<td><strong>Fence Erector</strong></td>
<td>$39.29</td>
<td>7B</td>
<td>1M</td>
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<td>Whitman</td>
<td><strong>Fence Erectors</strong></td>
<td><strong>Fence Laborer</strong></td>
<td>$39.29</td>
<td>7B</td>
<td>1M</td>
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<tr>
<td>Whitman</td>
<td><strong>Flaggers</strong></td>
<td><strong>Journey Level</strong></td>
<td>$37.19</td>
<td>7B</td>
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<td>Whitman</td>
<td><strong>Glaziers</strong></td>
<td><strong>Journey Level</strong></td>
<td>$30.59</td>
<td>7L</td>
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<tr>
<td>Whitman</td>
<td><strong>Heat &amp; Frost Insulators And Asbestos Workers</strong></td>
<td><strong>Journey Level</strong></td>
<td>$51.04</td>
<td>5K</td>
<td>1U</td>
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<td>Whitman</td>
<td><strong>Heating Equipment Mechanics</strong></td>
<td><strong>Journey Level</strong></td>
<td>$54.61</td>
<td>6Z</td>
<td>1B</td>
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<tr>
<td>Whitman</td>
<td><strong>Hod Carriers &amp; Mason Tenders</strong></td>
<td><strong>Journey Level</strong></td>
<td>$40.54</td>
<td>7B</td>
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<tr>
<td>Whitman</td>
<td><strong>Industrial Power Vacuum Cleaner</strong></td>
<td><strong>Journey Level</strong></td>
<td>$12.00</td>
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<td>Whitman</td>
<td><strong>Inland Boatmen</strong></td>
<td><strong>Journey Level</strong></td>
<td>$12.00</td>
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<tr>
<td>Whitman</td>
<td><strong>Inspection/Cleaning/Sealing Of Sewer &amp; Water Systems By Remote Control</strong></td>
<td><strong>Cleaner Operator, Foamer Operator</strong></td>
<td>$12.00</td>
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<tr>
<td>Whitman Inspection/Cleaning/Sealing Of Sewer &amp; Water Systems By Remote Control</td>
<td>Grout Truck Operator</td>
<td>$12.00</td>
<td>1</td>
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<td>Whitman Inspection/Cleaning/Sealing Of Sewer &amp; Water Systems By Remote Control</td>
<td>Head Operator</td>
<td>$12.78</td>
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<td>Whitman Inspection/Cleaning/Sealing Of Sewer &amp; Water Systems By Remote Control</td>
<td>Technician</td>
<td>$12.00</td>
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<td>Whitman Inspection/Cleaning/Sealing Of Sewer &amp; Water Systems By Remote Control</td>
<td>Tv Truck Operator</td>
<td>$12.00</td>
<td>1</td>
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<td>Whitman Insulation Applicators</td>
<td>Journey Level</td>
<td>$45.11</td>
<td>5A 1B 8N</td>
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<td>Whitman Ironworkers</td>
<td>Journeyman</td>
<td>$61.21</td>
<td>7N 1O</td>
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<td>Whitman Laborers</td>
<td>Air And Hydraulic Track Drill</td>
<td>$39.83</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Asphalt Raker</td>
<td>$39.83</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Asphalt Roller, Walking</td>
<td>$39.56</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Brick Pavers</td>
<td>$39.29</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Brush Hog Feeder</td>
<td>$39.29</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Brush Machine</td>
<td>$39.83</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Caisson Worker, Free Air</td>
<td>$39.83</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Carpenter Tender</td>
<td>$39.29</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Cement Finisher Tender</td>
<td>$39.56</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Cement Handler</td>
<td>$39.29</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Chain Saw Operator &amp; Faller</td>
<td>$39.83</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Clean-up Laborer</td>
<td>$39.29</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Compaction Equipment</td>
<td>$39.56</td>
<td>7B 1M</td>
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<td>Whitman Laborers</td>
<td>Concrete Crewman</td>
<td>$39.29</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Concrete Saw, Walking</td>
<td>$39.56</td>
<td>7B 1M</td>
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<td>Whitman Laborers</td>
<td>Concrete Signalman</td>
<td>$39.29</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Concrete Stack</td>
<td>$39.83</td>
<td>7B 1M</td>
<td></td>
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<tr>
<td>Whitman Laborers</td>
<td>Confined Space Attendant</td>
<td>$39.29</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Crusher Feeder</td>
<td>$39.29</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Demolition</td>
<td>$39.29</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Demolition Torch</td>
<td>$39.56</td>
<td>7B 1M</td>
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<td>Whitman Laborers</td>
<td>Dope Pot Fireman, Non-mechanical</td>
<td>$39.56</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Driller Helper (when Required To Move &amp; Position Machine)</td>
<td>$39.56</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Drills With Dual Masts</td>
<td>$40.11</td>
<td>7B 1M</td>
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<td>Whitman Laborers</td>
<td>Dry Stack Walls</td>
<td>$39.29</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Dumpman</td>
<td>$39.29</td>
<td>7B 1M</td>
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<td>Whitman Laborers</td>
<td>Erosion Control Laborer</td>
<td>$39.29</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Final Detail Cleanup (i.e., Dusting, Vacuuming, Window Cleaning; Not Construction Debris Cleanup)</td>
<td>$37.19</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Firewatch</td>
<td>$39.29</td>
<td>7B 1M</td>
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<tr>
<td>Whitman Laborers</td>
<td>Form Cleaning Machine Feeder, Stacker</td>
<td>$39.29</td>
<td>7B</td>
<td>1M</td>
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https://fortress.wa.gov/lni/wagelookup/prvWagelookup.aspx  1/16/2019
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<td>$43.46</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Bob Cat (skid Steer)</td>
<td>$44.39</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Bolt Threading Machine</td>
<td>$43.46</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Boom Cats (side)</td>
<td>$44.99</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Boring Machine (earth)</td>
<td>$44.39</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Boring Machine (Rock Under 8 inch Bit - Quarry Master, Joy Or Similar)</td>
<td>$44.39</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Bump Cutter (wayne, Saginaw Or Similar)</td>
<td>$44.39</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Cableway Controller (dispatcher)</td>
<td>$44.99</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Cableway Operators</td>
<td>$45.26</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Canal Lining Machine (concrete)</td>
<td>$44.39</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Carrydeck &amp; Boom Truck (under 25 Tons)</td>
<td>$44.71</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Cement Hog</td>
<td>$43.78</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Chipper (without Crane) Cleaning &amp; Doping Machine (pipeline)</td>
<td>$44.39</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Clamshell, Dragline</td>
<td>$46.36</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Compactor (self-propelled With Blade)</td>
<td>$44.99</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Compressor (2000 Cfm Or Over, 2 Or More, Gas Diesel Or Electric Power)</td>
<td>$43.78</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Compressors (under 2000 Cfm, Gas, Diesel Or Electric Power)</td>
<td>$43.46</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Concrete Cleaning / Decontamination Machine Operator</td>
<td>$45.26</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Concrete Pump Boon Truck</td>
<td>$44.99</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Concrete Pumps (squeeze-crete, Flow-crete, Whitman &amp; Similar)</td>
<td>$44.55</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Concrete Saw (multiple Cut)</td>
<td>$43.78</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Concrete Slip Form Paver</td>
<td>$44.99</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Conveyor Aggregate Delivery Systems (c.a.d.)</td>
<td>$44.99</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Crane Oiler- Driver (cdl Required) &amp; Cable Tender, Mucking Machine</td>
<td>$43.46</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Cranes (25 Tons &amp; Under), All Attachments Incl. Clamshell, Dragline</td>
<td>$44.71</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td></td>
<td>$44.99</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Cranes (25 Tons To And Including 45 Tons), All Attachments Incl. Clamshell, Dragline</td>
<td>$45.26</td>
<td>7B</td>
<td>1M</td>
</tr>
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<tr>
<td>Whitman Power Equipment Operators</td>
<td>Cranes (85 Tons &amp; Over) And All Climbing, Overhead, Rail &amp; Tower. All Attachments Incl.</td>
<td>$46.36</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Crusher Feeder</td>
<td>$43.46</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Crusher, Grizzle &amp; Screening Plant Operator</td>
<td>$44.99</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Curb Extruder (asphalt Or Concrete)</td>
<td>$44.55</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Deck Engineer</td>
<td>$44.39</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Deck Hand</td>
<td>$43.46</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Derricks &amp; Stifflegs (65 Tons &amp; Over)</td>
<td>$45.26</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Derricks &amp; Stifflegs (under 65 Tons)</td>
<td>$44.71</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Distributor Leverman</td>
<td>$43.78</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Ditch Witch Or Similar</td>
<td>$43.78</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Dope Pots (power Agitated)</td>
<td>$43.78</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Dozer / Tractor (up To D-6 Or Equivalent) And Traxcavator</td>
<td>$44.39</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Dozer / Tractors (d-6 &amp; Equivalent &amp; Over)</td>
<td>$44.99</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Dozer, 834 R/t &amp; Similar</td>
<td>$44.99</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Drill Doctor</td>
<td>$44.99</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Driller Licensed</td>
<td>$46.36</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Drillers Helper</td>
<td>$43.46</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Drilling Equipment (8 inch Bit &amp; Over - Robbins, Reverse Circulation &amp; Similar)</td>
<td>$44.71</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Drills (churn, Core, Calyx Or Diamond)</td>
<td>$44.55</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Elevating Belt (holland Type)</td>
<td>$45.26</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Elevating Belt-type Loader (euclid, Barber Green &amp; Similar)</td>
<td>$44.39</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Elevating Grader-type Loader (dumor, Adams Or Similar)</td>
<td>$44.39</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Elevator Hoisting Materials</td>
<td>$43.78</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Equipment Serviceman, Greaser &amp; Oiler</td>
<td>$44.55</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Fireman &amp; Heater Tender</td>
<td>$43.46</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators</td>
<td>Fork Lift Or Lumber Stacker, Hydra-life &amp; Similar</td>
<td>$43.78</td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Generator Plant Engineers (diesel Or Electric)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Gin Trucks (pipeline)</td>
<td>$43.78</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Grade Checker</td>
<td>$44.71</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Gunite Combination Mixer &amp; Compressor</td>
<td>$44.39</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>H.d. Mechanic</td>
<td>$45.26</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>H.d. Welder</td>
<td>$45.26</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Heavy Equipment Robotics Operator</td>
<td>$45.26</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Helicopter Pilot</td>
<td>$46.36</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Helper, Mechanic Or Welder, H.D</td>
<td>$43.46</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Hoe Ram</td>
<td>$44.71</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Hoist (2 Or More Drums Or Tower Hoist)</td>
<td>$44.55</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Hoist, Single Drum</td>
<td>$43.78</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Hydraulic Platform Trailers (goldhofer, Shaurerly And Similar)</td>
<td>$45.26</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Hydro-seeder, Mulcher, Nozzlemian</td>
<td>$43.46</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Lime Batch Tank Operator (recycle Train)</td>
<td>$44.99</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Lime Brain Operator (recycle Train)</td>
<td>$44.99</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Loader (360 Degrees Revolving Koehring Scooper Or Similar)</td>
<td>$45.26</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Loader Operator (front-end &amp; Overhead, 4 Yds. Incl. 8 Yds.)</td>
<td>$44.99</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Loaders (bucket Elevators And Conveyors)</td>
<td>$43.78</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Loaders (overhead &amp; Front-end, Over 8 Yds. To 10 Yds.)</td>
<td>$45.26</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Loaders (overhead &amp; Front-end, Under 4 Yds.: R/t)</td>
<td>$44.55</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Loaders (overhead And Front-end, 10 Yds. &amp; Over)</td>
<td>$46.36</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Locomotive Engineer</td>
<td>$44.39</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Longitudinal Float</td>
<td>$43.78</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Master Environmental Maintenance Technician</td>
<td>$45.26</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Mixer (portable - Concrete)</td>
<td>$43.78</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Mixermobile</td>
<td>$44.39</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Mobile Crusher Operator (recycle Train)</td>
<td>$44.99</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Mucking Machine</td>
<td>$44.39</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Multiple Dozer Units With Single Blade</td>
<td>$44.99</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td><strong>Power Equipment Operators</strong></td>
<td><strong>$43.78</strong></td>
<td>7B</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Pavement Breaker, Hydram hammer &amp; Similar</td>
<td>$44.71</td>
<td>7B</td>
</tr>
<tr>
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<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Paving (dual Drum)</td>
<td>$44.99</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Paving Machine (asphalt And Concrete)</td>
<td>$44.71</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Plant Oiler</td>
<td>$44.67</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Posthole Auger Or Punch</td>
<td>$44.39</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Power Broom</td>
<td>$43.78</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Pump (grout Or Jet)</td>
<td>$44.39</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Pumpman</td>
<td>$43.49</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Quad-track Or Similar Equipment</td>
<td>$44.99</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Railroad Ballast Regulation Operator</td>
<td>$43.78</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Railroad Power Tamper Operator</td>
<td>$43.78</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Railroad Tamper Jack Operator</td>
<td>$43.78</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Railroad Track Liner Operator</td>
<td>$44.71</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Refrigeration Plant Engineer (1000 Tons &amp; Over)</td>
<td>$44.71</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Refrigeration Plant Engineer (under 1000 Ton)</td>
<td>$44.55</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Rollerman (finishing Asphalt Pavement)</td>
<td>$44.99</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Rollers, All Types On Subgrade, Including Seal And Chip Coating (farm Type, Case, John Deere And Similar, Or Compacting Vibrator), Except When Pulled B</td>
<td>$43.46</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Roto Mill (pavement Grinder)</td>
<td>$44.99</td>
<td>7B</td>
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<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Rotomill Groundsman</td>
<td>$44.55</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Rubber-tired Scrapers (multiple Engine With Three Or More Scrapers)</td>
<td>$45.26</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Rubber-tired Skidders (r/t With Or Without Attachments)</td>
<td>$44.55</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Scrapers, All, Rubber-tired</td>
<td>$44.99</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Screed Operator</td>
<td>$44.99</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Shovels (3 Yds. &amp; Over)</td>
<td>$45.26</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Shovels (under 3 Yds.)</td>
<td>$44.99</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Signalman (whirleys, Highline, Hammerheads Or Similar)</td>
<td>$44.71</td>
<td>7B</td>
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<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>Soil Stabilizer (p &amp; H Or Similar)</td>
<td>$44.39</td>
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<tr>
<td>Whitman</td>
<td>Power Equipment Operators</td>
<td>$43.78</td>
<td>7B</td>
<td>1M</td>
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</table>
| Whitman | Power Equipment Operators | Spray Curing Machine  
(concrete) | $43.78 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators | Spreader Box (self-propelled) | $44.39 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators | Steam Cleaner | $43.46 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators | Straddle Buggy (ross & Similar On Construction Job Only) | $43.78 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators | Surface Heater & Planer Machine | $44.55 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators | Trenching Machines (7 Ft. Depth & Over) | $44.55 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators | Trenching Machines (under 7 Ft. Depth Capacity) | $45.26 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators | Ultra High Pressure Waterjet Cutting Tool System Operator, (30,000 Psi) | $44.99 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators | Vactor Guzzler, Super Sucker | $43.78 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators | Vacuum Drill (reverse Circulation Drill Under 8” Bit) | $44.55 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators | Welding Machine | $45.26 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators | Whirleys & Hammerheads, All | $44.99 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators- 
Underground Sewer & Water | A-frame Truck (2 Or More Drums) | $43.78 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators- 
Underground Sewer & Water | A-frame Truck (single Drum) | $44.55 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators- 
Underground Sewer & Water | Asphalt Plant Operator | $44.99 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators- 
Underground Sewer & Water | Assistant Plant Operator, Fireman Or Pugmixer (asphalt) | $43.78 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators- 
Underground Sewer & Water | Assistant Refrigeration Plant & Chiller Operator (over 1000 Ton) | $44.39 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators- 
Underground Sewer & Water | Assistant Refrigeration Plant (under 1000 Ton) | $43.78 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators- 
Underground Sewer & Water | Automatic Subgrader (ditches & Trimmers) | $44.99 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators- 
Underground Sewer & Water | Backfillers (cleveland & Similar) | $44.55 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators- 
Underground Sewer & Water | Backhoe & Hoe Ram (under 3/4 Yd.) | $44.71 | 7B | 1M | 8D |
<p>| Whitman | Backhoe (45,000 Gw &amp; Under) | $44.71 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Backhoe (45,000 Gw To 110,000 Gw) | $44.99 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Backhoe (over 110,000 Gw) | $45.26 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Backhoes &amp; Hoe Ram (3 Yds &amp; Over) | $45.26 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Backhoes &amp; Hoe Ram (3/4 Yd. To 3 Yd.) | $44.99 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Bagley Or Stationary Scraper | $43.78 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Batch &amp; Wet Mix Operator (multiple Units, 2 &amp; Incl. 4) | $44.99 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Batch Plant &amp; Wet Mix Operator, Single Unit (concrete) | $44.39 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Batch Plant (over 4 Units) | $44.99 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Belt Finishing Machine | $43.78 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Belt Loader (kocal Or Similar) | $44.39 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Belt-crete Conveyors With Power Pack Or Similar | $44.39 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Bending Machine | $44.39 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Bit Grinders | $43.46 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Blade (finish &amp; Bluetop), Automatic, Cmi, Abc, Finish Athey &amp; Huber &amp; Similar When Used As Automatic | $45.26 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Blade Operator (motor Patrol &amp; Attachments) | $44.99 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Blower Operator (cement) | $43.78 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Boat Operator | $43.46 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Bob Cat (skid Steer) | $44.39 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Bolt Threading Machine | $43.46 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Boom Cats (side) | $44.99 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Boring Machine (earth) | $44.39 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Boring Machine (Rock Under 8 inch Bit - Quarry Master, Joy Or Similar) | $44.39 | 7B | 1M | 8D |
| Whitman | Power Equipment Operators-Underground Sewer &amp; Water | Bump Cutter (wayne, Saginau Or Similar) | $44.39 | 7B | 1M | 8D |</p>
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<th>Power Equipment Operators-Underground Sewer &amp; Water</th>
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<td>Cableway Controller (dispatcher)</td>
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<td>Carrydeck &amp; Boom Truck (under 25 Tons)</td>
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<td>Whitman</td>
<td>Cement Hog</td>
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<td>Chipper (without Crane) Cleaning &amp; Doping Machine (pipeline)</td>
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<td>Clamshell, Dragline</td>
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<td>7B</td>
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<td>Whitman</td>
<td>Compactor (self-propelled With Blade)</td>
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<td>Compressor (2000 Cfm Or Over, 2 Or More, Gas Diesel Or Electric Power)</td>
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<td>Concrete Pump Boon Truck</td>
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<td>Concrete Pumps (squeeze-crete, Flow-crete, Whitman &amp; Similar)</td>
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<td>Concrete Saw (multiple Cut)</td>
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<td>Cranes (25 Tons &amp; Under), All Attachments Incl. Clamshell, Dragline</td>
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<td>Cranes (25 Tons To And Including 45 Tons), All Attachments Incl. Clamshell, Dragline</td>
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<td>Cranes (45 Tons To 85 Tons), All Attachments Incl. Clamshell And Dragline</td>
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<td>Fork Lift Or Lumber Stacker, Hydra-life &amp; Similar</td>
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<td>Generator Plant Engineers (diesel Or Electric)</td>
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<td>Gin Trucks (pipeline)</td>
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<td>Helper, Mechanic Or Welder, H.D</td>
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<td>Hoist (2 Or More Drums Or Tower Hoist)</td>
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<td>Whitman Power Equipment Operators- Underground Sewer &amp; Water</td>
<td>Hoist, Single Drum</td>
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<td>Hydraulic Platform Trailers (goldhofer, Shaurerly And Similar)</td>
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<td>Lime Batch Tank Operator (recycle Train)</td>
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<td>Lime Brain Operator (recycle Train)</td>
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<td>Underground Sewer &amp; Water</td>
<td>Multiple Dozer Units With Single Blade                                       $44.99</td>
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<td>Whitman Power Equipment Operators-</td>
<td>Pavement Breaker, Hydra-hammer &amp; Similar                                      $43.78</td>
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<td>Paving Machine (asphalt And Concrete)                                        $44.99</td>
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<td>Underground Sewer &amp; Water</td>
<td>Piledriving Engineers                                                         $44.71</td>
<td>7B</td>
<td>1M</td>
<td>8D</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators-</td>
<td>Plant Oiler                                                                  $43.46</td>
<td>7B</td>
<td>1M</td>
<td>8D</td>
</tr>
<tr>
<td>Underground Sewer &amp; Water</td>
<td>Posthole Auger Or Punch                                                       $44.39</td>
<td>7B</td>
<td>1M</td>
<td>8D</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators-</td>
<td>Power Broom                                                                  $43.78</td>
<td>7B</td>
<td>1M</td>
<td>8D</td>
</tr>
<tr>
<td>Underground Sewer &amp; Water</td>
<td>Pump (grout Or Jet)                                                          $44.39</td>
<td>7B</td>
<td>1M</td>
<td>8D</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators-</td>
<td>Pumpman                                                                      $43.46</td>
<td>7B</td>
<td>1M</td>
<td>8D</td>
</tr>
<tr>
<td>Underground Sewer &amp; Water</td>
<td>Quad-track Or Similar Equipment                                              $44.99</td>
<td>7B</td>
<td>1M</td>
<td>8D</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators-</td>
<td>Railroad Ballast Regulation Operator (self-propelled)                       $43.78</td>
<td>7B</td>
<td>1M</td>
<td>8D</td>
</tr>
<tr>
<td>Underground Sewer &amp; Water</td>
<td>Railroad Power Tamper Operator (self-propelled)                              $43.78</td>
<td>7B</td>
<td>1M</td>
<td>8D</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators-</td>
<td>Railroad Tamper Jack Operator (self-propelled)                              $43.78</td>
<td>7B</td>
<td>1M</td>
<td>8D</td>
</tr>
<tr>
<td>Underground Sewer &amp; Water</td>
<td>Railroad Track Liner Operator (self-propelled)                              $44.71</td>
<td>7B</td>
<td>1M</td>
<td>8D</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators-</td>
<td>Refrigeration Plant Engineer (1000 Tons &amp; Over)                             $44.71</td>
<td>7B</td>
<td>1M</td>
<td>8D</td>
</tr>
<tr>
<td>Underground Sewer &amp; Water</td>
<td>Refrigeration Plant Engineer (under 1000 Ton)                               $44.55</td>
<td>7B</td>
<td>1M</td>
<td>8D</td>
</tr>
<tr>
<td>Whitman Power Equipment Operators-</td>
<td>Rollerman (finishing Asphalt Pavement)                                       $44.99</td>
<td>7B</td>
<td>1M</td>
<td>8D</td>
</tr>
<tr>
<td>Underground Sewer &amp; Water</td>
<td>Rollers, All Types On Subgrade, Including Seal And Chip Coating (farm Type, Case, John Deere And Similar, or Compacting) $43.46</td>
<td>7B</td>
<td>1M</td>
<td>8D</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Roto Mill (pavement Grinder)</td>
<td>$44.99</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Rotomill Groundsman</td>
<td>$44.55</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Rubber-tired Scrapers (multiple Engine With Three Or More Scrapers)</td>
<td>$45.26</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Rubber-tired Skidders (r/t With Or Without Attachments)</td>
<td>$44.55</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Scrapers, All, Rubber-tired</td>
<td>$44.99</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Screed Operator</td>
<td>$44.99</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Shovels (3 Yds. &amp; Over)</td>
<td>$45.26</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Shovels (under 3 Yds.)</td>
<td>$44.99</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Signalman (whirleys, Highline, Hammerheads Or Similar)</td>
<td>$44.71</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Soil Stabilizer (p &amp; H Or Similar)</td>
<td>$44.39</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Spray Curing Machine (concrete)</td>
<td>$43.78</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Spreader Box (self-propelled)</td>
<td>$43.78</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Spreader Machine</td>
<td>$44.39</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Steam Cleaner</td>
<td>$43.46</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Straddle Buggy (ross &amp; Similar On Construction Job Only)</td>
<td>$43.78</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Surface Heater &amp; Planer Machine</td>
<td>$44.55</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Tractor (farm Type R/t With Attachments, Except Backhoe)</td>
<td>$43.78</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Traverse Finish Machine</td>
<td>$44.39</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Trenching Machines (7 Ft. Depth &amp; Over)</td>
<td>$44.99</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Trenching Machines (under 7 Ft. Depth Capacity)</td>
<td>$44.55</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Tug Boat Operator</td>
<td>$44.99</td>
<td>7B</td>
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<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Tugger Operator</td>
<td>$43.78</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Turnhead (with Re-screening)</td>
<td>$44.55</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators-Underground Sewer &amp; Water</td>
<td>Turnhead Operator</td>
<td>$44.39</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators- Underground Sewer &amp; Water</td>
<td>Ultra High Pressure Wateriet Cutting Tool System Operator, (30,000 Psi)</td>
<td>$45.26</td>
<td>7B</td>
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<tr>
<td>Whitman</td>
<td>Power Equipment Operators- Underground Sewer &amp; Water</td>
<td>Vactor Guzzler, Super Sucker</td>
<td>$44.99</td>
<td>7B</td>
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<tr>
<td>Whitman</td>
<td>Power Equipment Operators- Underground Sewer &amp; Water</td>
<td>Vacuum Blasting Machine Operator</td>
<td>$45.26</td>
<td>7B</td>
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<tr>
<td>Whitman</td>
<td>Power Equipment Operators- Underground Sewer &amp; Water</td>
<td>Vacuum Drill (reverse Circulation Drill Under 8” Bit)</td>
<td>$44.55</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators- Underground Sewer &amp; Water</td>
<td>Welding Machine</td>
<td>$43.46</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Equipment Operators- Underground Sewer &amp; Water</td>
<td>Whirleys &amp; Hammerheads, All</td>
<td>$45.26</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Line Clearance Tree Trimmers</td>
<td>Journey Level In Charge</td>
<td>$49.96</td>
<td>5A</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Line Clearance Tree Trimmers</td>
<td>Spray Person</td>
<td>$47.37</td>
<td>5A</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Line Clearance Tree Trimmers</td>
<td>Tree Equipment Operator</td>
<td>$49.96</td>
<td>5A</td>
</tr>
<tr>
<td>Whitman</td>
<td>Power Line Clearance Tree Trimmers</td>
<td>Tree Trimmer</td>
<td>$44.57</td>
<td>5A</td>
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<tr>
<td>Whitman</td>
<td>Power Line Clearance Tree Trimmers</td>
<td>Tree Trimmer Groundperson</td>
<td>$33.60</td>
<td>5A</td>
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<tr>
<td>Whitman</td>
<td>Refrigeration &amp; Air Conditioning Mechanics</td>
<td>Journey Level</td>
<td>$80.93</td>
<td>6Z</td>
</tr>
<tr>
<td>Whitman</td>
<td>Residential Brick Mason</td>
<td>Journey Level</td>
<td>$49.04</td>
<td>5A</td>
</tr>
<tr>
<td>Whitman</td>
<td>Residential Carpenters</td>
<td>Journey Level</td>
<td>$45.11</td>
<td>5A</td>
</tr>
<tr>
<td>Whitman</td>
<td>Residential Cement Masons</td>
<td>Journey Level</td>
<td>$43.20</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Residential Drywall Applicators</td>
<td>Journey Level</td>
<td>$45.11</td>
<td>5A</td>
</tr>
<tr>
<td>Whitman</td>
<td>Residential Drywall Tapers</td>
<td>Journey Level</td>
<td>$40.10</td>
<td>7E</td>
</tr>
<tr>
<td>Whitman</td>
<td>Residential Electricians</td>
<td>Journey Level</td>
<td>$30.15</td>
<td>5I</td>
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<tr>
<td>Whitman</td>
<td>Residential Glaziers</td>
<td>Journey Level</td>
<td>$30.59</td>
<td>7L</td>
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<tr>
<td>Whitman</td>
<td>Residential Insulation Applicators</td>
<td>Journey Level</td>
<td>$45.11</td>
<td>5A</td>
</tr>
<tr>
<td>Whitman</td>
<td>Residential Laborers</td>
<td>Journey Level</td>
<td>$39.29</td>
<td>7B</td>
</tr>
<tr>
<td>Whitman</td>
<td>Residential Marble Setters</td>
<td>Journey Level</td>
<td>$49.04</td>
<td>5A</td>
</tr>
<tr>
<td>Whitman</td>
<td>Residential Painters</td>
<td>Journey Level</td>
<td>$34.65</td>
<td>6Z</td>
</tr>
<tr>
<td>Whitman</td>
<td>Residential Plumbers &amp; Pipefitters</td>
<td>Journey Level</td>
<td>$58.78</td>
<td>6Z</td>
</tr>
<tr>
<td>Whitman</td>
<td>Residential Refrigeration &amp; Air Conditioning Mechanics</td>
<td>Journey Level</td>
<td>$58.78</td>
<td>6Z</td>
</tr>
<tr>
<td>Whitman</td>
<td>Residential Sheet Metal Workers</td>
<td>Journey Level (Field or Shop)</td>
<td>$54.61</td>
<td>5I</td>
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<tr>
<td>Whitman</td>
<td>Residential Soft Floor Layers</td>
<td>Journey Level</td>
<td>$15.50</td>
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<tr>
<td>Whitman</td>
<td>Residential Sprinkler Fitters (Fire Protection)</td>
<td>Journey Level</td>
<td>$31.19</td>
<td>7J</td>
</tr>
<tr>
<td>Whitman</td>
<td>Residential Stone Masons</td>
<td>Journey Level</td>
<td>$49.04</td>
<td>5A</td>
</tr>
<tr>
<td>Whitman</td>
<td>Residential Terrazzo Workers</td>
<td>Journey Level</td>
<td>$42.21</td>
<td>5A</td>
</tr>
<tr>
<td>Whitman</td>
<td>Journey Level</td>
<td></td>
<td>$34.33</td>
<td>5A</td>
</tr>
<tr>
<td>Occupation</td>
<td>Level</td>
<td>Wage</td>
<td>Code</td>
<td>Code Description</td>
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</tr>
<tr>
<td>Residential Terrazzo/Tile Finishers</td>
<td>Journey Level</td>
<td>$42.21</td>
<td>5A</td>
<td></td>
</tr>
<tr>
<td>Whitman Residential Tile Setters</td>
<td>Journey Level</td>
<td>$40.21</td>
<td>5I</td>
<td></td>
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<tr>
<td>Whitman Roofers</td>
<td>Journey Level</td>
<td>$42.21</td>
<td>5I</td>
<td>Using Irritable Bituminous Materials</td>
</tr>
<tr>
<td>Whitman Roofers</td>
<td>Journey Level</td>
<td>$59.26</td>
<td>6Z</td>
<td></td>
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<tr>
<td>Whitman Sign Makers &amp; Installers</td>
<td>Journey Level</td>
<td>$13.91</td>
<td>1</td>
<td></td>
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<tr>
<td>Whitman Soft Floor Layers</td>
<td>Journey Level</td>
<td>$15.79</td>
<td>1</td>
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<tr>
<td>Whitman Soil Floor Layers</td>
<td>Journey Level</td>
<td>$12.00</td>
<td>1</td>
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<tr>
<td>Whitman Solar Controls For Windows</td>
<td>Journey Level</td>
<td>$56.82</td>
<td>7J</td>
<td></td>
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<tr>
<td>Whitman Stage Rigging Mechanics (Non Structural)</td>
<td>Journey Level</td>
<td>$13.23</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Whitman Stone Masons</td>
<td>Journey Level</td>
<td>$49.04</td>
<td>5A</td>
<td></td>
</tr>
<tr>
<td>Whitman Street And Parking Lot Sweeper Workers</td>
<td>Journey Level</td>
<td>$14.00</td>
<td>1</td>
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<tr>
<td>Whitman Surveyors</td>
<td>Chain Person</td>
<td>$12.00</td>
<td>0</td>
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<tr>
<td>Whitman Surveyors</td>
<td>Instrument Person</td>
<td>$12.05</td>
<td>0</td>
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<tr>
<td>Whitman Surveyors</td>
<td>Party Chief</td>
<td>$15.05</td>
<td>0</td>
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<tr>
<td>Whitman Telecommunication Technicians</td>
<td>Journey Level</td>
<td>$42.94</td>
<td>5I</td>
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<tr>
<td>Whitman Telephone Line Construction - Outside</td>
<td>Cable Splicer</td>
<td>$41.22</td>
<td>5A</td>
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<tr>
<td>Whitman Telephone Line Construction - Outside</td>
<td>Hole Digger/Ground Person</td>
<td>$23.12</td>
<td>5A</td>
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<tr>
<td>Whitman Telephone Line Construction - Outside</td>
<td>Installer (Repairer)</td>
<td>$39.53</td>
<td>5A</td>
<td></td>
</tr>
<tr>
<td>Whitman Telephone Line Construction - Outside</td>
<td>Special Apparatus Installer I</td>
<td>$41.22</td>
<td>5A</td>
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<tr>
<td>Whitman Telephone Line Construction - Outside</td>
<td>Special Apparatus Installer II</td>
<td>$40.41</td>
<td>5A</td>
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<tr>
<td>Whitman Telephone Line Construction - Outside</td>
<td>Telephone Equipment Operator (Heavy)</td>
<td>$41.22</td>
<td>5A</td>
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<tr>
<td>Whitman Telephone Line Construction - Outside</td>
<td>Telephone Equipment Operator (Light)</td>
<td>$38.36</td>
<td>5A</td>
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</tr>
<tr>
<td>Whitman Telephone Line Construction - Outside</td>
<td>Telephone Lineperson</td>
<td>$38.36</td>
<td>5A</td>
<td></td>
</tr>
<tr>
<td>Whitman Telephone Line Construction - Outside</td>
<td>Television Groundperson</td>
<td>$21.92</td>
<td>5A</td>
<td></td>
</tr>
<tr>
<td>Whitman Telephone Line Construction - Outside</td>
<td>Television Lineperson/Installer</td>
<td>$29.13</td>
<td>5A</td>
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<tr>
<td>Whitman Telephone Line Construction - Outside</td>
<td>Television System Technician</td>
<td>$34.68</td>
<td>5A</td>
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<tr>
<td>Whitman Telephone Line Construction - Outside</td>
<td>Television Technician</td>
<td>$31.18</td>
<td>5A</td>
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<tr>
<td>Whitman Tree Trimmer</td>
<td></td>
<td>$38.36</td>
<td>5A</td>
<td></td>
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</tr>
<tr>
<td>Whitman</td>
<td>Telephone Line Construction - Outside</td>
<td>$42.21</td>
<td>5A</td>
<td>1M</td>
</tr>
<tr>
<td>Whitman</td>
<td>Terrazzo Workers</td>
<td>Journey Level</td>
<td>$42.21</td>
<td>5A</td>
</tr>
<tr>
<td>Whitman</td>
<td>Tile Setters</td>
<td>Journey Level</td>
<td>$42.21</td>
<td>5A</td>
</tr>
<tr>
<td>Whitman</td>
<td>Tile, Marble &amp; Terrazzo Finishers</td>
<td>Journey Level</td>
<td>$34.33</td>
<td>5A</td>
</tr>
<tr>
<td>Whitman</td>
<td>Traffic Control Stripers</td>
<td>Journey Level</td>
<td>$45.53</td>
<td>7A</td>
</tr>
<tr>
<td>Whitman</td>
<td>Truck Drivers</td>
<td>Asphalt Mix Over 20 Yards</td>
<td>$43.40</td>
<td>5D</td>
</tr>
<tr>
<td>Whitman</td>
<td>Truck Drivers</td>
<td>Asphalt Mix To 20 Yards</td>
<td>$43.23</td>
<td>5D</td>
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<tr>
<td>Whitman</td>
<td>Truck Drivers</td>
<td>Dump Truck</td>
<td>$43.23</td>
<td>5D</td>
</tr>
<tr>
<td>Whitman</td>
<td>Truck Drivers</td>
<td>Dump Truck &amp; Trailer</td>
<td>$43.40</td>
<td>5D</td>
</tr>
<tr>
<td>Whitman</td>
<td>Truck Drivers</td>
<td>Other Trucks</td>
<td>$43.12</td>
<td>5D</td>
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<tr>
<td>Whitman</td>
<td>Truck Drivers - Ready Mix</td>
<td>Journey Level</td>
<td>$44.47</td>
<td>6I</td>
</tr>
<tr>
<td>Whitman</td>
<td>Well Drillers &amp; Irrigation Pump Installers</td>
<td>Irrigation Pump Installer</td>
<td>$13.92</td>
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PART 1  GENERAL

1.01  SUMMARY

A. Section Includes:
   1. Procedures for preparation and submittal of the Schedule of Values.

1.02  SUBMITTALS

A. Contractor shall submit an initial Schedule of Values per the Pre-Construction Submittal Requirements of Section 01 33 00.

B. Contractor shall submit supporting documentation justifying the amounts in the Schedule of Values if requested by Owner.

1.03  SCHEDULE OF VALUES

A. Contractor shall submit a typed schedule on Owner’s form. Once approved, Contractor shall not revise the Schedule of Values without prior approval by Owner.

B. Format:
   1. Separate each category of Work into a separate line item.
   2. List all major Work activities indicated on the Progress Schedule.
   3. Separate floors, phases, and other easily recognized building divisions when appropriate.
   4. Separate labor, materials and equipment for each item.
   5. Identify site mobilization, demobilization, bonds, and insurance as individual line items.
   6. Include a line item for close-out Work between Substantial Completion and Final Completion.
   7. If applicable, include a line item for allowances. For unit cost allowances, give quantities measured from the Contract Documents multiplied by the unit cost.
   8. When required by Owner, include separate line items for “separately funded Work.”

END OF SECTION 01 29 73
PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Preconstruction Meeting;
2. Progress Meetings; and
3. Other meetings, as requested by Owner.

1.02 PRECONSTRUCTION MEETING

A. Meeting Location: Owner will schedule a meeting prior to the start of construction. The purpose of this meeting is to review Contract administration requirements and mobilization procedures. Attendance is required for the following:

1. Architect/Engineer and design Subconsultants;
2. Contractor's Superintendent and Project Manager;
3. Representative of major Subcontractors, as appropriate;
4. Others, as appropriate.

B. Owner's Designated Representative shall:

1. Preside over and conduct meeting.
2. Record, reproduce, and distribute copies of minutes within 7 Days of the meeting to all meeting participants.

C. Agenda for the meeting will include at a minimum:

1. The Work;
2. Progress Schedule, including Work sequence, phasing, and occupancy requirements;
3. Communications chain and persons authorized to direct changes;
4. Use of the Project site;
5. Special Project procedures;
6. Procedures and processing:
   a. Application for Payments and Schedule of Values;
   b. Contract Change Proposals (CCP), Work Directive (WD);
   c. Change Orders (CO);
d. Requests for Information (RFI);
e. Submittals; and
f. Others as appropriate.

7. Project Record;
8. Construction facilities, controls, and construction aids;
9. Temporary utilities;
10. Security procedures;
11. Safety and first-aid procedures;
12. Environmental Health and Safety;
13. Housekeeping procedures;
14. AHJ representative(s) and inspection procedures;
15. Utility shut downs;
16. Parking;
17. Existing conditions;
18. Subcontractor list;
19. Emergency phone and keys to site;
20. Progress meeting scheduling;
21. Shipment and deliveries; and
22. Other(s) as appropriate.

1.03 PROGRESS MEETINGS

A. Progress meetings will occur weekly.

B. Meeting Location: Contractor's Project field office, unless otherwise agreed.

C. Attendance: Representatives attending meetings must be qualified and authorized to act on behalf of their firms. Attendance shall include:

1. Architect/Engineer and Subconsultants, as appropriate;
2. Owner's Designated Representatives;
3. Contractor's Superintendent and Project Manager;
4. Subcontractors, as appropriate;
5. Suppliers, as appropriate; and
6. Others, as appropriate.
D. Owner’s Designated Representative shall:

1. Administer progress and other specially scheduled meetings;

2. Record, reproduce, and distribute copies of minutes within 6 Days of meeting to all meeting participants; and

E. Contractor shall, at each meeting, provide each meeting attendant with:

1. Short-interval (look-ahead) schedule coordinated with the Progress Schedule;

2. Updated Progress Schedule, if appropriate;

3. Updated submittal log and schedules;

4. Updated RFI log;

5. Issues Log;

6. Quality Control Log; and

7. Any applicable tracking mechanisms.

F. Agenda for these meetings will include at a minimum:

1. Project safety;

2. Review and approval of minutes from previous meeting;

3. Review Work progress since previous meeting;

4. Review plans for progress for subsequent Work period and short-interval (look-ahead) schedule;

5. Review Progress Schedule;

6. Present corrective measures and procedures to regain Progress Schedule, as applicable;

7. Present field observations, problems, and conflicts;

8. Discuss RFIs;

9. Review quality control;

10. Review submittal log and schedules and present methods to expedite as required;

11. Review off-site fabrication;

12. Review delivery schedules;

13. Review coordination issues;

14. Review proposed changes for:

   a. Effect on Progress Schedule and on completion date.

   b. Effect on any other contracts of the Project.
15. Review Issues Log;
16. Review draft Application for Payment (at end of month);
17. Review Project Record; and
18. Review any other issues.

1.04 OTHER MEETINGS

A. Owner may call additional Project meetings as appropriate.
B. Meetings as required by other sections.
C. Format and agenda of these meetings will follow that of Progress Meetings unless Owner determines otherwise.

END OF SECTION 01 31 19
PART 1  GENERAL

1.01  GENERAL COMMUNICATION

A. Subcontractors: Informal communication between Owner, Owner’s consultants, and other Subcontractors is permitted. If written clarification or direction is required to resolve questions, transmit questions in writing using a Request for Information (RFI) through the Contractor to Owner.

B. In case of an EMERGENCY, dial 9-1-1 if appropriate; otherwise, contact Owner’s Designated Representative. If he or she is not available contact Facilities Services, Capital at 509-335-5571.

1.02  CORRESPONDENCE

A. Address all correspondence to Owner’s Designated Representative.

B. Contractor shall copy Architect/Engineer on all correspondence to and from Owner.

C. Include Project title and Owner Project number on all correspondence.

1.03  REQUEST FOR INFORMATION

A. When field conditions or Contract Document require clarification, a written Request for Information (RFI) must be submitted per the following:

1. Identify the nature and location of each clarification/verification using a RFI form and provide at least the following information:

   a. Project name and number;
   b. Date;
   c. Date response requested;
   d. RFI number;
   e. Subject;
   f. Initiator of the question;
   g. Indication of costs;
   h. Indication of schedule impact;
   i. Location on site;
   j. Contract Drawing reference;
   k. Contract Specification section and paragraph reference;
I. Descriptive text;

m. Recommended solution(s); and

n. Space for reply on same page as questions.

B. Each RFI must be limited to a single issue.

C. Route and copy RFIs in same manner as correspondence.

1.04 NONCONFORMANCE REPORT


B. Procedure: If Contractor proceeds to install deficient Work or fails to correct Work that in the opinion of Owner fails to conform to the Contract Documents, an NCR may be issued. Upon receipt of a NCR, Contractor shall take immediate action to correct nonconforming Work. Correction of nonconforming Work will be reviewed at progress meetings.

1.05 COORDINATION

A. Special Coordination: Contractor shall:

1. Notify Veterinary Teaching Hospital staff 2 weeks in advance of any noise creating activity that is above normal noise levels (between 45-50 decibels).

2. Protect adjacent areas from construction debris and dust. A dust barrier is required.

3. ID badges are required and an escort is required in sensitive areas.

4. Do not obstruct loading dock. Loading dock shall be used for loading and unloading only.

5. Material and Equipment staging areas are available onsite as well as designated parking.

6. Access routes within the building for material deliveries will be determined during the pre-construction meeting.

7. Elevator is not available for Contractor use.

B. General Coordination: Contractor shall:

1. Coordinate with Work of other sections to ensure that all fixtures, devices, switches, outlets, ducts, pipes, and similar items can be installed as shown without modifications to framing. Provide all blockouts, raceways and similar framing, as required;

2. Coordinate the Work and not delegate responsibility for coordination to any Subcontractor. Contractor must make available to each Subcontractor, prior to the execution of each Subcontract, copies of the Contract Documents to which the Subcontractor will be bound.
Subcontractor will similarly make copies of the Contract Documents available to their respective lower-tier Subcontractors. Contractor must provide Owner copies of the written agreements between Contractor and any Subcontractor upon request;

3. Anticipate interrelationship of all Subcontractors and their relationship with the total Work;

4. Resolve differences or disputes between Subcontractors and materials suppliers concerning coordination, interference, or extent of Work between sections;

5. Be in charge of and responsible for the Work and the Project site, including directing and scheduling all Work; and

6. Cooperate with Separate Contractors. Work by others may be occurring within the building or at locations adjacent or near to the Project site. Contractor must cooperate with all such work.

C. Mechanical and Electrical Coordination: Contractor shall:

1. Resolve all “tight”, restricted, or inaccessible areas involving Work of various disciplines in advance of installation.

2. If necessary, and before Work proceeds in these areas, prepare coordination drawings for review showing all Work in “tight”, restricted, or inaccessible areas.

3. Provide coordination drawings necessary to resolve “tight”, restricted, or inaccessible areas, at no increase in Contract Sum.

D. Job Site Field Measurements and Templates: Contractor shall:

1. Obtain field measurements required for accurate fabrication and installation of Work. Exact measurements are Contractor’s responsibility.

2. Furnish or obtain templates, patterns, and setting instructions as required for installation of all Work. Contractor shall verify in field, as needed.

E. Contractor Badging:

1. All employees of Contractor and Subcontractors, vendors, or consultants retained by Contractor must obtain a Facilities Services Contractor Identification (ID) badge if they will be performing Work on the Pullman campus of Washington State University.
   a. ID badges issued for prior Facilities Services projects are valid provided the employee/employer information is still correct and the ID badge has not expired.

2. Facilities Services will issue the Contractor an authorization memorandum necessary to obtain ID badges. Contractor will be responsible for providing copies of the authorization letter to appropriate Subcontractors, consultants, and vendors for use in procuring ID badges.
for their employees.

3. ID badges will be issued by the Cougar Card Center located on the ground floor of the Compton Union Building (CUB). Employees are required to appear in person so pictures and signatures may be obtained.

   a. To receive an ID badge, each employee will be required to present a copy of the authorization letter issued by Facilities Services, a form of picture identification, the name of their current employer and a payment of $10.00.

   b. The maximum effective period for an ID badge is 24 months.

   c. When ID badges expire, if they are lost or stolen, or if the individual changes employers, the ID badge is no longer valid and the employee is required to obtain a new ID badge through the standard authorization process.

4. A valid ID badge must be worn by all employees in full view above the waist at all times when working at the Pullman campus of Washington State University.

   a. Contractor shall enforce Owner’s ID badge policy at all times at the Project site.

5. Subject to Owner review and approval, Contractor may acquire and maintain a limited number of temporary ID badges from Owner to utilize for short duration visits by employees for whom repeat visits are not anticipated. Contractor shall maintain a log indicating the date, time issued/returned, employee name, and employer for all temporary badges. The temporary ID badges shall display “Facilities Services Contractor, Temporary Badge”, Contractor’s name, and a number unique to that particular temporary ID badge.

6. Contractor ID badges will not function as Cougar Cards. Individuals may obtain a Cougar Card as a “community member” but those cards will not be considered an acceptable substitute for the requirement to obtain and display an ID badge.

7. ID badge expenses:

   a. On projects with a Guaranteed Maximum Price (GMP) the expense for ID badges may be considered a Cost of the Work.

   b. On fixed price contracts, Contractor shall include any and all expenses related to ID badges in its bid, including the actual cost of each badge. These costs will be included in the Contract Sum and not separately reimbursable.

END OF SECTION 01 31 23
PART 1 GENERAL

1.01 SUMMARY

A. This Section specifies the administrative and procedural requirements to comply with the requirements of the General Conditions regarding preparation of Contractor's Progress Schedules, monthly update to the Progress Schedules, and other schedules as specified herein. The purposes of these schedules and reports are to:

1. Ensure adequate planning and execution of the Work by Contractor;
2. Establish a standard against which progress of the Work can be tracked;
3. Assist in monitoring progress;
4. Evaluate the impact of any changes to the Contract; and
5. Support the basis for progress payments.

B. All schedule submittals including updated Progress Schedules will be reviewed by Owner for compliance with Contract terms and the needs of the University. Review of any schedule does not constitute approval or acceptance of Contractor's construction means, methods, or sequencing, or an assessment by Owner of Contractor's ability to complete the Work within the Contract Time.

1.02 WORK INCLUDED

A. Contractor shall submit a preliminary Progress Schedule, as required by the Pre-Construction Submittal Requirements of Section 01 33 00.

B. Contractor shall prepare and submit Progress Schedules and reports as required by this Section. NOTE: Processing and payment of the second Application for Payment is contingent upon receipt, review, and subsequent acceptance of the updated Progress Schedule.

C. Contractor shall participate in monthly scheduling meetings and provide updated Progress Schedules as require by this Section.

D. Contractor shall perform Contemporaneous Period Analysis (CPA) of any delays associated with the critical path schedule as required by this Section.

E. Contractor shall provide weekly Short-Interval (look-ahead) schedules as required by this Section.

F. Contractor shall submit a Submittal Schedule as required by this Section.

1.03 PRELIMINARY PROGRESS SCHEDULE

A. Contractor shall submit a preliminary Progress Schedule as part of the Pre-
Construction Submittal Requirements in Section 01 33 00 - Submittals. The schedule shall include activity description, activity start and end dates. The schedule shall emphasize milestone dates and date of Substantial Completion. Schedule shall clearly identify the critical path schedule elements.

B. Progress Schedule shall be in Bar Chart format.

C. Schedule activities longer than 14 days shall be sufficiently detailed.

D. Participate in schedule update meetings and provide updated Progress Schedules.

1.04 CONTRACTOR'S PROGRESS SCHEDULE

A. Within three calendar days of receiving WSU comments on the preliminary Progress (Bar Chart) Schedule, the Contractor shall prepare and submit a detailed Progress (Bar Chart) Schedule. This schedule shall be the Contractor's as-planned schedule and shall be used to plan, organize, and execute the Work, record and report actual performance and progress through updates, as well as show how the Contractor plans to complete all remaining Work. The accepted Contractor's Progress (Bar Chart) Schedule and subsequent updates shall be the basis for consideration and analysis of requests for time extensions.

B. Updates:

1. The Contractor is required to prepare and submit an updated Progress (Bar Chart) Schedule as agreed upon at the Pre-construction Meeting.

2. The Contractor and Owner's Designated Representative will review the updated schedule and will discuss any differences or issues raised. Decisions made and agreed to by all parties are binding. However, no contracted completion dates will be modified except by an approved Contract Change Proposal and subsequent Change Order.

3. Timely submission of updates is of significant and crucial importance to the management of this Project. Lack of or late receipt of updates diminishes their value to the Project. Therefore, at the Owner’s Designated Representative discretion, partial payment may be withheld for a late update as may be determined by the Owner's Designated Representative in consideration of the value of the update at the time of receipt, the circumstances of the late submittal, and the level of progress achieved on the Project.

C. The Contractor shall submit the Progress Schedule, consisting of the reports and diagrams as specified by this subsection, in the following formats quantities:

1. Electronic PDF file of all reports, schedules, etc.

2. Native electronic copy of the CPM Progress Schedule.

D. Float: Contractor is not entitled to any adjustment in the Contract Time or the Contract Sum, or to any additional payment or equitable adjustment of any sort,
by reason of the loss or the use of any float time, including time between Contractor’s anticipated completion date and the end of the Contract Time, whether or not the float time is described as such on the Progress Schedule.

E. Qualifications: Contractor shall submit the resume(s) of the person(s) designated as responsible for schedules and reports (the Contractor's scheduler) Prior to commencing construction activities. Contractor's scheduler shall have demonstrable capability to plan, coordinate, execute, and monitor a CPM schedule as required for this Project. Owner’s Designated Representative will approve or disapprove the Contractor's proposed scheduler. In the event of disapproval, a new scheduler shall be proposed within 7 Days and be subject to the same consideration criteria as noted above.

1.05 MONTHLY UPDATES

A. Contractor shall prepare and submit updated Progress Schedules and participate in schedule update meetings with the Owner each month. Participation in the meeting and submission of the monthly update is a condition precedent for payment of the line item value for scheduling Work.

1. Updated monthly schedule submittals:
   a. A PDF electronic version of complete Project schedule showing the critical path accompanied by a narrative of any deviations from the previous month.
   b. Electronic schedule file in native format.
   c. Short-interval schedules or look-ahead schedules shall not be an acceptable submittal.

B. Contractor shall prepare an update of the current Progress Schedule each month to reflect Work progress achieved since the previous update. Progress updating shall be performed without changes to the schedule logic or the original duration of activities. Monthly progress updating is required and necessary prior to performing a Contemporaneous Period Analysis of any change to the calculated completion date from the prior update.

C. Contractor may, in a second report, incorporate any logic and duration changes that represent revised planning. All such changes must be clearly identified and submitted for acceptance.

D. The Progress Schedule must clearly identify the current Substantial and Final Completion dates.

E. Contractor shall account for all adverse weather days and similar excusable noncompensable delays. By whatever method Contractor chooses to account for such delays and events, a narrative description and CPA of the accounting shall be included with the narrative report.

F. Monthly schedule update meetings:

1. Monthly schedule update meetings shall be held at Contractor's Project
field office one week prior to the due date of Contractor’s monthly Application for Payment, unless otherwise agreed.

2. The Contractor shall provide updated Project schedule submittals.

3. The Contractor shall also provide a narrative report including:
   a. A description of the Work accomplished during the preceding period;
   b. A discussion of the Work that had been scheduled to be performed during the previous period but was not, and explain why it was not performed; and
   c. A discussion of the Work scheduled for the upcoming period noting any issues or events that could impact this Work. If Contractor intends to make logic or original activity duration changes, the report must specifically identify such changes.

4. Contractor, Owner, and Architect/Engineer will review these reports and will discuss any differences or issues raised. No contractual completion dates will be modified except by approved Change Order.

G. Timely submission of updates is of significant and crucial importance to the Project. Owner may withhold payment as per Section 01 29 00 Applications for Payment.

1.06 THE CONTEMPORANEOUS PERIOD ANALYSIS

A. It is Owner’s intent to resolve all issues affecting the Contract completion date in a timely, efficient and effective manner. To achieve this goal, and in addition to contractor’s obligation to follow the contractual dispute resolution procedure, Contractor shall analyze any delays to the critical path or completion date by application of the Contemporaneous Period Analysis method. A CPA shall normally coincide with the monthly schedule update meetings.

B. Assessment of impacts due to changes or other events, in accordance with the CPA method, must be based on the most recent accepted updated Progress Schedule. No logic or duration changes shall be made to updates until progress related data has been incorporated into the Progress Schedule and the Progress Schedule is updated to reflect actual progress for the period. All data shall be provided to Owner.

C. Submission of an accurate and properly updated Progress Schedule and completion of the Contemporaneous Period Analysis are conditions precedent to the review and approval of any request for an extension in the Contract Time. Owner may assess liquidated damages, if any, regardless of the status of any requests for time extensions pending, until any such requests are resolved.

D. The process for preparing and submitting a CPA is as follows:
   1. Contractor will notify Owner in writing of event(s) or occurrence(s) which constitute a delay of the critical path or completion date affecting progress
of the Work.

2. Contractor shall evaluate the event(s) or occurrence(s) and produce a narrative of the resulting delay describing the effect upon concurrent or logically connected subsequent activities.

3. Consistent with the narrative, Contractor shall produce a subnet to graphically describe the event(s) or occurrence(s) and the effect upon the Progress Schedule.

4. Contractor will recalculate the Progress Schedule and provide an updated PDF and Native Progress Schedule.

E. The CPA will be reviewed at the monthly schedule update meeting or at a special meeting scheduled with Owner. At the CPA review meeting, Contractor shall present the CPA and respond to questions.

F. Until and unless substantiated delay is accepted by Owner, the time effect shall not be incorporated into any monthly update. If accepted after a monthly update in which the event(s) or occurrence(s) took place, that monthly update may be recalculated, resubmitted and shall be included in an approved Change Order.

1.07 SHORT-INTERVAL SCHEDULE

A. Prepare a weekly Short-Interval (look-ahead) Schedule based upon the Contractor’s Work plan and the updated Progress Schedule.

B. Format for the Short-Interval (look-ahead) Schedule shall be acceptable to Owner. The format shall include comment annotation as necessary.

C. Content of the Short-Interval (look-ahead) Schedule shall include the Work planned for the next 3-week period and the Work that was performed in the previous week.

D. Copies of the Short-Interval (look-ahead) Schedule shall be provided at the weekly progress meetings to be used as a basis for discussion of progress and of planned Work.

1.08 SUBMITTAL SCHEDULE

A. Provide a Submittal Schedule within 10 Days of Owner’s Acceptance of the Project Schedule per Section 01 33 00 - Submittals.

PART 2 PRODUCTS

2.01 SCHEDULING SOFTWARE

A. Contractor shall utilize Microsoft Project or Primavera P6 unless otherwise agreed to by Owner.
B. Contractor shall provide a licensed and royalty pre-paid copy of the mutually agreed upon scheduling software. The selected software must be capable of performing target-to-current schedule comparisons, cost and resource loading functions and have the option of executing calculations in retained logic. Activities must be able to process lead and lag time relationships, start-to-finish or finish-to-finish relationships, and be capable of being hammocked, if required. The software must be registered with Owner and be provided in a format compatible with Owner's systems.

END OF SECTION 01 32 13
PART 1  GENERAL

1.01  SECTION INCLUDES

A. Preconstruction photography.
B. Construction photography of Work-in-progress.

1.02  GENERAL

A. Contractor shall provide photographs taken from locations coordinated with Owner.
B. Photographer: Experienced in taking construction photography.
C. Equipment: All photos shall be in digital format.
D. Video images may be acceptable for certain operations. Confirm with Owner.

PART 2  PRODUCTS

2.01  PRECONSTRUCTION PHOTOGRAPHS

A. Contractor shall provide electronic files containing photographs of the existing conditions at the site, surroundings, and haul routes per the Pre-Construction Submittal Requirements of Section 01 33 00. Coordinate with Owner the extent of the preconstruction photographic record that is required.

2.02  CONSTRUCTION PHOTOGRAPHS

A. Contractor shall provide electronic files containing photographs of construction progress on a monthly basis.

2.03  PHOTOGRAPHIC SUBMITTALS

A. Photographs shall be submitted each month during the Contract Time, or as otherwise agreed upon by Owner. The number of photographs shall be sufficient to document the site to the satisfaction of the Owner and Contractor.
B. Photographs shall be representative of Project progress, showing all major Work and any critical concealed conditions.
C. The files in each monthly photograph submittal must each be labeled with the Project name, Project number, and submittal date. Additionally, each photograph shall be dated, labeled, and accompanied by a brief description identifying the location and direction the photo was taken. Date stamp using month/date/year format.
PART 3 EXECUTION

3.01 PRECONSTRUCTION PHOTOGRAPHS

A. Coordinate the scope of preconstruction photographic record survey with Owner.

B. Take preconstruction photographs to identify and establish a baseline record of existing conditions.

C. A preconstruction photographic record survey shall include, but not be limited to, all areas that may be impacted or damaged by construction phase activities.

D. The extent or nature of the existing site and adjacent surroundings shall be thoroughly documented.

3.02 CONSTRUCTION PHOTOGRAPHS

A. Contractor shall take construction photographs each month during construction of the Project.

B. Contractor shall document concealed conditions (once exposed) that differ from expectations.

1. It is critical that Contractor photographically document concealed conditions that may benefit Owner’s future maintenance and operations activities. Take photographs (with a reference point) prior to cover or concealment. For example:

   b. Under-slab utility rough-in.
   c. Wall cavity utility routing.
   d. Above-ceiling installation after ceiling support system installed, but prior to cover.

2. The photograph record described above shall be considered minimum and shall not be deemed to limit the quantity or quality of the photographic record.

END OF SECTION 01 32 33
PART 1       GENERAL

1.01 SUMMARY

A. This section includes administrative and procedural requirements for submittals required for performance of the Work, including:

1. Pre-Construction Submittal Requirements;
2. Shop Drawings;
3. Product data;
4. Samples; and
5. Mock-ups.

1.02 SUBMITTAL PROCEDURES

A. Provide submittal schedule as required by Section 01 32 13 – Progress Schedule. The Submittal Schedule shall meet all of the requirements below.

B. Coordination: Review of the submittals by Owner is not for the purpose of determining their accuracy and/or completeness, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of Contractor as required by the Contract Documents.

1. Owner reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are provided.
2. Allow at least 14 Days for review of each submittal by Owner. Complex or interrelated submittals, or the submission of multiple submittals at or near the same time, will require additional time. Provide a "priority list" when submitting multiple submittals at or near the same time. Submittal sequencing should coincide with the submittal schedule (see Section 01 32 13 – Progress Schedule).

C. Submittal Preparation: Place a permanent label or title block on each submittal for identification.

1. Include the following information on the label or title block:
   a. Project name, Project number, and date;
   b. Name and address of Owner;
   c. Name and address of Contractor and submitting Subcontractor, if applicable;
   d. Name and address of supplier and manufacturer, if applicable;
   e. Number and title of appropriate Specification section; and
   f. Drawing number and detail references, as appropriate.
2. Provide adequate space for action stamps to record review.

D. Submittal Transmittal: Package submittals in manageable quantities and transmit to Owner and Architect/Engineer, if applicable, simultaneously. Submittals received from sources other than Contractor will be returned without action. By submitting submittals, Contractor represents to Owner that Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements, and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within each submittal with the requirements of the Work and of the Contract Documents.

1. Address one topic or related set of topics in each transmittal based upon Specification sections (i.e., mechanical items should not be submitted under same transmittal with electrical items).

2. Clearly call out relevant information, deviations, and requests for data, including minor variations from the Contract Documents on both the transmittal and all copies of a submittal.

3. Shop drawings, product data, samples, and mock-ups shall be submitted to Owner’s Designated Representative for review/approval. The minimum number of submittals to be provided are:
   a. Pre-Construction, Shop Drawings, Product Data: Electronic copies.
   b. Samples: As required by the technical Specification section.
   c. Mock-ups: As required by the technical Specification section.
   d. Demonstrations: As required to facilitate installation and inspection.
   e. Reference technical Specifications for additional submittal requirements.

4. Owner may modify the required submittal quantities.

E. Material and Color Submittal: Submit samples of actual colors and/or materials.

F. Number submittals by Specification section number and revision letter.

G. In the event of the need to "revise and resubmit" a submittal, resubmit same in acceptable form/content, clearly identifying deviations from the previous rejected submittal. Contractor shall also keep accurate records of the receipt, review, and delivery of all submittals and shall submit to Owner, as requested, status reports.

H. Provide a final electronic copy of all approved submittals.

1.03 PRE-CONSTRUCTION SUBMITTAL REQUIREMENTS

A. All Pre-Construction Submittals are required before onsite construction activities may commence. Contractor shall submit the following Pre-
Construction Submittals within 10 days of Notice to Proceed. Submittal review for these items only shall be supplied within 14 days of receipt by Owner.

1. Indoor Air Quality Management Plan
2. Site Safety and Health Plan (for information only)
3. Quality Control / Quality Assurance Plan
4. Waste Management Plan
5. Progress Schedule
6. Schedule of Values
7. Pre-Construction Photographs
8. Emergency Points of Contact
9. List of Subs and Suppliers
10. Demolition Plan
11. Asbestos Safety Plan
12. List of Long Lead Items

1.04 SHOP DRAWINGS

A. Submit Shop Drawings drawn to accurate scale. Do not reproduce Contract Documents or copy standard information for use as Shop Drawings. Standard information prepared without specific references to the Project will not be accepted as a Shop Drawing.

B. Shop Drawings Include: fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings. Include the following information:

1. Dimensions;
2. Products and materials;
3. Compliance with specified standards;
4. Coordination requirements;
5. Notation of dimensions established by field measurements;
6. Any deviation from Drawings or Specifications; and
7. Date when review is requested to maintain Progress Schedule.

C. Coordination Drawings:

1. Contractor and Subcontractors shall prepare and submit coordinated Shop Drawings at a scale not less than 1/4" = 1'0". Clearly show how the Work is to be installed or constructed in relation to the Work of other Subcontractors. Required coordinated Shop Drawings shall include but not be limited to the following:

   a. Contractor shall prepare a drawing indicating the reflected ceiling plan, beam soffit elevation, ceiling heights, roof openings, and other items to be installed.
b. HVAC and controls Subcontractors shall prepare drawings indicating location, size, and elevation of ductwork, hangers, seismic bracing, grilles, registers, equipment, access (clear) areas to service equipment, and ceiling access doors.

c. Plumbing Subcontractor shall prepare drawings indicating location and elevation of piping, hangers, seismic bracing, valves, cleanouts, access doors, fixtures, and required access (clear) areas for service of fixtures.

d. Electrical Subcontractor and fire alarm Subcontractor shall prepare drawings indicating the layout of fixtures, conduit runs 2” in diameter or greater, clearances, pull boxes, junction boxes, sound system speakers, cable trays and hangers, electrical equipment, panels, and access areas for equipment and panels.

2. Contractor shall meet with its Subcontractors to resolve any apparent conflicts in the coordinated Shop Drawings.

3. When these drawings have been coordinated to the satisfaction of Contractor and each applicable Subcontractor, Contractor and the applicable Subcontractor will sign and date a certification indicating that:
   a. all related conditions have been reviewed;
   b. no apparent conflicts exist;
   c. the requirements of the Contract Documents have been complied with; and
   d. all elements of a complete installation are included.

4. Maintain and submit all coordinated Shop Drawings as part of the Project Record (see Section 01 78 39 – Project Record).

5. If Owner requests, Contractor must produce submittals acceptable to Owner, but the submittals must satisfy the requirements identified above.

1.05 PRODUCT DATA

A. Product data includes: Manufacturer’s printed installation instructions, catalog cuts, standard color charts, rough-in diagrams and templates, standard wiring diagrams, and performance curves.

1. Where product data must be specially prepared because standard printed data is not suitable, the submittal must be provided as a Shop Drawing.

B. Requirements: Mark each copy to show applicable options. Include the following information:

1. Manufacturer’s printed recommendations;
2. Compliance with recognized trade-association standards;
3. Compliance with recognized testing-agency standards;
4. Application of testing-agency labels and seals;
5. Notation of dimensions verified by field measurement;
6. Notation of coordination requirements;
7. Any deviation from Drawings or Specifications; and
8. Date when review requested to maintain Progress Schedule.

1.06 SAMPLES AND MOCK-UPS

A. Submit samples and mock-ups that are identical to the material or product proposed. Samples include partial sections of components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern.

1. Package samples to facilitate review. Include the following:
   a. Generic description of the sample;
   b. Source;
   c. Product name or name of manufacturer;
   d. Compliance with recognized standards;
   e. Availability and delivery time; and
   f. Specification section.

B. Requirements: Submit samples and mock-ups for review of kind, color, pattern, and texture for a comparison of these characteristics before actual installation.

1. Where variation in color, pattern, texture or other characteristics are inherent in the material, submit not less than four units to show limits of variation.

C. Submittals: Where samples are for selection of appearance from a range of standard choices, submit a full set of choices for the material or products.

D. Maintain sets of approved samples and mock-ups at the Project site for quality comparisons throughout the course of construction.

E. Demolish and remove all samples and mock-ups prior to Substantial Completion but not sooner than directed by Owner.

1.07 OWNER's ACTION

A. Review: Except for submittals for information or a similar purpose, Owner will review each submittal, mark to indicate action taken, and return promptly.

B. Owner approval of submittals does not supersede or alter Contract Document requirements.

END OF SECTION 01 33 00
PART 1 GENERAL

1.01 SUMMARY

A. This Section includes the administrative and procedural requirements for any general alterations to be performed during the Project, including but not limited to products, transition and adjustments, cutting, patching, and repair and cleaning.

1.02 SUBMITTALS

A. Contractor shall submit a written request in advance of cutting or alteration that impacts:
   1. Structural integrity of any element of Project.
   2. Integrity of weather-exposed or moisture-resistant elements.
   3. Efficiency, maintenance, or safety of any operational elements.
   5. Work of Owner or a separate contractor.

B. Contractor must include in its written request, when required:
   1. Identification of Project.
   2. Location and description of affected Work.
   3. Necessity for cutting or alteration.
   4. Description of proposed Work and products to be used.
   5. Alternatives to cutting and patching.
   6. Effect on Work of Owner or separate contractor.
   7. Written permission of affected separate contractor.
   8. Date and time Work will be executed.

1.03 QUALITY ASSURANCE

A. Limits of Work:
   1. Contractor shall maintain existing building structure (including structural floor and roof decking) and envelope (exterior skin and framing, excluding window assemblies and nonstructural roofing material) not indicated to be removed; do not cut such existing conditions beyond indicated limits.
   2. Contractor shall maintain existing interior nonstructural elements (interior walls, doors, floor coverings, and ceiling systems) not indicated to be removed; do not cut such existing conditions beyond indicated limits.
   3. Contractor shall maintain existing nonshell, nonstructural components (walls, flooring, and ceilings) not indicated to be removed; do not cut such existing conditions beyond indicated limits.
B. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

C. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:

1. Primary operational systems and equipment.
2. Air or smoke barriers.
3. Fire-suppression systems.
4. Mechanical systems piping and ducts.
5. Control systems.
6. Communication systems.
7. Conveying systems.
8. Electrical wiring systems.
9. All low voltage systems.
10. Operating systems of special construction in Division 13.
11. Other operating systems as appropriate.

D. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended that result in increased maintenance or decreased operational life or void of warranty, or could adversely affect safety. Miscellaneous elements include the following:

1. Water, moisture, or vapor barriers.
2. Firestopping or fire barriers.
3. Membranes and flashings.
4. Exterior curtain-wall construction.
5. Equipment supports.
6. Piping, ductwork, vessels, and equipment.
7. Noise and vibration-control elements and systems.
8. Other miscellaneous systems as appropriate.

E. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exterior conditions or in occupied spaces in a manner that would, in Owner’s opinion, reduce the building’s aesthetic qualities. Contractor shall remove and replace conditions that have been cut and patched in a visually unsatisfactory manner.

PART 2 PRODUCTS

2.01 PRODUCTS FOR PATCHING AND EXTENDING WORK

A. New Materials: Match existing products and Work when patching and extending Work.
B. Type and Quality of Existing Products: Determine by inspection and testing products where necessary; refer to existing Work as a standard.

PART 3 EXECUTION

3.01 EXAMINATION

A. Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents related to that portion of the Work, as well as other information available to Contractor, take field measurements, and inspect any existing conditions, including elements subject to damage or movement during cutting and patching.

B. After uncovering existing Work, inspect conditions affecting performance of Work.

C. By beginning any cutting or patching, Contractor represents and warrants its acceptance of existing conditions.

D. Contractor shall verify that demolition is complete and areas are ready for installation of new Work.

3.02 PREPARATION

A. Contractor shall cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.

B. Contractor shall remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, deteriorated masonry, concrete, and disturbed subgrade material. Replace materials as specified for finished Work.

C. Contractor shall remove debris and abandoned items from area and from concealed spaces.

D. Contractor shall prepare surface and remove surface finishes to provide for proper installation of new Work and finishes.

E. Contractor shall close openings in exterior surfaces to protect existing Work. Contractor shall insulate ductwork and piping to prevent moisture and condensation in exposed areas.

F. Contractor shall provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect Work from damage.

3.03 PERFORMANCE

A. Contractor shall coordinate alterations and renovations to expedite completion of the Work.
B. Remove, cut, and patch Work in a manner to minimize damage. Provide a means of restoring products and finishes to their original or specified condition.

C. Refinish remaining existing surfaces in renovated rooms and spaces, to specified condition for each material, with a neat and clean transition to adjacent finishes.

D. In addition to specified replacement of equipment and fixtures, restore existing plumbing, heating, ventilation, air conditioning, and electrical systems to full original operational condition.

E. Install products as specified in individual sections.

F. Remove samples of installed Work for testing when requested.

G. Provide openings in the Work for penetration of mechanical and electrical Work.

H. Cut rigid materials using the appropriate equipment and tool. Pneumatic tools not allowed without prior approval.

   1. Concrete Walls: Saw-cut walls using accurately located straight lines, unless directed otherwise. Minimize overcuts.
   2. Masonry Walls: Saw-cut along mortar joints, cutting block uniformly in accurately located straight lines, unless otherwise directed. Remove all mortar adhering to edges. Overcuts not allowed.
   3. Wood Framed Walls: Demolish plaster or gypsum wallboard, removing wall framing only as required. Cut wall finish materials in straight uniform lines.
   4. Concrete Floors: Saw-cut floors and remove. Core drill as required.

I. Restore Work with new products in accordance with requirements of Contract Documents.

J. Fit Work to existing pipes, sleeves, ducts, conduit, and other penetrations through surfaces, while maintaining assemblies.

K. At penetrations of fire rated walls, partitions, ceilings, or floors, completely seal voids with firestopping material to full thickness of the penetrated element, while maintaining assemblies.

L. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 01 35 16
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements pertaining to regulatory requirements.

B. List of regulatory requirements.

1.02 CONTRACTOR RESPONSIBILITY

A. Contractor is solely responsible for compliance with all codes, laws, or regulatory requirements.

B. Inspections performed or not performed by the City of Pullman, Labor and Industries, Owner, Owner Designated Representative, or others who are under contract to Owner do not waive or change Contractor’s obligations, nor do such inspections constitute approval or acceptance of portions of the Work.

1.03 CONTRACTOR REQUIREMENTS

A. Contractor shall perform the Work in accordance with the requirements of governing agencies and applicable regulatory requirements, including those included in this Section and elsewhere in the Contract Documents. Contractor must comply with all applicable laws, building codes, regulations, and rules, including, when applicable, the Washington State University campus code.

B. Contractor shall schedule and coordinate inspections and gain approvals required by the City of Pullman and other governing agencies in a timely manner and as required for Owner occupancy of the Project within the Contract Time.

C. Contractor shall inform the City of Pullman Building and Fire Departments, Labor and Industries, and other governing agencies of changes in the Work affecting regulatory requirements in a timely manner.

D. Contractor shall promptly forward to Owner all inspection reports, orders, permits, and other directives and correspondence received from the City of Pullman inspectors or other governing agencies having jurisdiction over the Work.

E. Contractor shall promptly notify Owner when the Contract Documents appear to be in conflict with Regulatory Requirements.

F. Contractor shall, at all times, use its best efforts and exercise its judgment as an experienced contractor to adopt and implement policies and practices designed to avoid work stoppages, slowdowns, disputes, or strikes where reasonably possible and practical under the circumstances, and shall, at all times, maintain Project-wide labor harmony.
1.04 REGULATORY REQUIREMENTS

A. Authority Having Jurisdiction (AHJ) shall be the organization, office, or individual responsible for enforcing the requirements of the applicable code(s) or standard(s), and or for approving equipment, materials, installation(s), or procedure(s).

B. Regulatory authorities establish minimum requirement levels. Where provisions of the Contract Documents and regulatory requirements differ or conflict, the more stringent requirement governs.

C. Regulatory requirements added by other sections of the Contract Documents or otherwise applicable are binding upon the Work in accordance with the provisions of this Section. The regulatory-requirements list provided below is intended to assist Contractor in determining the regulatory requirements for the Project, but neither the inclusion nor omission of any item from the list shall be construed to relieve Contractor of obligations that otherwise exist under the law or the Contract.

1.05 LIST OF REGULATORY REQUIREMENTS


C. National Fire Protection Association (NFPA) Codes.


H. State of Washington, WAC Chapters 173, 246, and 296, as applicable.


J. Washington State Energy Code, WAC 51-11C. Shortened


M. Electrical Work:

1. NFPA 70, National Electrical Code (NEC), most recent adopted edition.
2. Underwriters’ Laboratories (UL).
3. National Electrical Manufacturer’s Association (NEMA).

1.06 PERMITS REQUIRED

A. Contractor shall obtain and pay for all required building permits, including any renewals. Contractor shall identify costs for permits on the Schedule of Values for permits obtained.

B. All trade permits (e.g. electrical, pressure vessel, elevator, etc.) must be included in each Subcontractor bid.

1.07 APPRENTICESHIP REQUIREMENTS – NOT USED

END OF SECTION 01 41 00
PART 1 GENERAL

1.01 SUMMARY

A. Conduct portions of the Work requiring special procedures due to hazardous materials and conditions in accordance with regulatory standards and guidance provided in this Section.

1.02 SUBMITTALS

A. Contractor shall deliver a current copy of its site specific Health and Safety Plan to the Owner per the Pre-Construction Submittal Requirements of Section 01 33 00. The submittal must include each Subcontractor’s site specific Health and Safety Plan. Submittal to Owner is for information only, not for review, acceptance, or approval of the Health and Safety Plan, nor for analysis of content or completeness.

1.03 QUALIFICATIONS OF HEALTH AND SAFETY PERSONNEL

A. Contractor shall employ a competent person for each hazardous construction task in accordance with the requirements of WAC 296-155.

B. Contractor shall submit to Owner the names of its employees performing duties as competent persons, as well as the names of Subcontractor employees performing duties as competent persons.

1.04 HAZARDOUS MATERIALS MANAGEMENT

A. Dangerous Waste Management:

1. Contractor agrees and acknowledges that:

   a. Contractor has direct and exclusive control over the Work and operations at the Project site and is responsible for any Contractor generated, created, or disturbed Washington State dangerous waste and its collection, labeling, accumulation, transportation, and disposal. Owner’s EH&S department will provide assistance to Contractor upon request, and will coordinate transportation and disposal of Project-generated Washington State dangerous waste.

   b. Contractor must provide Owner immediate notification of any pre-existing unanticipated Washington State dangerous waste or site contamination.

2. Contractor is responsible for securing its own waste generator identification number, and Contractor shall sign all manifests associated with the Contractor-generated waste.

   a. Contractor shall obtain an EPA/State ID number in accordance with WAC 173-303-360 before conducting activities generating chemical waste designated as Washington State dangerous waste.
b. Contractor shall cancel the EPA/State ID number when:
   1) All activities generating or managing waste have ceased;
   2) All regulated wastes have been removed from the Project site under proper manifests, and all site contamination is remediated; and
   3) All annual dangerous-waste reporting requirements are complete.

c. Contractor may call the Washington State Department of Ecology (DOE) to request a reporting package for early submittal.

d. Contractor shall furnish to Owner's EH&S Department, Pullman, WA, within 3 Days from submittal or receipt, copies of the following documents:
   1) Form 2 Notification of Dangerous Waste Activities;
   2) All signed Uniform Hazardous Waste Manifests (original copy when shipping wastes and copy returned from the treatment, storage, disposal, or recycling facility), Land Disposal Restriction Notification forms, Certificates of Recycling/Disposal/Destruction, and Exception Reports;
   3) All Annual Reports; and
   4) All correspondence from the DOE.

3. Owner remains responsible for Washington State dangerous waste and site contamination: (1) pre-existing Contractor’s activities at the site, (2) not listed in the Contract Documents, and (3) not disturbed by Contractor through improper construction activities.

4. For waste identified in contract document and for unanticipated Washington State dangerous waste or site contamination discovered during the course of the Work on the site, Contractor shall:
   a. Collect, containerize, and accumulate all Washington State dangerous waste or site contamination in accordance with applicable Federal, State, and local regulations.
   b. Coordinate all transportation and disposal activities through Owner’s EH&S department, who will utilize the Washington State Hazardous Waste Disposal Services contract or equivalent pre-approved contractor. Owner’s disposal contractor shall complete all applicable dangerous waste shipping papers including all Uniform Hazardous Waste Manifests, Land Disposal Restriction Notification forms, profiles and barrel packing lists.

B. Hazardous Materials Spills and Releases:

1. Contractor and Subcontractor(s) shall immediately report all hazardous materials spills at the Project site to Owner. If a hazardous material spill occurs at a Project site in Whitman County, and if any individual may be affected by the spill, Contractor and/or Subcontractor(s) must immediately
report the spill to Whitcom (emergency dispatch). In other counties, Contractor and Subcontractor(s) must report spills to the appropriate emergency response agency in that area.

2. Contractor shall be responsible for spill containment, cleanup, decontamination, post-cleanup monitoring, disposal of any wastes generated from cleanup activities, and generation of any reports required by regulatory agencies and/or regulations including, but not limited to, WAC 173-303 and WAC 173-340.

C. Spill Prevention Control and Countermeasures:

1. Owner’s EH&S department is responsible for Owner’s SPCC Plan. Any of Contractor’s on-site activities involving the handling and/or storage of materials meeting the definition of oil per 40 CFR 112 in containers and/or equipment with a capacity greater than 42 gallons must be included in the Owner’s SPCC Plan. Contractor shall provide Owner’s EH&S department with an inventory of this equipment or containers at least 14 Days prior to the equipment or containers being brought to the Project site.

2. Contractor shall provide and utilize secondary containment for containers and tanks of oil with a capacity greater than 42 gallons. Owner may waive this requirement in its sole discretion upon Contractor’s request after Owner reviews Contractor’s written explanation as to why secondary containment is unnecessary for a particular container or tank.

D. Asbestos:

1. All Contractor employees involved in excavation or demolition shall be asbestos awareness trained. Contractor shall submit to Owner the name of Contractor’s competent trainer, the names of each of Contractor’s trained personnel, and the date of each training. Contractor’s submittal must also state that the training was conducted for asbestos awareness for the Work.

2. All asbestos abatement Work shall be performed by persons trained in Washington State-approved courses and certified by the State of Washington.

3. All asbestos abatement Work performed shall be overseen by a consultant hired by the Owner to ensure the Work meets regulatory standards and Owner requirements.

4. All asbestos cement pipe Work shall be performed by persons trained in an asbestos cement pipe procedures course whose content is reviewed and approved by the Washington State Department of Labor and Industries, per WAC 296-62-07722(3)(ii)(C).

5. If suspected asbestos-containing material is discovered during Contractor’s execution of the Work, and abatement of the material is not a requirement of the Contract, Contractor shall suspend any Work that affects the material and immediately notify Owner. Contractor shall safeguard the area to prevent entry until certified personnel determine
whether the material is non-asbestos containing or the material is abated, at which time the Work in that area may resume.

E. Lead:

1. Owner shall inform Contractor of lead-containing coatings and materials that the Contractor may encounter while performing the Work. These materials or coatings may release lead into the air, soil, or water, or may be a source of contamination due to skin contact. Owner shall provide general data about the percentage of lead content of each suspected lead-containing material or coating and/or provide Contractor with data showing the amount of lead per surface area.

2. Contractor is responsible for protecting its employees from lead exposure, as required by Washington law.

3. Contractor shall manage all paint chips, building components, soil, and/or other material considered by Owner to be dangerous waste according to the Dangerous Waste Management paragraph.

F. Polychlorinated Biphenyls:

1. Owner may survey oil-filled equipment prior to commencement of construction. This equipment includes, but is not limited to, transformers, electrical switches, hydraulic elevators, emergency generators, capacitors and light ballasts. Owner’s survey shall usually determine if the equipment is filled with oil containing polychlorinated biphenyl (PCB). Owner shall remove, or arrange for the removal of, any equipment that contains oil in concentrations qualifying the equipment as dangerous waste per WAC 173-303.

2. If oil-filled equipment is discovered during Contractor’s execution of the Work, Contractor shall suspend any Work that may affect the equipment and immediately notify Owner. Owner shall test the equipment and determine the appropriate management method for the equipment and the oil it contains.

G. Mercury:

1. Owner may survey all equipment suspected of containing mercury prior to commencement of construction. This equipment includes, but is not limited to, switches and thermostats. Owner’s survey shall determine if the equipment contains mercury. Owner shall remove, or arrange for the removal of, any such equipment.

2. If mercury-containing equipment is discovered during Contractor’s execution of the Work, Contractor shall suspend any Work that may affect the equipment and immediately notify Owner. Owner shall test the equipment and determine the appropriate management method for the equipment and the mercury it contains.
H. Hazardous Materials or Equipment:

1. Fixed equipment such as fume hoods, safety cabinets, and vacuum systems, and related ductwork, fans, and appurtenances, may contain or be contaminated with hazardous materials. Owner may test this equipment to determine what, if any, hazards are present. If equipment contains a hazard, or if the equipment itself is a dangerous waste, Owner shall inform Contractor of the nature of the hazard including any information necessary for Contractor to protect its workers. If the equipment is a dangerous waste, Contractor shall dispose of, or make arrangements for the disposal of, the equipment per the above Dangerous Waste Management paragraph.

I. Underground Storage Tanks (USTs): Not required.

J. Department of Homeland Security (DHS) Chemicals of Interest (COI)

1. Contractor and Subcontractors shall report any COI to Owner as required by the DHS. Contractor may contact Owner’s Representative in conjunction with the University’s EH&S Department for the specific means of reporting.

1.05 WATER AND STORMWATER POLLUTION PREVENTION – NOT USED

1.06 AIR POLLUTION

A. Contractor shall comply with all provisions of the Owner’s Air Operating Permit, WAC 173-400 and WAC 173-401 requirements as applicable.

B. Contractor shall control pollutants, such as diesel emissions, chemical emissions, and dust generated by the Project, so that pollutants do not adversely impact the Project site or the surrounding-area air quality.

C. Contractor shall submit to Owner within 30 Days of the Notice to Proceed a list of any stationary air emission-generating equipment included in the Work, such as: fuel-powered electrical generators, internal combustion engines, boilers, paint booths, CFC-containing equipment, or other regulated emission sources. Contractor shall assist Owner in the preparation of necessary permit applications, and Owner shall obtain necessary permits. Contractor shall abide by any conditions or requirements of permits.

D. Per WAC 173-400, Contractor shall mitigate all fugitive emissions (such as dust, vehicle exhausts, and other emissions that do not pass through a stack, chimney, or vent) generated by the Work. Contractor shall mitigate dust at the Project site throughout the entire duration of the Work. Dust mitigation may include application of specific chemical compounds approved by Owner, or may be accomplished with intermittent watering and sprinkling at such a frequency as will satisfactorily settle dust (excluding paved surfaces). Paved surfaces shall be cleaned mechanically without the discharge of water or chemicals to storm drains.
and/or surface waters. Under no circumstances shall Contractor permit dust mitigation cause soil erosion or pollution of surface waters.

E. No materials shall be burned without required permits. If permitted burning is done, odors shall be minimized in accordance with the Owner’s Air Operating Permit.

F. CFCs (chlorofluorocarbons) or HCFCs (hydrochlorofluorocarbons) are not permitted as refrigerants in new or renovation projects. New permanently installed refrigeration equipment, such as chillers, temperature controlled chambers, air conditioning equipment, compressors, etc., must contain HFC (hydrofluorocarbon) refrigerants only (i.e., R-134A, R-404A, or R-507). At the completion of the Project, Contractor must provide detailed documentation to Owner about the refrigeration equipment installed, including identifying markings, capacity, and type of refrigerant. Refrigerant must be installed only by persons certified to do so.

G. Indoor Air Quality:

1. Owner shall notify Contractor of the location of fresh air supply intakes for buildings in the immediate area of the Work, and of fresh air supply intakes for buildings that may be affected by emissions from Contractor operations.

2. Contractor shall notify Owner 3 Days prior to commencing Work in which Contractor must operate vehicles or equipment in areas where fresh air supply intakes are located.

3. Contractor shall notify Owner 3 Days prior to commencing Work in which Contractor will be using solvents or other volatile chemicals, or processes which emit fumes, smoke, or strong odors that may affect fresh air supply intakes, or may enter Owner’s buildings through doorways or windows.

4. Contractor shall not allow its activities that emit vapors, fumes, smoke or strong odors to negatively affect fresh air supply intakes.

5. If air releases of hazardous chemicals must occur, Contractor shall submit no later than 30 Days after the Notice to Proceed a chemical release plan detailing how such incidents may adversely affect Owner. Such a plan shall also specify protection to be provided to the employees of Owner and Contractor actions required to minimize chemical overexposure.

6. During welding activity, Contractor shall confine fumes to the Project site, and the fumes must not adversely affect Owner’s employees or students.

1.07 PUBLIC HEALTH

A. Solid Waste Disposal:

1. Contractor shall legally dispose of or recycle all solid waste at an off-site location. Contractor shall not burn, dump, or bury waste materials, debris, or rubbish on Owner property. Contractor shall clean the Project
site at the end of each work shift. Contractor is liable for any and all damage resulting from improper waste handling and disposal (see Section 07 74 19 - Construction Waste Management).

B. Environmental Noise:

1. Per WAC 173-60, and applicable local requirements, Contractor shall not exceed maximum permissible environmental noise levels for the duration of the Work.

C. General Sanitation:

1. Per WAC 246-203, Contractor shall supply adequate water for drinking and hand washing purposes. The use of common drinking cups or towels is prohibited. For hand washing purposes, Contractor shall supply hot running water, soap, disposable towels, and a waste receptacle.

D. Drinking Water Protection:

1. Per WAC 246-290 and 246-291, Contractor shall protect all public water supplies. No portion of a public water system containing potable water shall be put into service nor shall service be resumed until the facility has been effectively disinfected and a satisfactory bacteriological sample has been obtained from a DOE-certified laboratory. Results of sampling shall be sent to Owner. The procedure used for disinfection shall conform to current standards of the American Water Works Association.

2. A minimum sanitary control area around all wells shall be maintained at all times. The sanitary control area shall extend at least 100 feet from any well. No source of contamination may be constructed, stored, disposed or applied within the sanitary control area.

3. If wells are being constructed or abandoned, Owner shall procure the appropriate water rights and construction permits per WAC 173-160. Owner shall provide copies of these documents to Contractor. Wells shall be constructed/abandoned properly by a licensed well driller. Contractor shall submit a plan to Owner detailing how all disinfection shall be accomplished.

4. Backflow Prevention:
   a. Any connection made by Contractor to Owner’s drinking water system, including connection to a fire hydrant, must be made through a backflow prevention assembly approved by a Washington State certified cross connection control specialist (CCS) engaged by Owner and inspected and tested by a Washington State certified backflow assembly tester (BAT).
   b. Contractor shall label all non-potable water outlets, in a manner acceptable to the Owner, “Non-potable Water / Do Not Drink”.

E. Vector Control: Not Required.
F. On-Site Sewage Disposal: Not Required.

G. Water Recreation Facilities: Not Required.

H. Food Service Facilities: Not Required.

1.08 OCCUPATIONAL HAZARD MANAGEMENT

A. Chemical Hazard Communication:

1. If any hazardous chemicals will be used in the Work or present at the Project site, copies of applicable Material Safety Data Sheets (MSDS) shall be made immediately available to Owner prior to use by Contractor and during any use of the hazardous chemicals in the Work.

2. If the use or presence of hazardous chemicals at the Project site may affect the health of individuals outside the Project site, Contractor shall submit a written plan to Owner at least 30 Days prior to such use or presence detailing how Owner can avoid exposure to the products. Contractor shall submit MSDS / SDS to Owner for any hazardous chemical to which persons outside the project site may be exposed. The exposure avoidance plan shall also specify actions that should be taken if inadvertent exposure occurs. Owner shall provide Contractor with a written plan detailing how Contractor employees can avoid exposure to hazardous chemicals used by Owner that may impact the Project site, and shall specify actions which should be taken if inadvertent exposure occurs. Owner shall submit MSDS / SDS to Contractor for any hazardous chemical to which persons inside the project site may be exposed.

B. Lock-Out/Tag-Out:

1. When Owner and Contractor are to be engaged in coordinated activities requiring the control of hazardous energy, Owner and Contractor shall inform each other of their respective lock-out or tag-out procedures.

C. Confined Space:

1. When Contractor employees are to enter permit-required confined spaces, Owner shall:
   a. Inform Contractor that the Project site contains permit required spaces and that permit-space entry is allowed only through compliance with a confined-space program meeting WAC 296-809.
   b. Inform Contractor of hazards that have been identified.
   c. Coordinate entry operations with Contractor when both Owner and Contractor personnel will be working in or near permit spaces.
d. Debrief Contractor at the conclusion of the entry operations regarding any hazards confronted or created in permit spaces during entry operations.

END OF SECTION 01 41 19
PART 1 GENERAL

1.01 SUMMARY

A. Contractor shall perform all Work in a skillful and workmanlike manner. Materials and equipment furnished by Contract and any Subcontractor(s) must be of good quality and new unless the Contract Documents require or permit otherwise. Materials shall conform to the manufacturer’s standards in effect at the date of execution of the Contractor and shall be installed in accordance with the manufacturer’s instructions, specifications, and directions. Contractor shall, if requested by Owner, furnish satisfactory evidence regarding the kind and quality of any materials identifying thereon the source, and warranting their quality and compliance with the Contract Documents.

B. Section includes:

1. Contractor’s Quality Control Program;
2. Field samples;
3. Mock-ups;
4. Manufacturer’s instructions;
5. Manufacturer’s field services;
6. Testing laboratory services; and
7. Contractor tests and inspections.

1.02 QUALITY CONTROL PROGRAM SUBMITTALS

A. Contractor shall submit a written Quality Control Program for the Project per the Pre-Construction Submittal Requirements of Section 01 33 00. This submittal shall include but not be limited to the following:

1. An overview of Contractor’s Quality Control Program.
2. Identification and resume of Contractor’s on-site Quality Control Manager (QCM).
3. A description of the activities, record keeping, and correspondence that the QCM will perform and be accountable for throughout the duration of the Project.
4. A description of the quality control meetings to be conducted, sample inspection check lists (i.e., samples of actual inspection check list forms that will be submitted to Owner when scheduling inspections), and Subcontractors’ quality control representatives. All forms that Contractor intends to use in its Quality Control Program shall be part of the submittal.
5. A description of the QCM activities when inspections fail to verify compliance with the Contract Documents.
a. These activities are to include, as a minimum, follow-up with applicable Subcontractors, correction and/or completion of Work required for re-inspection, and the re-inspection.

b. Contractor shall submit its weekly Non-Compliance Logs at least 2 Days prior to each Progress Meeting.

6. A description of the QCM activities to provide the required notifications for inspections.

7. A description of record keeping and information turn-over to Owner as a component of the Operating and Maintenance data (i.e. factory representative’s start-up reports and permission to energize, verification of correct voltage and phasing to motors, etc.).

1.03 CONTRACTOR’S QUALITY CONTROL PROGRAM

A. Contractor shall establish and maintain a written Quality Control Program which shall be issued by Contractor to Subcontractors performing Work on the Project and utilized to verify that the execution of the Work is consistent with the requirements of the Contract Documents.

B. The Quality Control Program shall include, but not be limited to the following:

1. Preparatory Phase:

   a. Prior to beginning Work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. Contractor shall:

   b. Review of each paragraph of applicable specifications, reference codes, and standards. Make a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field at the preparatory inspection. Maintain these copies in the field, available for use by Owner’s Designated Representative until final acceptance of the work.

   c. Review the Drawings.

   d. Check to assure that all materials and/or equipment have been tested, submitted, and approved.

   e. Review provisions that have been made to provide required control inspection and testing.

   f. Examine the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

   g. Perform a physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

   h. Review appropriate accident safety procedures.

   i. Discuss procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and
workmanship standards for that feature of work.

j. Check to ensure that the portion of the plan for the work to be performed has been accepted by the Owner’s Designated Representative.

k. Schedule, manage and record the minutes of each preparatory meeting.

l. Review all RFIs associated with the Work.

2. Initial Phase:

a. At the beginning of the Work, Contractor shall:

b. Check work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

c. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing. Resolve all differences and deficiencies.

d. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

e. Check safety to include compliance with and upgrading of the Safety Plan. Review with each worker. Particular attention should be given to high hazard work.

f. Prepare and attach to the daily CQC report separate minutes of this phase.

g. Repeat the initial phase any time acceptable specified quality standards are not being met.

3. Follow Up Phase:

a. Perform daily checks to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the Work. The checks shall be made a matter of record in the QC documentation. Conduct final follow-up checks and correct deficiencies prior to the start of additional features of work which may be affected by the deficient work. Do not build upon nor conceal non-conforming work.

C. Contractor’s Quality Control Program shall be independent of any inspections and testing performed by Owner or by any independent testing and inspection agencies hired by Owner.

D. Within the Quality Control Program, Contractor shall have available on the jobsite at all times a written report of quality control activities. At a minimum, the report shall note Project site quality control inspections, performance of scheduled tests and follow-up testing, other required inspections, deficiency log, and examinations of workmanship and quality.
E. Test results shall identify applicable Contract (including Specification) requirements, the test or analysis procedures used, and the actual test results. A statement shall be included that the item tested or analyzed conforms or fails to conform to the Contract Documents. Each report shall be conspicuously stamped on the cover sheet “CONFORMS” or “DOES NOT CONFORM” as the case may be. All test reports shall be signed by a testing laboratory representative authorized to sign certified test reports. Copies of all test reports shall be available on the jobsite at all times.

F. If the Quality Control Program is found to be defective and Contractor does not promptly correct the deficiency, Owner may:
   1. Withhold payment until satisfactory corrective action has been taken, or
   2. Issue a stop work order until satisfactory corrective action has been taken.

G. Pre-Inspections: Contractor shall pre-inspect Work that requires normal, special, and additional inspections as indicated in the Contract Documents.

1.04 FIELD SAMPLES

A. Field samples are defined as the partial installation of selected materials at the Project site for Owner's review and acceptance of visual features and workmanship. Generally, accepted field samples are incorporated into the Work.

B. Contractor shall provide field samples as required by the Contract Documents at location acceptable to Owner.

C. Perform Work in accordance with the Contract Documents.

D. Approved samples will serve as an acceptable standard of quality and workmanship.

E. Maintain samples until completion of relevant Work.

F. Upon completion of relevant Work or when directed by Owner, demolish and remove samples from Project site unless sample is accepted as part of completed Work.

1.05 MOCK-UPS

A. Contractor shall provide mock-ups as required by the Contract Documents. Provide additional mock-ups, as required by Owner, until approval is obtained.

B. Do not proceed with subsequent Work until approval of the mock-up is obtained.

C. The approved mock-up shall be the standard of workmanship and materials for the Work that is represented by the mock-up.

D. Maintain mock-up in approved condition, until directed otherwise by Owner.
E. Unless specified otherwise, remove mock-up at completion of the Work or when directed by Owner.

F. Unless specified or approved otherwise, mock-ups shall be completed and approved prior to the pre-installation meeting at which the Work represented by the mock-up will be discussed.

G. Notify Owner a minimum of 7 Days prior to requesting mock-up approval.

1.06 MANUFACTURERS’ INSTRUCTIONS

A. Contractor shall comply with manufacturers’ instructions in full detail, including each step in sequence. Do not omit preparatory steps or installation procedures unless specifically modified or exempted by Contract Documents.

B. Should instructions conflict with Contract Documents, Contractor shall request clarification before proceeding.

1.07 MANUFACTURERS’ FIELD SERVICES

A. When specified, Contractor must require product manufacturer to furnish a qualified representative to observe field conditions and quality of workmanship, and to provide recommendations, certifications, and other specified services.

B. Representative shall submit written report to Owner listing observations and recommendations.

1.08 TESTING LABORATORY SERVICES

A. Owner will arrange for services of an independent Testing Laboratory to inspect and test the Work to verify compliance with Contract Documents.

B. Contractor’s Responsibilities:

1. Cooperate with Testing Laboratory personnel, and furnish access, tools, samples, certifications, test reports, design mixes, equipment, storage, and assistance as requested by the Testing Laboratory.

2. Notify Owner and Testing Laboratory a minimum of 7 Days in advance of all required tests and 48 hours in advance of all required inspections. When tests or inspections cannot be performed, through fault of Contractor, Contractor shall reimburse Owner for costs incurred by Owner.

3. Contractor shall remove and replace Work found to not comply with Contract Documents.

4. If initial tests and inspections indicate deficient work, Contractor shall reimburse Owner for costs of all subsequent tests and inspections related to such deficiency.

5. All damage to Work as a result of normal testing operations shall be repaired by Contractor to match surrounding surfaces.
6. Schedule testing and inspection so that work of testing and inspection personnel will be as continuous and brief as possible.

7. Contractor shall reimburse Owner for travel and lodging expenses incurred for testing and inspection services performed outside a radius of 100 miles of the Project site.

1.09 CONTRACTOR TESTS AND INSPECTIONS

A. Inspection and testing performed exclusively for Contractor’s convenience shall be the Contractor’s sole responsibility.

B. Earthwork Compaction Testing Requirements:
   1. Owner will engage the services of a Testing Laboratory to perform all soil and structural fill compaction testing. Compactions of any fill material shall be equal to or exceed the specified percentage of maximum dry density as defined by ASTM test procedure D1557 (modified proctor). Obtaining such specified compaction performance is the sole responsibility of Contractor.
   2. During any of Contractor’s operations, Owner reserves the right to perform compaction tests for its own information only. At Owner’s discretion, copies of such tests may be made available to Contractor. The taking of any such tests by Owner in no way relieves Contractor from testing to assure itself of compliance with the Contract Documents.

C. Approved Structural Steel Fabricators:
   1. Contractor shall pay for any required structural steel fabrication special inspections.

D. Cast-in-Place Concrete Strength Testing Requirements:
   1. Concrete test cylinders will be made by Owner or Owner’s Testing Laboratory. Contractor shall be responsible for proper care of cast cylinders while on the Project site (with respect to temperature, humidity and protection).
   2. Contractor is also responsible for timely transportation to the laboratory in Spokane (or closer) on a schedule that will permit adequate laboratory curing before testing.
   3. Contractor shall notify the Owner at least 48 hours before any concrete pour to allow time for observation.
   4. Frequency and location of tests are to be determined. As a minimum, four test cylinders will be made for each day’s pour or for every hundred cubic yards, whichever is greater.
   5. The results of Owner’s tests will be made available to Contractor.
   6. The quality of all concrete is to be the sole responsibility of Contractor. If Contractor feels that additional testing is required to assure continued
quality control, the frequency, testing, and payment therefore is Contractor’s responsibility.

E. All Other Work Inspection and Testing Requirements:

1. Contractor shall, at no additional cost to Owner, provide all inspections and tests required to assure full compliance with the Contract Documents. Unless specifically required, Contractor is not required to submit copies of such test results to Owner. Contractor, however, shall maintain copies of all testing and inspection reports at the Project site for inspection and copying by Owner.

2. The performance of testing or inspection by Owner or Owner’s Testing Laboratory does not relieve Contractor from responsibility for meeting all requirements of the Contract Documents.

END OF SECTION 01 45 00
PART 1      GENERAL

1.01 SUMMARY

A. Contractor shall be evaluated on performance throughout the course of the contract to provide past performance documentation for future projects.

B. Section includes:
   1. Program Objectives;
   2. Performance Categories and Assessment;
   3. Evaluation Reports;

1.02 PROGRAM OBJECTIVES

A. The Contract Performance Evaluation Program is intended to improve contractor selection given the following primary objectives:

   1. Assist the Owner in evaluating the contractor’s qualifications and proven ability to successfully perform future contracts when past performance has been previously documented;
   2. Provide the University objective data relating to Contractor responsibility;
   3. Provide contractors with a means of enhancing their qualifications and reputation by receiving recognition for exceptional performance;
   4. Encourage better working relationships between the University and the Contractor and to provide feedback to the contractor during and after the contract period;

1.03 PERFORMANCE CATEGORIES AND ASSESSMENT

A. Contractor shall be evaluated based upon the following categories:

   1. Schedule and Time Management;
   2. Quality Management;
   3. Communication Effectiveness;
   4. Management Approach;
   5. Code and Compliance; and

B. Each of the above categories will be assessed by multiple key project stakeholders and provided one of the following performance levels based upon
objective and cumulative data:

1. Outstanding (5): Contractor has exceeded the majority of all of the significant contract criteria and has met or exceeded the Schedule, Quality, Communications, Management, Code Compliance and Cost requirements of the contract. The contractor was extremely or completely knowledgeable of the contract requirements and applicable laws and regulations. A very consistent high level of cooperation, project management, and job site control appreciably contributed to an unusually good result.

2. Very Good (4): Contractor has exceeded many of the significant contract criteria and has met or exceeded some of the Schedule, Quality, Communications, Management, Code Compliance, and Cost requirements of the contract. The contractor was knowledgeable of the contract requirements and applicable laws and regulations. Was generally cooperative and performed their work with minimal prompting. Their performance results were very good.

3. Satisfactory (3): Contractor has satisfactorily met the overall contract criteria and has met the overall Schedule, Quality, Communications, Code Compliance and Cost requirement of the contract. The contractor occasionally had to be prompted or reminded of the contract requirements, but overall the project was acceptable, producing an acceptable result.

4. Marginal (2): Contractor may have met many, but not all, of the contract criteria and failed to meet one or more of the Schedule, Quality, Communications, Code Compliance or Cost performance requirements of the contract. Even though the project may have been accepted, the contractor’s performance, as evaluated, was marginal overall. The contractor frequently had to be prompted or reminded of the contract requirements; overall the project was less than satisfactory.

5. Unsatisfactory (1): Contractor failed to meet many or most of the contract criteria and failed to meet the overall Schedule, Quality, Communications, Code Compliance and Cost performance requirements of the contract. While the project may have been accepted by the owner, the effort expended in prompting the contractor to perform was excessive. The contractor’s poor or uncooperative performance created serious unnecessary and avoidable difficulties in achieving contract completion.

1.04 EVALUATION REPORTS

A. At the midpoint of project completion, Owner shall provide contractor with a draft Contract Evaluation Report based upon the current performance during the contract. This shall provide the Contractor an opportunity improve performance levels during the contract, and provide an opportunity for Contractor-Owner communication and working relationship.

B. A final Contract Performance Evaluation Report will be completed upon contract
completion and shall become the official report of record.

1. A Summary Contract Performance Evaluation will be provided to the Contractor within 60 calendar days after Final Completion.

2. Final Contract Performance Evaluation Reports will remain on record for a minimum of 5 years from date issued.

C. Upon receipt of the Summary Contract Performance Evaluation, Contractor shall review the report and may request a debrief conference within 21 calendar days of receipt.

D. If after the debrief, Contractor would like to dispute the evaluation findings the Contractor shall submit in writing, the specific reasons for disagreement and include the basis for their appeal within 14 calendar days following the debrief.

1. Upon receipt of appeal, Owner shall convene a review with the Assistant Vice President, Facilities Services, Capital to consider the objectivity, accuracy, completeness and fairness of the Contract Performance Evaluation.

2. The Contractor shall be notified and issued a final determination within 30 calendar days of receipt of the appeal.

END OF SECTION 01 45 34
PART 1 GENERAL

1.01 TEMPORARY UTILITIES

A. Owner may furnish to Contractor temporary Owner-owned utilities when available and upon Owner written approval. Owner reserves the right to restrict the use of its utilities if, in its opinion, Contractor fails to adequately conserve utilities or to use utilities appropriately. When using Owner-owned utilities, Contractor is to make metered connections to the nearest available service and disconnect same when no longer needed.

B. If Owner-owned utilities are not available at the Project site, or if Owner restricts use of Owner-owned utilities, Contractor shall obtain required services from commercial sources or public utilities, and Contractor is responsible to pay for all utility costs.

C. Contractor shall field verify the availability of utility services provided by Owner and coordinate the Work accordingly.

D. In remodeling projects where portions of the building are to remain in service, Contractor shall be responsible for coordinating the Work to maintain utility services to the occupied portions of the building.

1.02 TEMPORARY ELECTRICAL SERVICE

A. Contractor shall provide all services required for construction operations and may connect to existing services when available upon Owner approval.

B. Contractor shall provide lighting for construction operations.

C. Contractor may use existing lighting when available and adequate.

D. Contractor shall maintain site lighting throughout the duration of the Work.

1.03 HEAT AND VENTILATION

A. Contractor shall provide heat and ventilation as required to maintain specified conditions for construction operations and to protect materials and finishes from damage due to temperature or humidity.

B. After a building is substantially enclosed, the permanent heating system or a temporary hook-up of equipment from the permanent system may be used for temporary heat provided that the equipment is properly installed by the responsible electrical and mechanical Subcontractors and available for supplying temporary heat. Owner shall be the sole judge of the adequacy of the building enclosure for temporary heating or cooling purposes.

C. Contractor shall arrange with the electrical and mechanical Subcontractors installing said systems and equipment for the use, operation, and maintenance of
the systems. Contractor shall pay for all connections and attendants for temporary heating, including necessary accessories such as temporary (construction) air filters to protect the air distribution systems from contamination.

D. Contractor shall provide a dust free air distribution system and correct all damage to this system caused by the Work.

E. In existing facilities, Contractor shall coordinate use of the existing systems with Owner. Contractor shall extend and supplement with temporary units as required to maintain specified conditions for construction operations.

F. Use of electric resistance type heating systems for temporary heat is prohibited.

G. The warranty period for any permanent equipment used during construction will not commence until Contractor achieves Substantial Completion.

1.04 TEMPORARY WATER SERVICE

A. Unless available from an Owner-owned utility, Contractor shall provide service required for construction operations. At all times, Contractor shall utilize backflow/cross-connection devices, certified by Owner, to safeguard water supply.

B. For Work in existing facilities, Contractor shall connect to existing services when approved by Owner and extend branch piping with outlets so that water is available for use by all persons associated with the Work.

C. Provide drinking water from a safe source for all those associated with the Work.

1.05 SANITARY FACILITIES

A. Contractor shall provide temporary restroom facilities. Facilities shall not directly or indirectly drain or discharge onto Owner property or any waters of the State. Place where directed at the time Work begins; maintain in sanitary condition. Remove upon completion of the Work and disinfect the premises.

B. Use of permanent and/or existing Owner’s facilities is not allowed.

1.06 BARRIERS

A. Contractor shall provide barriers as required to prevent public entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. When temporary fencing is indicated by the Drawings, or if fencing is provided at Contractor’s option, enclosures shall be constructed of 6 feet high commercial grade chain link with vehicular and personnel gates, as required.
1.07 ENCLOSURES

A. Contractor shall provide temporary weather-tight closures of openings to provide acceptable working conditions, protect materials, facilitate temporary heating, and prevent entry of unauthorized persons. Provide doors with self-closing hardware and locks.

B. Contractor shall provide temporary roofing when so indicated by the Drawings or when made necessary by the Project requirements.

C. Contractor shall provide temporary dust-proof partitions when required to confine dust and moisture to the immediate Work area.

D. Contractor shall provide temporary noise-proof partitions when required to confine noise to the immediate Work area.

1.08 PROTECTION OF EXISTING FACILITIES

A. Utility Tunnel Protection: Contractor shall provide adequate planking across any tunnels to distribute loads and prevent damage. If necessary, Contractor shall provide temporary shoring inside tunnel areas.

B. Low Overhead Clearance: Contractor shall be fully responsible for addressing all vehicular limitations caused by low overhead restrictions throughout campus. Route all traffic to avoid damage to overhead structures. Review proposed routing with Owner prior to commencement of construction.

C. Tree and Plant Protection: Contractor shall protect trees and other plants not scheduled for removal; maintain protection until Project completion.

1. In the event that a tree or plant is damaged as a result of the Work that, in the opinion of Owner, requires replacement, Contractor shall be responsible for such replacement.

2. If at any time Contractor judges that the protection of plant materials designated to be saved is incompatible with Work required, or if operations necessarily threaten the health of any plant material, Contractor shall immediately notify Owner and cease Work affecting the area until a written agreement is reached concerning acceptable procedure.

1.09 SECURITY

A. Contractor shall provide security to protect the Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, and theft. Coordinate with Owner's security program.

B. During construction, all openings to Owner's utility tunnel system must be protected against unauthorized entry. Contractor shall provide closures,
approved by Owner, including locked doors or hatches at any openings created by the Work.

1.10 PROTECTION OF INSTALLED WORK

A. Contractor shall provide temporary protection for installed products. Control traffic in immediate area to minimize damage.

B. Contractor shall provide protective coverings for walls, projections elevator cabs, jambs, sills, and soffits of openings. Protect finished floors and stairs from traffic, movement of heavy objects, and storage.

C. Contractor shall prohibit traffic and storage on waterproofed and roofed surfaces and on lawns and landscaped areas.

1.11 CLEANING DURING CONSTRUCTION

A. Contractor shall clean the site each day during construction and shall prevent the accumulation of waste materials and rubbish.

B. Contractor shall clean interior areas prior to the start of finish Work and maintain areas free of dust and other contaminants during finishing operations.

1.12 OFF-SITE CLEAN UP

A. Contractor shall continuously keep sidewalks, lawns, parking areas, and streets clear of construction materials, debris, gravel, rock, and dirt related to the Project.

1.13 LIFTING DEVICES AND HOISTING FACILITIES

A. Contractor shall provide cranes, hoists, towers, and other lifting devices necessary for the proper and efficient movement of materials.

1.14 MECHANICAL AND ELECTRICAL SYSTEM SHUT-DOWNS

A. Any shut-down of mechanical or electrical systems affecting Owner's operations shall be scheduled by Contractor during off-hours. Contractor shall submit a written shut-down request providing at least 14 Days advance notice. Any shut-down must be coordinated with and approved by Owner.

1.15 CONSTRUCTION PARKING

A. Contractor’s employees may park only in accordance with campus traffic and parking regulations and pay all required fees.

B. When working in Pullman’s central campus, Contractor’s vehicular use will be limited to the following:

1. Delivery of materials to and from Project site;
2. Single vehicle for use by Project supervisor of each major Contractor (four total vehicles maximum); and

3. Workers' vehicles shall not be allowed to park in the central mall.

1.16 NOISE CONTROL

A. Any construction related noise that interferes or is likely to interfere with normal use of adjacent space(s) shall be scheduled and approved by Owner.

B. Contractor shall restrict any construction related noise to the hours approved by Owner and in accordance with the state and local noise ordinance.

C. Owner may approve Contractor working extended hours. Request any extended hours of operation with Owner.

1.17 TRAFFIC OBSTRUCTIONS

A. Contractor shall submit a written traffic control plan for all traffic obstructions, either pedestrian or vehicular, for approval by Owner, per the Pre-Construction Submittal Requirements of Section 01 33 00.

B. In some cases, it may be necessary to develop special routes for large or unwieldy deliveries that could interfere with pedestrian movement, especially at peak times.

C. Contractor shall avoid deliveries or equipment operations that block street traffic during peak times.

D. Pedestrian Obstructions: Any equipment on sidewalks or other pedestrian ways shall be barricaded. Barricades shall include a horizontal member at a maximum of two feet above the walking surface.

1.18 REMOVAL OF TEMPORARY FACILITIES

A. Contractor shall remove temporary materials, equipment, services, and construction facilities prior to Substantial Completion inspection.

B. Contractor shall clean and repair damage caused by installation or use of temporary facilities.

C. Contractor shall restore existing facilities used during construction to specified or original condition.

END OF SECTION 01 50 00
PART 1 GENERAL

1.01 PRODUCTS

A. Products include material, equipment, and systems.

B. Comply with Specifications and referenced standards as minimum requirements.

C. Components required to be supplied in quantity within a specification section shall be the same, and shall be interchangeable.

D. All materials shall be new unless specifically noted otherwise.

1.02 TRANSPORTATION AND HANDLING

A. Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.

C. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

1.03 STORAGE AND PROTECTION

A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.

B. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.

C. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter.

D. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under required conditions.

1.04 VARIATION FROM SPECIFIED PRODUCTS

A. Subsequent to Bid Opening/Proposal - Approved Equivalents:

1. Requests for approved equivalents will only be considered when approved equivalent statements, used in reference to product
specifications, are specifically provided for within individual Specification sections.

2. The terms "or an approved equivalent", "approved equivalent", or similar statements, when used herein in connection with manufacturers' products, shall be understood to mean products that are equally effective and suitable for their intended use; based on the judgment of the Owner, whose decision shall be final.

3. Written requests for consideration by the Owner of approved equivalents may be submitted throughout the Project.

4. Time extensions and additional costs resulting from use of approved equivalent products will not be considered.

B. No Substitutions:

1. The terms "No Substitutions", "Alternative Products not Acceptable", or similar statements used in reference to product specifications, shall mean that only the specified product will meet the needs of the University and that no other products will be considered at any time before or during the Project.

C. Requirements and Procedures for Product Variations:

1. The Contract is based on the standards of quality established in the Contract Documents.

2. Substitution or approved equivalent revisions shall be made only with the prior written acceptance of the Owner.

3. All requests for substitutions or approved equivalents must be on the proposer's letterhead and shall be accompanied by complete specifications, samples, records of performance, certified copies of tests by impartial and recognized laboratories, and such other information as the Owner may request to prove the merit of the proposed revisions.

4. The Contractor assumes the responsibility for capacity, dimensions, clearance, etc., of the named manufacturer's particular item to assure that the revision meets the requirements.

5. The Contractor shall assume the cost of any redesign, in the form of changes to the Drawings, or for the Work of any other trades, or any other costs required to properly incorporate any revision associated with substitutions or use of approved equivalent products.

6. Final decisions as to the quality and suitability of proposed revisions will rest solely with the Owner and will be based on proof submitted.

7. When the Owner approves a substitution or approved equivalent proposed by the Contractor, it is with the understanding that the Contractor certifies that the article or material is equivalent to or better than that specified.

END OF SECTION 01 60 00
PART 1 GENERAL

1.01 PURPOSE

A. Provide for an orderly, timely, and efficient completion of the Work for Owner.

1.02 SUBSTANTIAL COMPLETION

A. Requirements for Substantial Completion: Contractor shall comply with all requirements for Substantial Completion identified in the General Conditions and other Contract Documents. Prior to Substantial Completion, Contractor must have constructed the Work in substantial accordance with the Contract Documents, and:

1. Certificate of Occupancy received from the AHJ.
2. All elements of the Work must be operational and in good working order and condition, except for incidental punchlist Work;
3. The fire and life safety systems, if any, must be tested and accepted;
4. Any elevators must be operational, functioning, and in good working order and condition, and be fully approved for use;
5. All mechanical, electrical, plumbing, telecommunications, security, and access control systems must operate and function in good working order and condition, including commissioning;
6. The finish portion of the Work must be complete including but not limited to paint, trim, doors, partitions, cabinetry, floor coverings, ceilings, wall finish, and other finish surfaces, except for incidental punchlist Work;
7. All roadway improvements, paving, sidewalks, parking areas, other street improvements, lighting, landscaping and irrigation must be complete;
8. Utilities must be complete, connected, and operating normally;
9. Contractor must have removed all construction facilities, temporary controls, and construction debris;
10. Contractor must have completed training Owner’s personnel on all operating instructions and submitted training DVDs; and
11. Final cleaning.

B. Prior to Substantial Completion Contractor shall request in writing that Owner grant Substantial Completion. Accompanying the request Contractor submit the following:

1. A list of all items remaining to be completed or corrected;
2. Signed originals from authorities having jurisdiction of all certificates of compliance and final approval, as applicable;
3. All system software files required by the Contract Documents, including
but not limited to lighting and environmental controls;

4. Revised Draft Operation & Maintenance manuals; and

5. Draft Project Record.

C. Upon satisfactory completion of the requirements for Substantial Completion, Owner shall prepare and forward to Contractor a letter of Substantial Completion. The letter will identify the date of Substantial Completion and include a punch list identifying all remaining incomplete Work. Contract warranties shall begin as of the date of Substantial Completion.

1.03 FINAL COMPLETION

A. Requirements for Final Completion: Upon receipt of Contractor’s written Notice that Contractor has inspected and completed punch list items and that the Work is ready for final inspection and acceptance, Owner will promptly make such inspection accompanied by Contractor. If Owner determines that some or all of the punch list items are not complete, Contractor shall be responsible to Owner for all costs, including re-inspection fees, for any subsequent inspection to determine completion of the punch list. When Owner finds all punch list items complete and the Work and Contract fully performed, Owner shall establish the date of Final Completion. Owner is not required to establish Final Completion until the following are complete:

1. Complete all requirements listed in the Contract Documents for Substantial Completion of the Work;

2. Complete all remaining punch list items and remaining Work, and obtain approval by Owner that all Work is complete;

3. Obtain permanent occupancy permits (if only a temporary occupancy permit was issued at Substantial Completion);

4. Submit Project Record, any final property survey, and final Operation and Maintenance manuals (if not previously submitted) required by the Contract Documents;

5. Deliver any required tools, spare parts, extra stock of material and similar physical items to Owner as required by the Contract Documents;

6. Complete cleaning after completion of punch list;

7. Submit executed warranties;

8. Complete any required sustainability documentation for which Contractor is responsible;

9. Submit a final comprehensive list of all Subcontractors of all tiers and suppliers for the Project; and

10. Submit certification that materials used in the Work are "asbestos-free" and that all requirements of governing jurisdictions related to the Project have been addressed.
11. Final Project Record.

B. Upon satisfactory completion of the requirements for Final Completion, Contractor shall submit a final Application for Payment.

1.04 FINAL ACCEPTANCE

A. Requirements for Final Acceptance: Final Acceptance shall be established by Owner in writing. Owner shall not be obligated to accept the Project as complete before Final Completion has occurred and Contractor has submitted the following:

1. An affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which Owner or Owner’s property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, except for any claims that are specifically identified on the affidavit (Affidavit of Payment of Debts and Claims, AIA form G706 or equivalent).

2. A certificate or written statement evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 Days' prior written Notice has been given to Owner.

3. Receipt of consent of surety, if any, to final payment (AIA form G707 or equivalent).

4. If required by Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by. If a Subcontractor refuses to furnish a release or waiver required by Owner, Contractor may furnish a bond satisfactory to Owner to indemnify Owner against such lien. If such lien remains unsatisfied after payments are made, Contractor shall refund to Owner all money that Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

5. Provide copy to Owner of all “Affidavits of Wages Paid”. Pursuant to RCW 39.12.040, an "Affidavit of Wages Paid" from Contractor and from each Subcontractor certified by the Industrial Statistician of the Washington State Department of Labor and Industries, with the fees paid by Contractor or Subcontractor.

B. Contingent upon completion of all Affidavits of Wages Paid, the “Notice of Completion of Public Works Contract” form may be completed by Owner.

1.05 RETAINAGE

A. Retainage must be held at least 45 Days following Final Acceptance. If there are either unpaid taxes or fees, or unsatisfied claims of lien against the retained percentage, disbursement of retainage funds will be made in accordance with Washington law.
B. The retainage will be held and applied by Owner as a trust fund in the manner required by RCW 60.28. Release of the retainage will be processed in the ordinary course of business following Final Acceptance of the Work by Owner, provided no notice of lien has been given as provided in RCW 60.28, no claims have been brought to the attention of Owner, Owner has no claims under the Contract, and the requirements below have been met.

C. Owner shall not release retainage until the following requirements have been satisfied.

1. “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 Owner.

2. “Certificate of Payment of Contributions, Penalties and Interest on Public work Contract”: Upon receiving a copy of Owner’s notice of completion and after determining that Contractor is in compliance with the provisions of the Employment Security Act, the Employment Security Department will issue this certificate to Owner.

3. “Certificate of Release”: Upon receipt of Contractor’s request for release and verification from its records that required premiums have been paid by Contractor and each Subcontractor, the Department of Labor and Industries will issue a statement to that effect.

END OF SECTION 01 70 00
PART 1 GENERAL

1.01 SUMMARY

A. This Section describes the waste management and recycle management criteria for debris and solid waste generated as part of the Work.

B. Contractor shall be responsible for sorting, segregating, and placing designated waste materials into containers provided by Owner. Contractor shall be responsible for segregating and disposing all unacceptable and dangerous wastes as defined below.

C. Owner shall be responsible for furnishing waste collection containers, servicing those containers, and disposing solid waste from the Project, with the exception of unacceptable and dangerous waste.

D. Waste that is disposed of by Contractor shall be in accordance with all applicable local, state, and federal regulations, including WAC 173-350, Solid Waste Handling Standards, and WAC 173-303, Dangerous Waste Regulations.

1.02 DEFINITIONS


B. Dangerous Waste: Solid waste designated in WAC 173-303 and/or 40 CFR. As used in this Section, the words “dangerous waste” will refer to the full universe of wastes regulated by WAC 173-303 and 40 CFR.

C. Demolition Waste: Largely inert waste, resulting from the selective demolition of buildings, roads and other man-made structures such as cured concrete, asphaltic compounds, brick and masonry, ceramic, glass, steel, and aluminum, and non-inert materials such as clean wood, composition roofing and roofing paper, and minor amounts of metal. Plaster (i.e., sheetrock or plaster board) or any other material, other than clean wood, that is likely to produce gases or leachate during its decomposition process and asbestos waste are not considered to be demolition waste.

D. Land Clearing Waste: Natural vegetation and clean soils from clearing and grubbing land for development such as stumps, brush, weeds, tree branches, tree bark, mud, dirt, sod and rocks.

E. Recycle/Recycling: The process of separating waste materials for remanufacturing or reprocessing into usable or marketable materials. Examples of recycling include separating wood off-cuts for recycling by a wood processor into paper pulp, or separating cardboard, plastic, beverage containers, or miscellaneous metals for recycling.

F. Reuse: To use a construction waste material again in roughly its same form. Materials can be reused on-site or on other projects off-site. Examples of reuse
include removing a hardwood floor and reinstalling it in a new project, or using soil from one site as fill on another site.

G. Salvage: To remove a construction waste material or equipment from an existing building for reuse on-site or reuse on other projects off-site. Items to be salvaged shall be designated by Owner for removal and delivery to Owner.

H. Unacceptable Waste: All waste not authorized for disposal by Owner. This includes any waste that is now or hereafter defined by federal law or by the governing jurisdiction as radioactive, dangerous, hazardous or extremely hazardous waste, unsanitary waste, and vehicle tires in excess or those permitted to be disposed of by the laws of the governing jurisdiction. It does not include any waste destined for salvage, recycling, or general demolition.

I. Waste: All solid waste generated within the limits of the Project, or extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable and recyclable materials, masonry, and concrete.

J. Waste Management Plan: A Project-specific plan for the salvage, collection, transportation, recycling, and disposal of the waste generated at the Project site. A waste management plan includes procedures for separating, storing, and transporting waste and includes methods to assure proper implementation of the plan.

1.03 WASTE MANAGEMENT PLAN

A. Draft Waste Management Plan: Per the Pre-Construction Submittal Requirements of Section 01 33 00, Contractor shall submit to Owner a Draft Waste Management Plan. The Draft Plan shall contain the following:

1. List of materials to be salvaged, materials to be recycled, and materials to be disposed of as solid waste, and dangerous waste.

2. General material handling methods, including segregation and sorting, and placing solid waste into designated containers, on-site storage, and any special procedures for removing and protecting materials.

3. Plan for communicating salvage and recycling requirements on the Project.

4. Dangerous waste identification, accumulation, and disposal management procedures.

5. Materials to be sorted, salvaged, and recycled:
   a. At a minimum, the following types of materials shall be sorted and included for recycling:
      1) All metals (from banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze);
      2) Beverage containers;
3) Cardboard (from supplies and packaging);
4) Clean wood (all unpainted, untreated wood scrap including pallets and engineered wood);
5) Mixed office paper (including blue prints);
6) Film plastic (from shrink wrap and other packaging, and sheeting used as protection or erosion control); and
7) Plate glass.

b. With the exception of unacceptable waste, all materials not designated for salvage or recycle per Paragraph 1.03(A)(5) above, may be co-mingled and disposed of as waste.

B. Dangerous Waste Management:

1. Contractor is responsible for all dangerous waste generated during the Project shall be identified, accumulated and disposed in accordance with WAC 173-303. Contractor generated dangerous waste must be shipped for disposal within 90 Days of generation.

2. Contractor may accumulate dangerous waste in accordance with WAC 173-303 and Washington Department of Ecology Technical Information Memorandum 94-120, Satellite Accumulation. If Contractor accumulates dangerous waste in volume greater than 55 gallons or acutely hazardous waste in a volume greater than one quart, Contractor shall establish and operate a “90-Day” accumulation area in accordance with WAC 173-303.

3. Contractor shall dispose dangerous waste only through vendor(s) approved by Owner. Contractor shall arrange all dangerous waste shipments. Utilization of the vendor and facilities included in the State of Washington Hazardous Waste Disposal contract is authorized. Any other proposed vendor(s) and/or facilities are subject to audit by Owner, prior to utilization. Contractor shall pay for said audits. Contractor shall coordinate with Owner’s Environmental Health & Safety (EH&S) Department for transportation and disposal of all Project generated dangerous waste. EH&S will sign all Uniform Hazardous Waste Manifests.

C. Final Waste Management Plan: Once Owner has reviewed the draft Waste Management Plan and responded with comments or corrections, Contractor shall submit a final plan within 14 Days.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 WASTE CONTAINMENT

Owner will provide and service containers for all wastes, with the exception of
unacceptable waste. This service is at no cost to Contractor.

A. Contractor shall provide separate waste containers for and properly dispose of all unacceptable waste, including dangerous waste, in accordance with applicable law.

3.02 CONTAMINATION OF WASTE

A. Contractor shall take extraordinary care to ensure construction wastes are properly sorted, segregated, and placed within the correct containers.

B. Should any waste containers designated for salvage, recycle, or general disposal be cross-contaminated with dangerous or unacceptable waste, Contractor shall pay all costs of legally disposing the contaminated waste.

C. Co-mingling of waste:

1. Should designated recycle or salvage containers become cross contaminated with other than unacceptable wastes, the Contract Sum shall be reduced at a rate of $500.00 per cubic yard size of container. (i.e. a partially full, co-mingled 3 yard container would result in a charge to Contractor of $1,500.00).

D. Project progress meetings shall include review of construction waste management as an agenda item.

END OF SECTION 01 74 19
PART 1 GENERAL

1.01 PURPOSE

A. Contractor shall submit advance/draft electronic of Operation & Maintenance manuals (O&Ms) at or immediately following the 80% Application for Payment. Subsequent Applications for Payment will not be processed until an advance/draft copy of the O&Ms has been submitted for review.

B. Contractor shall submit a final draft of O&Ms on or before Substantial Completion and provide training of Owner’s staff in the operation and maintenance of the facility.

1.02 PROCEDURES

A. Together with a request for Substantial Completion, Contractor shall provide one revised draft electronic version of O&Ms.

B. To achieve Final Completion, Contractor shall submit:

1. Two final copies of O&Ms;
2. A text-searchable PDF electronic file of the O&Ms;
3. Separate Test & Balance Reports and Telecommunications Test Reports in an independent three ring binder;
4. A text-searchable PDF electronic file of the Test & Balance Reports and Telecommunications Test Reports.

PART 2 PRODUCTS

2.01 O&M MANUAL MATERIALS

A. O&M Manuals shall be bound into 3-ring binders (three sets) with the cover and spine to be composed and laid out per the cover page template on the last page of this Section.

B. The maximum thickness for each manual shall be 3”. Multiple manual sets shall be organized by:

1. General,
2. Vertical Transportation,
3. Mechanical,
4. Electrical, and
5. Other (Laboratory Equipment, Special Equipment, etc.).
C. Paper shall be 8 1/2" x 11", 20 lb. white paper. Divisions within volumes are to be accomplished and annotated with permanently imprinted tabs (insertable indexes are not permitted) which indicate Specification Section numbers only.

D. Copies must be legible. Facsimile transmission copies are not acceptable. Original equipment manufacturer (OEM) printed material is preferred.

PART 3 EXECUTION

3.01 PRODUCTION

A. O&Ms are to be as follows:

1. Table of Contents – a listing of the contents of all volumes. This table of contents shall be inserted at the beginning of each volume in the set.
   a. Identify Contractor, include name, address, phone and fax number, and provide a contact name.

2. Subcontractor List – a list or spreadsheet, organized by Specification Section, of all suppliers and Subcontractors of all tiers who performed Work on the Project. Include the name, address, phone and fax number of Subcontractor or supplier, the Specification Section, and the description of the Work. When Subcontractors perform Work of more than one Specification Section, provide a separate listing of each Specification Section. This listing shall be at the beginning of volume #1 only.
   a. Written certification from Contractor attesting that no asbestos containing products have been incorporated into the Work.

3. Warranty List – a list or spreadsheet containing Contractor’s one-year correction period obligation and all extended (greater than one-year) warranties, organized by Specification Section that indicates:
   a. Item Description (include here special warranty numbers or codes),
   b. Length of warranty,
   c. Specification Section, and
   d. Contractor’s contact information, followed by physical copies of the Contractor’s one-year correction period obligation and all extended warranties. Note that 1-year warranties from Subcontractors are not to be bound into each volume of the O&Ms. This warranty list and attendant warranties shall be at the beginning of volume #1 only, immediately following the asbestos certification.

4. Provide data as outlined in each specification section.
B. Original equipment manufacturer (OEM) information is required to be a part of all equipment information within the O&Ms.

C. Shop Drawings and product data initially submitted for acceptance are generally not acceptable for O&M use (one notable exception is snow melting cable layout drawing – a manufacturer detailed item). Routine Project components such as asphalt, concrete, pipe, fittings, conduit, etc., are not to be included in O&Ms.

END OF SECTION 01 78 23
(O&M cover and spine data on next page)
PART 1 GENERAL

1.01 PURPOSE AND PROCEDURE

A. Contractor shall submit draft Project Record drawings on or before Substantial Completion. Requests for Substantial Completion will not be considered if submission of Project Record drawings has not occurred.

B. Contractor shall submit final Project Record drawings before Final Completion may be achieved.

PART 2 PRODUCTS

2.01 MATERIALS

A. Project Record drawings are to be red-line markings on original Drawings which clearly indicate the as-built dimensions (both horizontally and vertically) for all installed Work.

B. Identify on Project Record drawings all underground utilities encountered during the Work. Locate these utilities both horizontally and vertically and tie the dimension string(s) back to permanent and visible structures.

C. Clearly label each sheet with the words “PROJECT RECORD DRAWINGS.”

D. Do not affix requests for information (RFIs), change proposals (CCPs) or architectural supplemental instructions (ASIs) to the Project Record drawings. If all or part of a Drawing has been modified, it is acceptable to affix the revised layout over top of the original. However, all dimensions that have been modified are to be red-lined or yellow highlighted.

E. Copies must be legible.

PART 3 EXECUTION

3.01 PRODUCTION

A. During construction, Project Record information will be reviewed not less than monthly concurrent with the monthly review of the draft Application for Payment.

END OF SECTION 01 78 39
PART 1  GENERAL

1.01 DESCRIPTION

A. Owner has set the following indoor air quality requirements for site operations on the Project, within the limits of the Progress Schedule, Contract Sum, and available materials, equipment, products, and services. These include:

1. Protect workers on the site from air quality problems during construction.
2. Prevent indoor air quality problems in the completed facility.
3. Prevent indoor air quality problems in adjacent facilities.

B. To achieve these requirements, Contractor shall develop an “Indoor Air Quality (IAQ) Management Plan” for this Project.

C. Comply with current LEED Reference Guide.

1.02 IAQ MANAGEMENT PLAN MANAGER

A. Contractor shall identify an IAQ Management Plan Manager who will be responsible to monitor construction activities to ensure that the requirements of the IAQ Management Plan are met. The IAQ Manager may also be the Contractor’s Quality Control Manager. The IAQ Manager will be responsible for the following:

1. Draft and submit the IAQ Management Plan to Owner for acceptance.
3. Conduct meetings as required with all participants in the construction process to communicate the IAQ procedures and understand the importance of the requirements of the IAQ Management Plan. If necessary, post signs to ensure workers’ safety.
4. Identify IAQ problems and institute remedial action as necessary.
5. Be present at regular Progress Meetings, as appropriate, and be responsible for providing a monthly written status report as it relates to IAQ for the Project and be prepared to discuss construction related IAQ procedures currently in effect.

1.03 IAQ MANAGEMENT PLAN

A. Draft IAQ Management Plan: Submit a Draft IAQ Management Plan within 14 Days after Notice to Proceed, which contains preliminary descriptions of the following procedures for which Contractor is responsible (initial installation, verification that element(s) are in place, daily inspection and upkeep, and removal):
1. List of indoor air quality protective measures to be instituted at Project site, including HVAC system protection during construction and any other control measure applicable to the Project;

2. A plan and schedule for inspection and maintenance of indoor air quality measures;

3. Installation sequencing for porous materials, including paint;

4. Measures to be employed to protect ducts and stored on-site or installed absorptive materials from moisture damage;

5. Type of filtration media used during construction;

6. Cleanup of contaminated components after construction.

B. The Draft IAQ Management Plan shall meet or exceed the minimum requirements of the current Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines.

C. Final IAQ Management Plan: After review and comment on the “Draft IAQ Management Plan,” Contractor shall submit a “Final IAQ Management Plan” that includes the finalized written procedures for above noted elements. This final plan shall address all review comments noted on the draft submittal and be submitted prior to the commencement of construction.

1.04 BUILDING FLUSH OUT SCHEDULE – NOT USED

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 IAQ MANAGEMENT PLAN IMPLEMENTATION

A. Contractor shall implement and maintain the approved IAQ Management Plan for the duration of the Project and update procedures at any time due to unanticipated building conditions. Contractor shall:

1. Use temporary filtration media during construction to protect HVAC at each return air grille; filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 8 as determined by ASHRAE 52.2 - 1999. Isolate the return side of the HVAC system from the surrounding environment as much as possible. Return side shall have the heaviest Work areas dampered off and all return system openings sealed with plastic. Return side shall be shut down and sealed whenever possible.

2. Avoid the use of products, materials and operations that would cause IAQ problems or concerns.

3. Protect the ventilation system components (equipment and ductwork) from contamination, and provide cleaning of the ventilation components,
including ductwork exposed to contamination during construction. Protect during transit and installation.

4. Provide ventilation as may be necessary to protect workers’ health and avoid the accumulation of volatile compounds, dust and other harmful airborne contamination.

5. Provide weekly reports and photographs of construction IAQ management measures such as protection of ducts and stored or installed absorptive materials. In each report, describe and illustrate IAQ measures (installation, effectiveness, upkeep, etc.) during construction along with a description of the SMACNA approach employed.

6. Provide data sheets of filtration media used during construction and installed prior to building occupancy.

7. During installation of carpet, resilient flooring, paints, furnishings, and other VOC emitting products, provide supplemental (spot) ventilation for at least 72 hours after Work is completed and describe these activities in the weekly reports.

B. Contractor shall conduct regular inspection and maintenance of indoor air quality measures, including ventilation system protection and ventilation rate.

C. Contractor shall use low-toxic cleaning supplies for surfaces and equipment.

D. When dry sanding for gypsum board assemblies, Contractor shall provide the following protection:
   1. Isolate the space;
   2. Provide plastic sheet separation during sanding;
   3. Close and seal all air system devices and ductwork; and
   4. Sequence the Work to avoid contamination of other spaces with gypsum dust.

3.02 VENTILATION OF CONSTRUCTION FUMES

A. When hazardous chemicals, mineral-spirit based paints, adhesives, or other similar materials are used, the Contractor shall exhaust toxic, noxious, or odor producing fumes from the building in a manner approved by Owner. Contractor’s method of exhaust shall ensure the safety of building occupants and pedestrians in and around the Project site. All supply and return air ductwork within the construction area shall be capped air-tight to prevent distribution of fumes.

3.03 COMPLETION PROCEDURES

A. Remove all IAQ measures as well as signs, framing, and supports at completion of Project.

END OF SECTION 01 81 19
PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. The work includes selective demolition within the existing building.
   2. The Contractor is responsible for determining scope and extent of demolition in order to allow for installation of the work shown on the Drawings. Specific demolition notes are indicated on the Drawings that are in addition to the Contractor’s required scope to accommodate the new work.
   3. Contractor is warned that there may be unknown alterations and unforeseen or unknown conditions above existing ceilings, behind existing wall furring, below concrete floor slabs, and within existing walls, and partitions.
   4. Refer to Mechanical and Electrical drawings and specifications for additional requirements.
   5. Demolition work includes protection of existing construction to remain, as well as removal and disposal of demolished materials.

B. Salvage: Owner will mark and retain salvageable items as determined with the Contractor.

C. Related Sections:
   1. 01 35 33 – Infection Control.
   2. 01 50 00 – Temporary Facilities and Controls: Requirements for fire prevention, dust and noise control, security, barriers, etc.
   3. 01 73 29 – Cutting and Patching.
   4. Divisions 22 and 26: Demolition, removal and disposition of pipes, conduits, ducts, equipment and other mechanical and electrical work is specified in these Divisions.

1.02 REFERENCES

A. American National Standards Institute (ANSI):
   1. A10.6 - Safety Requirements for Demolition.
   2. A10.18 - Safety Requirements for Temporary Floor and Wall Openings, Flat Roofs, Stairs, Railings and Toeboards.

1.03 ASBESTOS AND PCB

A. Hazardous Materials: Refer to Section 01 11 01.
1.04 SUBMITTALS

A. Schedule: Submit proposed methods and sequence of operations for selective demolition prior to preconstruction meeting. Coordinate all times with the Owner and obtain approval of schedule before commencing. Include the following:

1. Detailed sequence of demolition and removal of work to ensure Owner time to vacate areas and allow Owner continuing occupation of portions of existing building.
2. Indicate any temporary suspension of services and duration of these times.
3. Coordination for shut-off, capping, and continuation of utility services as required.
4. Details for dust and noise protection.

B. Photo Survey: As specified in paragraph 3.1.

1.05 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies: Comply with applicable requirements of rules, regulations, laws, ordinances of governing authorities.

B. Cutting and Patching: All selective demolition work that requires cutting and patching shall conform to the requirements specified in Section 01 73 29 Cutting and Patching. Do not cut and patch work exposed on the building exterior or in it's occupied spaces in a manner that would, in the Architect's opinion, result in lessening the building aesthetic qualities. Do not cut and patch work in a manner that would result in substantial visual evidence of cut and patch work.

1.06 PROJECT CONDITIONS

A. Occupancy: Owner will be continuously occupying areas of the building immediately adjacent to areas of selective demolition. Conduct demolition work in a manner that will minimize need for disruption of Owner's normal operations.

B. Existing Building Exits: Contractor's materials and activities shall not block any exit or impair floor-to-floor separation while the building is occupied.

C. Partial Removal: Items of salvaged value to Contractor may be removed from structure as work progresses. Salvaged items must be transported from site as they are removed. Storage of removed items on site will not be permitted.

D. Fire Protection: All practical measures shall be taken to ensure fire protection during all phases of the work. This shall include expediting construction of fire division walls, temporary cross hallway fire stop at the division walls, and securing the building from unauthorized entry. No flammable liquids, welding/cutting equipment, or compressed gases shall be used, except under specific Fire Department Permit and approval from the Owner.
E. Protection: Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition.

1. Provide protective measures as required to ensure free and safe passage of Owner's personnel and general public to and from occupied portions of the building.

2. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.

3. Protect floors with suitable coverings when necessary.

4. Construct temporary dust proof partitions to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dust proof doors and security locks, if required.

5. Remove protections at completion of work and restore effected finishes.

F. Damages: Promptly repair damages caused to adjacent facilities by demolition work at no cost to Owner.

G. Utility Services: Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction and the Owner. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities. Refer to 01 50 00 “Temporary Facilities and Controls” for utility shutdown procedures.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Provide all materials, equipment, tools, and methods required for the completion of demolition work as indicated and specified hereinafter.

PART 3 – EXECUTION

3.01 INSPECTION

A. Prior to commencement of selective demolition work, inspect areas in which work will be performed. Photograph existing conditions of structure, surfaces, equipment or to surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Owner prior to starting.

3.02 PREPARATION

A. Erect and maintain dust-proof partitions and closures as necessary to prevent spread of dust or fumes to occupied portions of the building.
1. Where selective demolition occurs immediately adjacent to occupied portions of the building, construct dust-proof partitions. Refer to Section 01 35 33 “Infection Control” for containment requirements.

3.03 DEMOLITION

A. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated or required.

B. Contractor shall first remove gypsum wallboard or plaster from existing walls to be removed, ceiling tiles, gypsum wallboard or plaster from existing ceilings to be removed to allow inspection of existing plumbing, HVAC ducts and other mechanical and electrical items.

1. After mechanical and electrical items have been uncovered, Contractor shall notify the Owner if there are any questions or if it is unclear as to the future status of these items (i.e. remove, cap or reroute).

C. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw.

D. Where partitions are designated or required to be removed, remove all doors, frames, relites, equipment and associated mechanical and electrical items. Patch floors, walls, columns, and ceilings to remain where they intersect with walls to be removed. Patch, repair, or infill existing suspended ceiling grids that are designated or required to be removed.

E. Remove resilient wall base from walls and columns wherever walls intersect areas scheduled to receive new floor coverings.

F. Remove existing resilient floor tile and sheet vinyl in areas as indicated or required. Existing adhesive must be completely removed. If existing adhesives were cutback or emulsion type asphalt, grind substrate using concrete or terrazzo grinding machines. After grinding, coat floor area using a latex patching material as recommended by new floor covering manufacturer.

G. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner in written, accurate detail. Pending receipt of directive from Owner, rearrange selective demolition schedule as necessary to continue overall job progress without delay.

3.04 REMOVALS

A. Remove debris, rubbish and other materials resulting from demolition operations from building on a daily basis. Transport and legally dispose of material off-site.

END OF SECTION 02 41 00
PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Features:
   1. Concrete mix design
   2. Concrete placement procedures
   3. Concrete finishing
   4. Concrete curing
   5. Repair of surface defects

1.03 REFERENCE STANDARDS

A. The latest versions of the publications listed below form a part of this specification; comply with provisions of these publications except as otherwise shown or specified.

   1. ACI 117 Standard Specification for Tolerances for Concrete
   2. ACI 301 Standard Specifications for Structural Concrete, including other standards referred to in ACI 301, such as ASTM, etc.
      a. ACI 305.1 Standard Specification for Hot Weather Concreting
      b. ACI 306.1 Standard Specification for Cold Weather Concreting
      c. ACI 308.1 Standard Specification for Curing Concrete

B. SUBMITTALS

   1. General: Make submittals in accordance with Section 01 33 00, "Submittal Procedures."
   2. Concrete Mix Design Proportions: Submit concrete mixture proportions and characteristics. Submit the concrete mix design to the local building officials where required. Do not begin concrete production until concrete mix designs have been reviewed and approved. Mix designs shall include proportions of all ingredients, including admixtures added at time of batching or at job site. Include the following:

      a. Specify the method used to determine proposed concrete mix design. Include field test records or trial mix test data used to establish the average compressive strength of the concrete mixture.
b. For admixtures, submit types, brand names, producers, manufacturer's technical data, and certification data.

c. Submit the cement type and certification, fly ash type and certification, water/cementitious materials ratio, and source of water supply.

d. Submit the slump.

e. Submit the air content of freshly mixed concrete.

f. Submit the concrete compressive strength at 7 and 28 days.

3. Curing Methods: Submit written methods, procedures, and products for curing of all concrete.

4. Repair Methods: Submit the proposed methods of repair, along with repair material specification, manufacturer's data on the proposed patching material, and the proposed preparation and application procedure.

5. Construction Joints: Submit information for acceptance of proposed location and treatment of construction joints proposed but not indicated on the Construction Documents.

6. Qualification of Finishers: Submit qualifications of the finishing contractor and the finishers who will perform the Work.

7. Records: Retain records of all 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. Submit copy to Owner's Representative and Building Official.

1.04 QUALITY ASSURANCE

A. The Contractor is responsible for correcting Work that does not conform to the specified requirements, including strength, tolerances, and finishes. The Contractor shall submit the proposed solution for review and approval.

B. Unless otherwise noted, maintain the allowable tolerances in ACI 117.

C. Maintain records verifying materials used are of the specified and accepted types and sizes and are in conformance with the Contract Documents.

D. Special Inspection and Testing: Concrete work is subject to special inspection and testing as specified; notify the Testing Agency at least 48 hours before inspection is required.

E. Concrete Contractor Qualifications: An experienced concrete contractor who has 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.

F. Concrete Producer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C94. Producer must be certified
according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.

1.05 DELIVERY, STORAGE, and HANDLING

A. Cementitious Materials: Store cementitious materials in dry, weather-tight buildings, bins, or silos that will exclude contaminants.

B. Aggregates: Store and handle aggregate in a manner that will avoid segregation and prevent contamination with other materials or other sizes of aggregates. Store aggregates to drain freely. Do not use aggregates that contain frozen lumps.

C. Admixtures: Protect stored admixtures against contamination, evaporation, or damage. Protect liquid admixtures from freezing and from temperature changes that will adversely affect their characteristics. Store and handle products in a manner to retain original quality. Do not use products stored beyond the manufacturer's recommended shelf life.

D. Delivery of Materials: Deliver site applied materials, such as joint and curing materials, in original factory packaging and unopened containers and protect from damage and contamination.

E. Place concrete within the time limits specified. Concrete shall possess the specified characteristics in the freshly mixed state at the point of placing.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

A. Portland Cement: Portland cement shall conform to ASTM C150, Type I or Type II.

   1. The cement shall be of the same brand and type and from the same plant of manufacture as the cement used in the concrete represented by the submitted field test records or used in the trial mixtures.

B. Aggregate: Aggregates and aggregate grading requirements shall conform to ASTM C33. Aggregates shall be free from any substance that may be deleteriously reactive with the alkalis in the cement in an amount sufficient to cause excessive expansion of the concrete. Aggregates used in concrete shall be obtained from same sources and have the same size ranges as the aggregates used in the concrete represented by submitted historical data or used in trial mixtures.

C. Admixtures: The use of admixtures shall be the responsibility of the Contractor. When more than one admixture is used in the mix, furnish satisfactory evidence to the Architect that the admixtures to be used are compatible in combination with the cement and aggregates. Provide only one brand of each type of
admixture. Admixtures shall be free of calcium chloride and thiocyanate (not more than 0.05% chloride ions). The following types of admixtures are approved:


3. **Water-Reducing Admixture (High Range):** Master Builders "Rheobuild 1000 of Glenium Series," W. R. Grace & Co. "Daracem, Mira, or ADVA Series," Sika "Viscocrete 2100," or approved equal conforming to ASTM C494, Type F.

4. **Retarding Admixture:** Master Builders "Pozzolith Series or Delvo Series," W. R. Grace & Co. "Daratard Series or Recover," Sika "Plastiment ES" or approved equal conforming to ASTM C494, Type B.

5. **Accelerating Admixture:** Master Builders "Pozzolith NC 534 or Pozzutec 20+," W. R. Grace & Co. "Daraset Series, DCI, PolarSet, or Lubricon NCA", Sika "SikaSet NC", or approved equal conforming to ASTM C494, Type C.

6. **Shrinkage Reducing Admixture:** Master Builders "Tetraguard AS20," W.R. Grace & Co. "Eclipse Floor 200 (interior – non-air entrainable) or Eclipse 4500 (exterior – air entrainable)", Sika "Sika Control 40", or approved equal conforming to ASTM C494, Type S.

**D. Water:** Water shall be in conformance with ASTM C94.

### 2.02 FIBER REINFORCEMENT

**A. Synthetic Micro-Fiber:** Monofilament polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches (13 to 38 mm) long.

### 2.03 RELATED MATERIALS

**A. Moisture Retaining Cover:** Use waterproof sheet materials that conform to ASTM C171.

**B. Commercial Bonding Grout and Repair Materials:** Use products in accordance with manufacturer's recommendations. Products include, but are not limited to, the following:

1. Portland-cement mortar modified with a latex acrylic, non-re-emulsifiable bonding agent conforming to ASTM C1059 Type II. Acceptable products include Euclid Chemical Co. "Flex-Con," Dayton Superior "Day-Chem Ad Bond (J-40)," or approved equal.

2. Epoxy mortars and epoxy compounds that are moisture-insensitive during application and after curing and that embody an epoxy binder conforming
to ASTM C881. The type, grade, and class shall be appropriate for the application as specified in ASTM C881.


2.04 PROPORTIONING AND DESIGN REQUIREMENTS OF CONCRETE MIXES

A. Concrete Mixes:

1. Strength Requirements: Compressive strength requirements are indicated on drawings and are based on cylinder tests at indicated age. Concrete made with high-early strength cement shall have a 7-day strength equal to the specified 28-day strength for concrete made with Type III Portland cement.

2. Cement Content for Slabs: Not less than those indicated in ACI 301.

3. Slump: The Contractor shall determine slump. Each concrete mix submitted shall have the slump specified. Slump tolerances shall meet the requirements of ACI 117.

4. Admixtures: Concrete may contain admixtures, such as water reducers, superplasticizers, or set retarding agents to provide special properties to the concrete. When admixtures are specified or required for workability for particular parts of the Work, use the types specified.

5. Chloride Ion: Maximum water soluble chloride ion concentrations in hardened concrete at ages 28 to 42 days contributed from the ingredients, including water, aggregates, cementitious materials and admixtures, shall not exceed a maximum, by weight of cement, of 0.06% for prestressed concrete and 0.30% for other concrete.

6. 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 PREPARATION

A. Do not place concrete until the Owner’s Project Representative approves all required submittals.
3.02 JOINTS

A. Control Joints: Locate construction joints as approved by the Owner’s Project Representative.

3.03 CONCRETE DELIVERY

A. Contractor is responsible for choice of concrete delivery method. For Ready-Mix Concrete, comply with requirements of ASTM C94 and as herein specified.

1. Elapsed time from start of batching at plant to completed discharge at job site shall not exceed 90 minutes or more than 300 revolutions, whichever comes first after introducing mixing water.

2. When air temperature is between 85°F and 90°F, reduce mixing and delivery time from 90 minutes to 75 minutes. When air temperature is above 90°F, reduce mixing and delivery time to 60 minutes.

3. The concrete temperature shall be monitored in the truck. A rise in temperature of 5°F within 10 minutes or less indicates concrete setting has started before discharge and the load shall be rejected.

4. Ready-Mix Concrete: Provide certificate signed by authorized official of supplier with each load of concrete, stating the following:
   a. Time truck left plant
   b. Mix of concrete
   c. Amount of water and cement in mix
   d. Amount and type of admixtures
   e. Time truck is unloaded at site
   f. Additional water amount allowed at the project site
      1) A truck without batch tickets will be rejected.
   g. Control of Mixing Water: Water may be added once to increase the slump of the concrete within the first 15 minutes after the truck arrives at the job-site, provided the following requirements are adhered to:
      1) The specified slump and maximum allowable water/cement ratio is not exceeded.
      2) The Independent Testing Agency is present to monitor the amount of water added to compare with the amount of water added at the plant. Testing Agency shall keep written record of the amount of water added at the job-site to each truckload delivered.
      3) The drum shall be turned an additional 30 revolutions, or more if necessary, until the added water is uniformly mixed into the concrete.
4) Water shall not be added to the batch after the taking of test cylinders, unless new test cylinders are taken at the expense of the Contractor.

5) Do not add water to concrete after adding high-range water-reducing admixtures to mix.

h. Admixtures: Add admixtures within an accuracy of 3%. Where two or more admixtures are used in the same batch, they shall be added separately and must be compatible. Approved admixtures must be added at the appropriate time in strict compliance with manufacturer's directions. Concrete that shows evidence of total collapse or segregation caused by the use of admixtures shall be removed from the site.

3.04 CONCRETE PLACEMENT

A. Pre-Placement Inspection: Before concrete placement operation begins, perform the following procedures:

1. Inspect and complete formwork installation and all reinforcing, and embed items. Notify other crafts to permit installation of their work.

2. Ensure that the reinforcing will be maintained in the proper position during concrete placement operations.

3. Moisten wood forms immediately before placing concrete where form coatings are not used.

4. At topping slabs, thoroughly saturate base slab just prior to placing topping, but do not leave pools of water.

5. Verify all dimensions and elevations.

B. Conveying: Methods of conveying concrete is the responsibility of the Contractor. Convey concrete from mixer to the place of final deposit rapidly by methods that prevent segregation or loss of ingredients and that will ensure the required quality of concrete. Do not use aluminum pipes or chutes. Use acceptable conveying equipment of a size and design that will prevent cold joints from occurring. Clean conveying equipment before each placement.

1. Pumping or Pneumatic Conveying: Use pumping conveying equipment that permits placement rates that avoid cold joints and prevent segregation in discharge of pumped concrete. In addition:

   a. Pipeline shall be steel pipe or heavy-duty flexible hose.

   b. Inside diameter of the pipe shall be at least three times the maximum size of the coarse aggregate.

   c. Distance to be pumped shall not exceed the limits recommended by the pump manufacturer.

   d. Provide continuous supply of concrete to the pump.
e. When pumping is completed, the concrete remaining in the pipeline shall be ejected without contaminating the concrete in place.

2. Cleaning: Do not discharge rinse water into forms or areas to receive concrete.

3. Depositing: Deposit concrete continuously in one layer, or in multiple layers if the fresh concrete is deposited on in-place concrete that is still plastic. Do not deposit fresh concrete on concrete that has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joint as specified. Deposit concrete as near to its final location as practicable to avoid segregation.

a. Re-tamping of concrete that has taken its initial set is not allowed.

3.05 FINISHES FOR UNFORMED SURFACES

A. General: Finish slab surfaces in accordance with one of the finishes noted below, as designated in the Contract Documents. Finish all joints and edges with proper tools as approved.

B. Placement: Place concrete at a rate that allows spreading, straightedging, and darbying or bull floating before bleed water appears. Screed all slabs, topping fills to true levels and slopes. Work surfaces as required to produce specified finish. Do no finishing in areas where water has accumulated; drain and re-screed. In no case use a sprinkling of cement and sand to absorb moisture.

C. Tolerances: Measure floor slabs for slabs-on-grade to verify compliance with the tolerance requirements noted in ETS-LINDGREN drawings. Measure floor finish tolerances within 72 hours after slab finishing and before removal of supporting formwork.

D. Scratch Finish: Place, consolidate, strike off, and level concrete, eliminating high spots and low spots. Roughen the surface with stiff brushes or rakes before the final set. Produce a finish that will meet Moderately flat (Ff flatness = 25) requirements of ACI 117.

E. Cleaning and Profiling for Concrete Slab Installation: Mechanically remove all loose or weak concrete, dirt, debris and any contaminants that could act as a bond breaker, by bead blasting. Do not use chemicals to prepare the substrate, including acid etching, sweeping compounds, solvents or adhesive removers.

1. The prepared concrete must have an ICRI concrete surface profile of 3 and a maximum of 5 (CSP #3-CSP #5). Continue to shot or bead blast until required CSP is achieved.

2. If the concrete profile is greater than CSP #5, use a grinder to eliminate high spots prior to shot or bead blasting.
3. Thoroughly vacuum to remove all loose material. Concrete must be clean, sound and solid prior to proceeding with the installation of Concrete Slab.

3.06 CONCRETE CURING AND PROTECTION

A. General: Cure concrete in accordance with the Curing Methods noted below for a minimum of 7 days after placement. Cure high-early strength concrete for a minimum of 3 days after placement. Alternatively, moisture retention measures may be terminated when any of the following criteria are met:

1. Tests made on at least two cylinders kept adjacent to the structure and cured by the same methods as the structure indicate 70% of f’c, as determined in accordance with ASTM C39, has been attained.

2. The compressive strength of laboratory-cured cylinders, representative of the in-place concrete, exceeds 85% f’c, provided the temperature of the in-place concrete has been maintained at 50°F or higher during curing.

3. Strength of concrete reaches f’c as determined by accepted nondestructive test methods.

   a. Protection: Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

3.07 CONCRETE SURFACE REPAIRS

A. General: All surface defects shall be reported to the Architect. Remove and replace concrete having defective surfaces if defects cannot be repaired to the satisfaction of the Architect.

B. Repair of Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins, stains, and other discolorations that cannot be removed by cleaning.

C. Repair of Unformed Surfaces: 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. Repair finished unformed surfaces that contain defects that affect durability of concrete.

2. 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.

3. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days. Depth or removal shall not exceed 1/4 inch without scanning the affected area to verify required concrete cover will be maintained over reinforcing, post-tensioning tendons, or other embedment.
4. 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. Proprietary patching compounds may be used when acceptable to the Architect.

D. Site-Mixed Repair Materials:

1. Bonding Grout: Mix approximately 1 part cement and 1 part fine sand with water to the consistency of thick cream.

2. Repair Mortar: Mix repair mortar using the same materials as concrete to be patched with no coarse aggregate. Do not use more than 1 part cement to 2-1/2 parts sand by damp loose volume.
   a. For repairs in exposed concrete, make a trial batch and check color compatibility of repair material with surrounding concrete. Blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding.
   b. Use repair mortar at a stiff consistency with no more mixing water than is necessary for handling and placing. Mix repair mortar and manipulate the mortar frequently with a trowel without adding water.

3. Commercial Repair Products: Acceptable commercial repair products other than site-mixed repair materials may be used for repair, as specified in Part 2. Use repair products in accordance with manufacturer's recommendations.

END OF SECTION 03 30 00
PART 1 - GENERAL

1.01 SUMMARY
A. Section Includes: Cementitious concrete floor leveling compound.

1.02 ACTION SUBMITTALS
A. Product Data: For each type of product indicated.

1.03 INFORMATIONAL SUBMITTALS
A. Field quality-control test reports.

1.04 QUALITY ASSURANCE
A. Installer: Company specializing in installing work of this Section and certified in writing by the underlayment manufacturer and supplier.

1.05 DELIVERY, STORAGE, AND HANDLING
A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage, mixing with other components, and application.
B. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

1.06 PROJECT CONDITIONS
A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting concrete floor topping performance.
B. Close areas to traffic during topping application and, after application, for time period recommended in writing by manufacturer.

PART 2 - PRODUCTS

2.01 LEVELING COMPOUND
A. Factory-prepared and dry-packaged cementitious underlayment material capable of application from a feather edge to one half inch (1/2") thickness over existing, prepared concrete floor slab.
2.02 RELATED MATERIALS
   A. Underlayment Moisture Control System for installation below Concrete Floor Leveling Compound:

2.03 Basis of Design Product: Ardex MC Rapid moisture control system, no substitutions.
   A. MIXING
      1. Floor Leveling Compound: Mix materials and water according to manufacturer’s written instructions. Do not overwater.

PART 3 - EXECUTION

3.01 EXAMINATION
   A. Examine substrates, with Installer present, for conditions affecting performance of concrete floor topping.
   B. Verify that base slabs are visibly dry and free of moisture. Test for capillary moisture by the plastic sheet method according to ASTM D 4263.
   C. Proceed with application only after unsatisfactory conditions have been corrected.

3.02 PREPARATION
   A. Bead Blast existing structural slab after existing topping slab has been removed.
   B. Prepare and clean existing base slabs according to concrete floor topping manufacturer’s written instructions. Fill voids, cracks, and cavities in base slabs. Remove contaminants from existing concrete that might impair bond of floor topping.
   C. Thoroughly clean extraneous material such as dirt, loose chips, and dust from concrete surface. If compressed air is used, it shall be free of oil.

3.03 APPLICATION
   A. Apply primer mixed according to manufacturer’s written instructions.
   B. Start floor underlayment application in presence of manufacturer's technical representative.
      1. Place underlayment continuously in a single layer, consolidating to achieve tight contact with bonding surface.
   C. See ETS-Lindgren Drawings for Floor Levelness Requirements.
D. Coat face of construction joint with epoxy adhesive at locations where concrete floor topping is placed against hardened or partially hardened concrete floor topping.

3.03 CURING
A. Cure installation per manufacturer’s recommendations.

3.02 REPAIRS
A. Defective Underlayment: Repair and patch defective concrete floor underlayment areas, including areas that have not bonded to concrete substrate as directed by Owner’s Project Representative.

3.03 CLEAN UP
A. Maintain a clean, orderly work area.
B. Clean excess material from surrounding areas immediately.
C. Protect adjacent surfaces that may be damaged, with drop cloths, waterproof paper, or other means to maintain surfaces free of material splashes, water, and debris.

END OF SECTION 03 53 00
PART 1  GENERAL

1.01  SUMMARY

A. Section Includes:
   1. Structural steel.
   2. Metal framing system components.

B. General Structural Notes on Drawings also apply to work of this Section.

C. Field Welding is subject to strict compliance with WSU Safety and Fire Watch requirements. Coordinate work with Owner’s Project Representative.

1.02  SUBMITTALS

A. Comply with requirements of Section 01 33 00 'Submittal Procedures'.

B. Shop Drawings: Show fabrication of structural-steel components.
   1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
   2. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
   3. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pre-tensioned and slip-critical high-strength bolted connections.

C. Qualification Data: For qualified installer and fabricator.

D. Welding certificates.

E. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

F. Mill test reports for structural steel, including chemical and physical properties.

G. Product Test Reports: For the following:
   1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
   2. Shop primers.

H. Source quality-control reports.
1.03 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.

B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

D. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.
2. AISC 360.
3. RCSC’s "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.04 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and re-lubricate bolts and nuts that become dry or rusty before use.

1.05 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.
PART 2 PRODUCTS

2.01 STRUCTURAL-STEEL MATERIALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25%.

B. Channels, Angles, Shapes: ASTM A 36/A 36M, Fy=36 KSI

C. Plate and Bar: ASTM A 36/A 36M.

D. Hollow Structural Sections (HSS): ASTM A500 Grade B, Fy=46 KSI.

E. Welding Electrodes: Comply with AWS requirements.

2.02 THREADED RODS

A. ASTM F1554, Grade 36 or 55.

2.03 BOLTS, CONNECTORS, AND ANCHORS

A. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH (ASTM A 563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers.

1. Finish: Hot-dip zinc coating.


2.04 PRIMER

A. Primer: Fabricator’s standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer complying with Master Painters Institute (MPI) Approved Products List #79 and compatible with topcoat.

2.05 GROUT

A. ASTM C1107-00, premixed non shrink type. 5,000 PSI Minimum, 7-day cure strength.

1. Masterflow 928 High-precision mineral-aggregate grout by BASF,

2. WR Meadows 1428 HP Mineral Aggregate-Based Precision Grout

3. or Approved Equal.
2.06 METAL STRUT CHANNEL SYSTEM

A. Products: Subject to compliance with requirements, provide one of the following as indicated on the Drawings:

1. Metal Framing Strut Channel System and Accessories

B. Steel: Pre-Galvanized; 12GA (2.7 mm), 14GA (1.9 mm) and 16 GA (1.5 mm). ASTM A653 SS GR 33.

C. Finishes: Hot-dipped Galvanized (HG) conforming to ASTM A123 or A153.

2.07 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.

1. Mark and match-mark materials for field assembly.
2. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

2.08 SHOP CONNECTIONS

A. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.09 SHOP PRIMING

A. Shop prime steel surfaces except the following:
1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).

2. Surfaces to be field welded.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 3, "Power Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.010 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

2. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

B. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.

2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.


4. Radiographic Inspection: ASTM E 94.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for
compliance with requirements.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

3.03 ERECTION

A. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

B. Splice members only where indicated.

C. Do not use thermal cutting during erection.

D. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.04 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.05 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted Connections: Bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1/D1.1M.

1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
   a. Liquid Penetrant Inspection: ASTM E 165.
   b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
   c. Ultrasonic Inspection: ASTM E 164.
   d. Radiographic Inspection: ASTM E 94.

D. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

END OF SECTION 05 55 00
PART 1 – GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Solid Surface finish casework
   2. Shelving and Hardware

1.02 SUBMITTALS

A. Product Data: For solid surfacing and high-pressure decorative laminate, adhesive for bonding plastic laminate and finishing materials and processes, integral sinks.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, integral sinks and other components.
   1. Show details.
   2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
   3. Show locations and sizes of cutouts and holes for equipment and other items installed in architectural casework.

C. Samples for Verification:
   1. Plastic laminates, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish.
   2. Solid-surfacing materials, 6 inches (150 mm) square.

D. Casework Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

E. Qualification Data: For Installer and fabricator.

1.03 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project.

B. Installer Qualifications: Fabricator of products.

C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that
the material bearing the classification marking is representative of the material tested.

D. Quality Standard: Unless otherwise indicated, comply with AWI’s "Architectural Woodwork Quality Standards" for grades of interior architectural casework indicated for construction, finishes, installation, and other requirements.

1. Provide AWI Quality Certification Program labels and certificates indicating that casework, including installation, complies with requirements of grades specified.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver casework until painting and similar operations that could damage casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in Section 01 50 00 - “Temporary Facilities and Controls”.

1.05 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install casework until wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where casework is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before being enclosed, and indicate measurements on Shop Drawings.

2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating casework without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.06 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural casework can be supported and installed as indicated.

1.07 WARRANTY

A. Provide manufacturer’s warranty against defects in materials.
B. Warranty shall provide material and labor to replace or repair defective materials and installations at the discretion of Owner’s Project Representative.

PART 2 – PRODUCTS

2.01 MATERIALS

A. General: Provide materials that comply with requirements of AWI's quality standard for each type of casework and quality grade specified, unless otherwise indicated.

B. Wood Products: Comply with the following:


C. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

1. Use treated materials that comply with requirements of referenced caseworking standard. Do not use materials that are warped, discolored, or otherwise defective.

2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.

3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

4. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

a. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.

b. For items indicated to receive a stained or natural finish, use organic resin chemical formulation.

c. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a caseworking shop certified by testing and inspecting agency.

d. Mill lumber before treatment and implement special procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other
causes, marring, and other defects affecting appearance of treated casework.

D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by casework quality standard.
   1. Manufacturers: Subject to compliance with requirements, provide high-pressure decorative laminates by one of the following:
      a. Wilsonart, Inc.
      b. Nevamar
      c. Formica
      d. Or Approved Equal
   2. Colors and Patterns: As indicated in Drawings.

E. Solid-Surfacing Material: Homogeneous solid sheets or acrylic or polyester resin over continuous substrate complying with ISSFA-2 and NEMA LD3. Non-porous, no surface coating, laminated or of composite construction with through body colors capable of being worked and repaired using standard woodworking tools, meeting ANSI Z124.3 or ANSI Z124.6.
   1. Manufacturers: Subject to compliance with requirements, provide Solid Surface Materials by one of the following:
      a. Corian by DuPont
      b. Wilsonart Solid Surface
      c. Avonite
      d. Or Approved Equal
   2. Colors and Patterns: As indicated in Drawings.

F. CABINET HARDWARE AND ACCESSORIES
   1. General: Provide cabinet hardware and accessory materials that are non-ferrous, commercial grade stainless steel.
   2. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening, self-closing.
   4. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081; stainless steel or brass.
   5. Door Locks: BHMA A156.11, E07121; stainless steel or brass.

G. MISCELLANEOUS MATERIALS
   1. Adhesives, General: Do not use adhesives that contain urea formaldehyde.
2. **VOC Limits for Installation Adhesives and Glues:** Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   a. Wood Glues: 30 g/L.
   b. Contact Adhesive: 250 g/L.

3. **Adhesive for Bonding Plastic Laminate:** unpigmented contact cement.

4. **Adhesive for Bonding Edges:** Hot-melt adhesive.

5. **Adhesive for Bonding Solid Surface Materials:** Manufacturer's standard one or two part adhesive kit to create inconspicuous, nonporous joints.

### H. FABRICATION, GENERAL

a. **Interior Casework Grade:** Unless otherwise indicated, provide Custom-grade interior casework complying with referenced quality standard.

b. **Wood Moisture Content:** Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

c. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

d. **Fabricate casework to dimensions, profiles, and details indicated.**

e. **Complete fabrication, including assembly, finishing, and hardware application,** to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

f. **Trial fit assemblies at fabrication shop that cannot be shipped completely assembled.** Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

### I. PLASTIC-LAMINATE AND SOLID SURFACE CABINETS

a. **Grade:** Custom.

b. **AWI Type of Cabinet Construction:** Flush overlay.

c. **AWI Construction Type:** Type I, multiple self-supporting units rigidly joined together.

d. **AWI Door and Drawer Front Style:** Flush overlay.

e. **Reveal Dimension:** 1/4 inch (13 mm).

f. **Cladding for Exposed Surfaces:** Solid Surface

g. **Edges:** PVC T-Mold, matching laminate in color, pattern, and finish.
h. Materials for Semiexposed Surfaces:

J. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

   1. As selected by Owner's Project Representative from Manufacturer's full range of solid colors, matte finish.

PART 3 – EXECUTION

3.01 PREPARATION

   A. Before installation, condition casework to average prevailing humidity conditions in installation areas.

   B. Before installing architectural casework, examine shop-fabricated work for completion and complete work as required, including removal of packing.

3.02 INSTALLATION

   A. Grade: Install casework to comply with requirements for the same grade specified in Part 2 for fabrication of type of casework involved.

   B. Assemble casework and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.

   C. Install casework level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).

      1. Install blocking in wall at cabinet locations as shown in Drawings

   D. Scribe and cut casework to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

   E. Anchor casework to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed fastening, countersunk and filled flush with casework and matching final finish if transparent finish is indicated.

   F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
G. ADJUSTING AND CLEANING

1. Repair damaged and defective work, where possible, to eliminate functional and visual defects; where not possible to repair, replace. Adjust joinery for uniform appearance.

2. Clean, lubricate, and adjust hardware.

3. Clean exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06 40 23
PART 1 - GENERAL

1.01 SUMMARY

A. SECTION INCLUDES:
   1. Flashing and repair of existing membrane roofing as required at enlarged cryo-vent penetration. Match existing installation.
   2. Accessories.

B. RELATED SECTIONS:
   1. Section 07 62 00 – Sheet Metal Flashing and Trim.

C. ROOF TERMINOLOGY:
   1. See ASTM D 1079 and glossary of NRCA’s "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing repair work in this Section.

1.02 PERFORMANCE REQUIREMENTS

A. General Performance: 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.

B. Material Compatibility: Provide roofing materials that are compatible with existing materials and with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

C. Exterior Fire Test Exposure: Roof system shall maintain the existing UL, FM or Intertek WH-ETL Class A rating for roof systems.

1.03 ACTION SUBMITTALS

A. Comply with requirements of Section 01 33 00 'Submittal Procedures'.

B. Product Data: For each type of product required to modify roof at new or modified penetration.
   1. Shop Drawings for roofing repairs. Provide plans, details, and attachments to other work as required for patching and repair.
1.04 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer and Manufacturer.

B. Warranties: Match existing Roofing Warranty.

C. Verification Samples: For each modified bituminous membrane ply product specified, two samples, minimum size 6 inches square representing match to existing product and color.

D. Manufacturer’s Certificates: Provide to certify products meet or exceed specified requirements.

1.05 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

B. Perform work in accordance with NRCA Roofing and Waterproofing Manual.

1.07 DELIVERY STORAGE AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer’s name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

1.08 COODINATION

A. Coordinate Work with installation of cryo-vent and associated materials and construction, including membrane and metal flashings and copings.
1.09 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.010 WARRANTY

A. Special Project Warranty: Match Warranty of Existing Roofing Installation. Submit roofing Installer's warranty signed by Installer, covering the Work of this Section, including all components of membrane roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards and vapor retarders for the following warranty period:

B. Warranty Period: Two (2) years from date of Substantial Completion.

1.011 PREINSTALLATION MEETINGS

A. Convene a minimum of two weeks prior to commencing Work of this Section.

B. Review installation procedures and coordination required with related Work.

C. Inspect and make notes of job conditions prior to installation.

D. Record minutes of Conference and provide copies to all present and Owner’s Project Representative.

E. Identify all outstanding issues in writing, designating the responsible party for follow up action and timetable for completion.

F. Installation or roofing system shall not begin until all outstanding issues are resolved to the satisfaction of Owner’s Project Representative.

PART 2 - PRODUCTS

2.01 ROOFING MATERIALS

A. Match existing flashing and roofing materials and installation.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
1. Verify that roof penetrations are in place and curbs are set and braced and that vent pipe is securely installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Prime decks where required in accordance with Manufacturer requirements and recommendations.

3.03 INSTALLATION, GENERAL

A. Install membranes and flashings and counter flashings in accordance with Manufacturer's instructions and recommendations of National Roofing Contractors Association Roofing and Waterproofing Manual and applicable codes.

B. Avoid installation of membranes at temperatures lower than 40 degrees F.

C. Match existing vent flashing details for installation elsewhere on the building.

3.04 INSTALLATION OF ROOF SYSTEM

A. Base, Flashing Base and Cap Pies: Cut base sheets, lap and install with interply adhesive per Manufacturer's instructions. Shingle base sheets uniformly and as required to shed water.

B. Metal work: Provide metal flashings, counter flashings, parapet coping and equipment curb flashings where required by Roofing Manufacturer for a warranted installation, whether indicated on Drawings or not.

   1. Fabricate and install in accordance with SMACNA “Architectural Sheet Metal Manual” and/or NRCA Roofing Waterproofing Manual.

C. Surface Coatings: Apply roof coating primer and finish coats in strict conformance with Manufacturer’s procedures.

3.05 CLEANING

A. Clean up and remove daily from site all wrappings, empty containers, paper, loose material and other debris.
B. Remove markings from finished surfaces.

C. Repair or replace damaged or disfigured finishes caused by roofing work.

3.06 PROTECTION

A. Provide traffic ways, barriers, fences, guards, rails, enclosures, chutes and other protections in compliance with State and Federal regulations throughout the course of the work and as required.

B. Protect exposed, finished wall and ground surfaces at all times.

3.07 FIELD QUALITY CONTROL

A. Inspections: Owner’s Project Representative shall be on site during roofing work.

B. Issue warranty upon acceptance of installation by Owner’s Project Representative.

END OF SECTION 07 55 52
PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items.
B. Flashing and counter-flashing

1.02 RELATED REQUIREMENTS

A. 07 25 26 - Air and Water-Resistant Barriers: for components attaching to flashing and trim.
B. 07 92 00 - Joint Sealers.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Review preparation and installation procedures and coordinating and scheduling required with related work.
B. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, material incompatibility, availability of air barrier system materials and components, installer's training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection of continuous air barrier.

1.04 SUBMITTALS

A. Comply with requirements of Section 01 33 00 'Submittal Procedures'.
B. Qualification Data: For fabricator.
C. Product Data: Provide product criteria, characteristics, accessories, jointing and seaming methods, and termination conditions.
D. Shop Drawings: Indicate material profile, jointing locations, jointing details, fastening methods, flashings, terminations, and installation details.
   1. Include details interacting with air and water resistive barriers and joint sealants.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualification: Company specializing in the manufacture of work specified in this section with minimum 5 years' experience.
1. Certified member in good standing in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details.

B. Fabricators Qualifications: Company specializing in performing the work of this Section with minimum 5 years’ experience.

1.06 DELIVERY STORAGE AND HANDLING

A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.

1.07 WARRANTY

A. Manufacturer’s Warranty: Correct defective work within a 20-year period after Substantial Completion for degradation of metal finish.

PART 2 - PRODUCTS

2.01 DESCRIPTION

A. Sheet metal including stainless steel, and aluminum fabricated into items such as flashings, copings, and counterflashings.

2.02 PERFORMANCE AND DESIGN CRITERIA

A. ANSI/SPRI ES-1 and all applicable FM 1-49 standards for design, fabrication and installation.

B. Design Sheet metal flashing and trim assemblies to 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 that does not rattle, leak, or loosen, and will remain watertight.

2.03 MATERIALS

A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating or AZ50 coating; minimum 0.02 inch (0.6 mm) thick base metal, shop pre-coated with PVDF coating.

1. Fluoropolymer Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.

2. Color: As selected by County’s Project Representative to match adjacent metal siding or existing building materials.

D. Stainless Steel: for all other uses: ASTM A 666 Type 304, rollable temper, 0.018 inch (0.46 mm) thick; smooth No. 4 finish.
2.4 FABRICATION

A. Fabricate metal flashings and sheet metal work other than aluminum in accordance with applicable SMACNA Architectural Sheet Metal Manual.

B. Form joints between lengths of flashing sections with laps and embed two beads of elastomeric sealant at each side of joint.
   1. Use prefabricated corner metal flashing with soldered joints at change in direction (corners). Prefabricated corner metal flashing to extend 12 inches at each side of wall. At moving joints, use sealed interlocking hooked seams.
   2. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal and sealant.

C. All exposed or visible metal flashing and trim to be finished in selected color as indicated including exposed rear faces of end dams, joints, etc. No exposed or visible steel or aluminum flashing work to be unfinished.

D. Fabricate custom flashing details and saddles to minimize solder joints.

E. Install sealant at flashing joints and laps.

2.5 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

B. Flexible Flashing:
   1. For use under metal copings and flashings use high temperature type.

C. Sealant: As specified in Section 07 92 00 - Joint Sealers.

D. Fasteners:

E. Sheet Steel:
   1. Steel pan head screws with fine thread for metal. Self-tapping or self-drilling.
      a. #8 x ½ inch (minimum) long stainless steel suitable for metal flashing application. Stainless to be 300 Series when exposed otherwise 300 or 400 Series is acceptable.
      b. For exposed conditions use pan head stainless steel screws, with neoprene washer, heads colored to match flashing.
PART 3 - EXECUTION

3.1 EXAMINATION
   A. Verify existing conditions meet the manufacturer's requirements before starting work.

3.2 PREPARATION
   A. Verify existing conditions meet the manufacturer's requirements before starting work.

3.3 INSTALLATION
   A. Install work of this section in accordance with: Construction Documents, reviewed shop drawings, manufacturers' installation instruction, SMACNA Architectural Sheet Metal Manual and Aluminum Sheet Metal Work on Building Construction.
   B. Use concealed fasteners except where approved before installation.
   C. Provide underlay sheet metal as required. Secure in place and lap underlayment joints 4 inch minimum.
   D. Counter-flash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using standing seams forming tight fit over hook strips.
   E. Lock end joints and seal with sealant.
   F. Fit flashings tight in place. Provide for thermal expansion. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
   G. Solder metal joints for full metal surface contact. After soldering, wash metal clean and neutralizing solution and rinse with water.

3.4 PROTECTION
   A. Protect installed work as required by the manufacturer to maintain product performance, design criteria and warranty.

END OF SECTION 07 62 00
PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Preparing sealant substrate surfaces.

B. Sealant and backing.

1.02 REFERENCES


B. ASTM C834: Specification for latex sealing compounds.

C. ASTM D 1622: Test method for apparent density of rigid cellular plastics.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer’s technical data for each joint sealer product required, including instructions for joint preparation and joint sealer application.

B. Samples for Initial Selection Purposes: Submit manufacturer’s standard bead samples consisting of strips of actual products showing full range of colors available for each product exposed to view.

C. Submit Manufacturer’s Material Safety Data Sheet information and other instructions for the proper use of specified products to avoid adverse health and environmental effects.

1.04 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the products specified in this Section must have a minimum of three years’ experience manufacturing the product.

B. Warranty: The Contractor shall provide a two (2) year watertight warranty from the date of Substantial Completion for the work of this section.

1.05 DELIVERY STORAGE AND HANDLING

A. Deliver materials to project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multi-component materials.

B. Store and handle materials to prevent their deterioration or damage due to moisture, temperature change, contaminates or other causes.
1.06 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with installation of joint sealers when ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturers.

B. Provide notification to Owner ten (10) days prior to use of any sealants or other materials likely to cause odors or fumes.

C. Joint Width Conditions: Do not proceed with installation of joint sealers when joint widths are less than allowed by joint sealer manufacturer for application indicated.

PART 2 - PRODUCTS

2.01 GENERAL

A. General Sealant Performance Requirements:
   1. Provide colors indicated or, if not otherwise indicated, as selected by Owner from manufacturer's standard colors.
   2. Selected materials for compatibility with joint surfaces and other indicated exposures, and except as otherwise indicated select modulus of elasticity and hardness or grade recommended by manufacturer for each application indicated.
   3. Where exposed to foot traffic, select materials of sufficient strength and hardness to withstand traffic without damage or deterioration of sealant.

2.02 ELASTOMERIC SEALANTS

A. One-Component Polyurethane Sealant (1PU-S):
   1. Polyurethane based, one-part elastomeric sealant, complying with ASTM-C-920-79, Type S Grade NS (non-sag), Class 25, unless Grade P recommended by manufacturer for application shown.
      a. "Sonolastic NP-1" by Sonneborn,
      b. "Bostic 1000" by Bostic,
      c. "Dymonic" by Tremco
      d. Or Approved Equal.

B. One-Component Interior Silicone Rubber Sealant: (NpbMr-SR-S):
   1. Silicone rubber-based, one-part elastomeric sealant, complying with ASTM-C-920-79, Type S, Grade NS, Class 25 and FS-S-001543, Class A. Provide Acid, nonporous-bond type, mildew-resistant silicone rubber
sealant (NpbMr-SR-S) where both joint faces are metal, glass, plastic, tile or other non-porous material.

a. "Omni-Plus" by Sonneborn,
b. "Dow 8640" by Dow Corning,
c. "G.E. 1702" by G.E.
d. Or Approved Equal.

C. One-Component Acrylic-Emulsion Caulk (AcEm-C):

1. Acrylic-latex-rubber-modified base, one-part caulk, permanently flexible, nonstaining and nonbleeding and paintable; recommended by manufacturer for general interior exposure, complying with ASTM-C-834-76.
   a. "Sonolac" by Sonneborn,
   b. "Sikaflex 420" by Sika,
   c. "Tremco Acrylic Latex" by Tremco
   d. Or Approved Equal.

D. One-Component Butyl Caulk (Bu-C):

1. Butyl base, one-part caulk, solvent release, non-skinning, black color; recommended by manufacturer for concealed, interior building joints not exposed to touch.
   a. "BC 158" by Pecora,
   b. "Tremco Butyl Caulk" by Tremco,
   c. "Chem Calk 300" by Bostik
   d. Or Approved Equal.

E. One-Component Polyurethane Security Sealant (ST-PU):

1. Silyl-terminated polyurethane based, one-part tamper-resistant elastomeric sealant, complying with ASTM-C-920-98, Type S Grade NS (non-sag), Class 12.5.
   a. "DynaFlex SC" by Pecora Corporation
   b. "Sonoclastic Ultra" by Sonneborne Corporation
   c. Or Approved Equal.

2.03 MISCELLANEOUS MATERIALS

A. Sealant Backing Material, General: 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.
B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material) Type B (bi-cellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Manufacturers:
1. Construction Foam Products; a division of Nomaco, Inc
2. Sonneborn
3. BASF Corporation – Construction Systems
4. Or Approved Equal.

D. Joint Primer/Sealer: Provide type of joint primer/sealer recommended by sealant manufacturer for joint surfaces to be primed or sealed.

E. Bond Breaker Tape (BB-Tp): Polyethylene tape or other plastic tape as recommended by sealant manufacturer to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.

F. Bituminous Cane Fiber Joint Fillers (BF-JF):
1. Provide resilient and non-extruding type premolded bituminous impregnated cane fiberboard units complying with ASTM D-1751, FS HH-F-341F, Type I and AASHTO 213.
   a. "All Cane Joint" by Edoco,
   b. "Horn Fiber Expansion Joint" by A.C. Horn
   c. ‘Fibre Expansion Joint” by WR Meadows
   d. Or Approved equal.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and joint openings are ready to receive work and field measurements are as shown on drawings and recommended by the manufacturer.

B. Beginning of installation means Contractor accepts existing substrate.

3.02 PREPARATION

A. Clean joints in accordance with manufacturer's instructions.
B. Remove loose materials and foreign matter that might impair adhesion of sealant.

C. Verify that joint backing and release tapes are compatible with sealant.

D. Perform preparation in accordance with ASTM C804 for solvent release C790 for latex base sealants.

E. Protect elements surrounding the work of this section from damage or disfiguration.

3.03 INSTALLATION

A. Install sealant in accordance with manufacturer's instructions.

B. Measure joint dimensions and size materials to achieve required width/depth ratios.

C. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.

D. Install bond breaker where joint backing is not used.

E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Install sealant free of air pockets, foreign embedded matter, ridges and sags.

G. Tool joints concave.

3.04 CLEANING AND REPAIRING

A. Clean work.

B. Clean adjacent soiled surfaces.

C. Repair or replace defaced or disfigured finishes caused by work of this section.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished installation.

B. Protect sealants until cured.
### 3.06 SEALANT SCHEDULE

<table>
<thead>
<tr>
<th>A. Location</th>
<th>Required Sealant (2.02A-E)</th>
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<tbody>
<tr>
<td>1. Hollow Metal Work:</td>
<td>(1PU-S)</td>
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<tr>
<td>2. CMU:</td>
<td>(1PU-S)</td>
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<tr>
<td>3. GWB:</td>
<td>(AcEm-C)</td>
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<tr>
<td>4. Mechanical Penetrations:</td>
<td>(1PU-S)</td>
</tr>
<tr>
<td>5. Wood to Metal:</td>
<td>(1PU-S)</td>
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<tr>
<td>6. Wood to Wood:</td>
<td>(1PU-S)</td>
</tr>
<tr>
<td>7. Plastic to Plastic:</td>
<td>(NpbMr-SR-S)</td>
</tr>
<tr>
<td>8. GWB to Plastic or Plastic</td>
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<tr>
<td></td>
<td>in infection control areas exposed to view: (ST-PU)</td>
</tr>
</tbody>
</table>
PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Framing metal studs for interior partitions, 20 gauge and lighter.
   2. Interior gypsum board and finishing systems.

1.02 DESIGN REQUIREMENTS

A. Fire-Resistance Ratings: Provide gypsum drywall construction having fire-resistance ratings indicated.

B. Conform to assemblies tested per ASTM E 119 by inspecting and testing organization acceptable to authorities having jurisdiction.

C. Structural Performance of Interior Partition Systems:
   2. Deflection Limit:
      a. For Brittle Finishes: 1/240 of span.
      b. For Gypsum Wallboard Finishes: 1/180 of span.
      c. For Flexible Finishes: 1/120 of span.

D. Sound Transmission Classes (STC):
   1. Untreated Interior Partition: 35 minimum.

1.03 SUBMITTALS

A. Comply with requirements of Section 01 33 00 “Submittal Procedures”.

B. Certification: Submit UL, WHI, or other listing of fire rated assemblies, identifying products being provided.

C. Product data.

1.04 QUALITY ASSURANCE


B. Thickness of metal framing components is specified by decimal thickness as currently favored by steel industry trade associations. (Refer ASTM A 525.)
1. Specified metal thickness is minimum acceptable for base metal, uncoated, unless specifically indicated as Manufacturer's design thickness.

2. Gauge references are for convenience only and shall not be used to imply an acceptance of base metal thinner than the decimal thickness specified.

C. Fire rating requirements take precedence over construction requirements indicated. In event of conflict, notify Owner's Representative and do not proceed in area of conflict until resolved.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original and unopened packages, containers, or bundles, with brand names and manufacturer's labels intact and legible.

B. Store materials in dry location, fully protected from weather and direct exposure to sunlight.

C. Stack gypsum board products flat and level, properly supported to prevent sagging or damage to ends and edges.

D. Store corner bead and other metal and plastic accessories to prevent bending, sagging, distortion, or other mechanical damage.

1.06 PROJECT CONDITIONS

A. Environmental Conditions: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 requirements or gypsum board manufacturer's recommendations, whichever are more stringent.

1. For nonadhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F (10 deg C) for 48 hours before application and continuously after until dry.

2. Do not exceed 95 deg F (35 deg C) when using temporary heat sources.

3. Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the listed Manufacturers.

B. Steel Framing and Furring:

1. Cemco, Inc.
3. Steeler
4. Or Approved Equal.

C. Gypsum Board:
1. Domtar Gypsum Co.
2. Georgia-Pacific Corp.
4. United States Gypsum Co.
5. Or Approved Equal.

D. Acoustical Gypsum Board:
1. Domtar Gypsum Co.
2. Georgia-Pacific Corp.
4. United States Gypsum Co.
5. Or Approved Equal.

2.02 STEEL FRAMING FOR WALLS AND PARTITIONS

A. Steel Studs and Runners: ASTM C 645.
1. Minimum Base-Metal Thickness: Minimum 20 gauge.
2. Depth: Runners: 1 ½”, Studs 1 ¼”
3. Slip-Type Head Joints: Where indicated, provide one of the following:
   a. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch (50.8-mm-) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
   b. Within the MRI Exam Room framing set inside the parent wall over the RF floor slab, Do not nail bottom runner into floor for any reason. Use adhesive bead to set bottom channel track in place.

B. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Minimum Base-Metal Thickness: As indicated on Drawings.

C. Cold-Rolled Channel Bridging: 0.0538-inch (1.37-mm) bare-steel thickness, with minimum 1/2-inch- (12.7-mm-) wide flanges.
1. Depth: 1-1/2 inches (38.1 mm).
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38.1 by 38.1 mm), 0.068-inch- (1.73-mm) thick, galvanized steel.

2.03 GYPSUM BOARD

D. Provide gypsum board in maximum lengths available to minimize end joints. Thickness, 5/8 inch unless otherwise indicated.

E. Gypsum Wallboard: ASTM C 36, tapered edges.
   1. Non-rated Assemblies: Regular Type.
   2. Fire Rated Assemblies: Type X.
   3. Install with fasteners as specified in ETS-Lindgren drawings and specifications.

F. Gypsum Backing Board for Multi-Layer Applications: ASTM C 442 or A 36.
   1. Non-rated Assemblies: Regular Type.
   2. Fire Rated Assemblies: Type X.

G. Gypsum Acoustical Wallboard:
   1. Thickness: 1/2" (12.7mm), tapered edges
   2. Width: 4’ (1220mm)
   3. Lengths: 8’ (2438mm), 9’ (2743mm), 10’ (3048mm), 12’ (3658mm)
   4. Weight: 2.13 lbs/sqft
   5. STC-rated Assemblies (per ASTM E90): 47-52
   6. Flame Spread (per ASTM E84): Class A
   7. Product Standards: C1766
   8. Installation Standards: ASTM C840; GA-214, GA-216

2.04 ACOUSTICAL PUTTY

A. Moldable Acoustical Putty: Basis of Design Product: Quiet Putty by Pabco Gypsum. Non-toxic, non-skinning pads with STC rating: 47-63 (ASTM E90) or approved equal by one the following:
   1. Acoustical Solutions
   2. ATS Acoustics
   3. CertainTeed
   4. or Approved Equal
2.05 TRIM ACCESSORIES
   A. ASTM C 840, Manufacturer’s standard trim accessories, including corner bead and edge trim of beaded type with face flanges for concealment in joint compound except where semi-finishing or exposed type is indicated.
   B. Provide corner bead formed from zinc alloy.

2.06 GYPSUM BOARD JOINT TREATMENT MATERIALS
   A. ASTM C 475 and ASTM C 840, complying with recommendations of Manufacturer of both gypsum board and joint treatment materials for application indicated.
   B. Joint Tape: Paper reinforcing tape, unless otherwise indicated. Use open-weave glass fiber tape where recommended by gypsum board Manufacturer with use of setting-type joint compound.
   C. Setting-Type Joint Compound: Factory-prepackaged, job-mixed chemical-hardening powder products formulated for uses indicated.
   D. Drying-Type Joint Compounds: Factory-prepackaged, vinyl-based products:
      2. All-purpose compound formulated for use as both taping and topping compound.

2.07 MISCELLANEOUS MATERIALS
   A. Provide auxiliary materials for gypsum board construction which comply with referenced standards and recommendations of RF Shielding Vendor
   B. Concealed Acoustical Sealant: Nondrying, nonhardening, nonskinning, nonstaining, nonbleeding, gunnable sealant as specified in Section 0 7 92 00 - Joint Sealants.

PART 3 - EXECUTION

3.01 EXAMINATION
   A. Examine substrates to which gypsum board construction attaches or abuts, preset hollow metal frames, structural framing, and other items affecting installation.
   B. Verify conditions are acceptable and ready to receive gypsum board assemblies.

3.02 STEEL FRAMING INSTALLATION
   A. Install steel framing to comply with ETS-Lindgren Shielding Vendor Drawings and Specifications
B. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement:
   1. Where edges of suspended ceilings abut building structure at ceiling perimeters and at penetrations of structural elements.
   2. Where partition and wall framing abuts overhead structure.
C. Do not bridge building expansion and control joints with steel framing or furring members. Frame both sides of joint with steel framing or furring members or as indicated.
D. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
E. Secure hangers to structural support by connecting directly to structure where possible. Otherwise connect to inserts, clips, other anchorage devices or fasteners as indicated.
F. Do not connect or suspend steel framing from ducts, pipes or conduit. Maintain 2 inches clearance to hangers and braces.
G. Provide indirect-hung metal support system with carrying channels (main runners) spaced 4 feet o.c., hangers 4 feet o.c. along runners, and rigid furring members 16 inches o.c., unless otherwise indicated.
H. Install direct-hung grid suspension system, including perimeter wall track or angle, with members spaced and installed to comply with Manufacturer’s instructions.
I. Install runner tracks at floors, ceilings and structural walls and columns. Where studs are installed directly against exterior walls of masonry or concrete, install asphalt felt strips between studs and wall.
J. Frame door and other openings with studs and runners of the proper gauge, number and arrangement to comply with Manufacturer’s recommendations for size of opening, weight and height of doors, and stud size, unless otherwise indicated.
K. Install supplementary framing, blocking and bracing at openings and terminations in the work and for support of fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings and similar construction to comply with details indicated and with recommendations of gypsum board Manufacturer.
L. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.03 GYPSUM BOARD INSTALLATION
A. Install and finish gypsum board to comply with ASTM C 840.
B. Install gypsum board to metal supports in accordance with GA 216 and fire rated assembly requirements.

C. Install sound attenuation blankets where indicated, without gaps and with support where necessary to prevent movement or dislocation.
   1. Locate behind and around electrical and mechanical items within or behind partition and tight to items passing through partitions.
   2. Lay sound attenuation blankets over ceiling construction adjacent and parallel to sound insulated partitions and STC rated operable partitions. Extend blankets out 24 inches each side.

D. Install acoustical sealant around perimeter of acoustically insulated partitions. Apply continuous bead at each side of framing member interface with substrates. Seal all penetrations.

E. Install board panels to minimize number of abutting end joints or avoid them entirely. Stagger abutting end joints of adjacent panels not less than one framing member.

F. Position adjoining panels so that tapered edges abut tapered edges and field-cut edges abut field-cut edges and ends. Avoid joints at corners of framed openings.

G. Attach gypsum panels to framing provided at openings and cutouts.

H. Isolate drywall construction from abutting structural and masonry work. Provide edge trim and sealant as recommended by Manufacturer.

I. Do not bridge building expansion or control joints. Leave space of the width indicated between boards, and trim both edges for installation of sealant or gasket.

J. Double Layer Application:
   1. Fasten first layer to resilient channels with ½” at 6” o.c. Do not allow screws to contact metal studs.
   2. Install second layer perpendicular to first.

3.04 INTERIOR GYPSUM BOARD FINISHES

A. Definitions: Specified levels of finish represent finishes described in consensus document entitled Recommended Specification: Levels of Gypsum Board Finish, as published by AWCI, CISCA, GA, and PDCA.
B. Level 0 Finish: No taping, applied trim accessories, or finishing required.

C. Level 1 Finish: Areas above ceiling, not exposed to view.
1. Embed joint tape in joint compound at gypsum board joints and interior angles.
2. After joint treatment, remove excess joint compound from gypsum board surfaces.
3. Apply trim accessories in corridors and other occupied areas.

D. Level 2 Finish:
1. Not Used.

E. Level 3 Finish:
1. Not Used.

F. Level 4 Finish: Surfaces to receive flat, matte, satin and semi-gloss finishes.
1. Embed joint tape in joint compound at joints and interior angles.
2. Apply three separate coats of compound over joints, angles, fastener heads, surface defects, and trim accessories.
3. Finish joint compound smooth and free of tool marks and ridges.
4. Remove excess joint compound from gypsum board and leave prepared surfaces ready to be coated with primer/sealer prior to application of final finishes.

G. Level 5 Finish:
1. Not Used.

END OF SECTION 09 20 00
PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Exposed suspension system.
   2. Trim and accessories.
   3. Acoustical lay-in panels.

1.02 DEFINITIONS

A. CSTC (Ceiling Sound Transmission Class): The numerical rating of sound attenuation for the ceiling system between two rooms when installed over a barrier with a common plenum above and tested in accordance with AMA-1-II-1967.

B. LR (Light Reflectance Coefficient): As determined by ASTM E 1264.

1.03 SUBMITTALS

A. Submit in accordance with Section 01 33 00.

B. Product Data: Submit data for each distinct suspension system and acoustical unit type indicated in accordance with Section 01 33 00. Include ceiling panels, suspension systems, insulation and seismic restraint.

C. Samples: Submit the following:
   1. Verification samples:
      a. Acoustical units: 12-inch-square samples of each type required.
      b. Exposed suspension and trim elements: 12-inch-long samples of each type and finish required.

D. Maintenance Material Submittal
   1. Do not provide maintenance materials beyond those required for replacement of materials damaged after Substantial Completion by Contractor.

1.04 QUALITY ASSURANCE

A. Fire Performance Characteristics:
   1. Surface burning characteristics: Provide products having the following characteristics when tested in accordance with ASTM E 84:
      b. Maximum smoke developed: 50.
B. Seismic Restraint: Design and construct seismic restraint system for suspended metal grid in accordance with City of Pullman 2015 Edition.
   1. Seismic Design Category: D

1.05 PROJECT CONDITIONS

A. In a timely manner, furnish to affected installers, attachment devices for incorporation into other work.

B. Coordination Data: Prepare and distribute to affected installers, data necessary for coordination with related work. Include setting diagrams showing placement of attachment devices for acoustical ceiling hangers.

C. Coordinate ceiling system installation with work of other sections as required, including the following:
   1. Light fixtures.
   2. HVAC equipment.
   3. Fire suppression system components.
   4. Loudspeakers.
   5. Partitions.
   6. Cable trays.
   7. Ceiling mounted medical equipment.
   8. Changes in plane, furring, etc.

D. Within each space to receive specified products, do not begin installation until the following conditions are met:
   1. Work above ceilings has been finished, tested, and approved.
   2. Space to receive ceiling system is properly enclosed and protected from weather.
   3. Any wet work within the space is dry.

E. Do not begin installation of ceiling system until building's normal operating temperature and humidity levels have been reached and will be maintained.

PART 2 - PRODUCTS

2.01 ACoustical Ceiling Units – General

A. Standard for Acoustical Ceiling Units: Provide units conforming to applicable requirements of ASTM E 1264 for Class A materials.

B. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria
and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.02 CEILING SUSPENSION SYSTEMS – MRI Scan Room 1303-A

A. Face Profile: 15/16 in.
B. Material: Co-Extruded Aluminum
C. Colors: White
D. Finishes: Manufacturer's standard shop-applied finishes.
E. Attachment Devices for Suspension System:
   1. Anchors and intermediate support members: Provide sizes capable of sustaining 5 times the load-carrying capabilities shown in ASTM C 635, Table 1, “Direct Hung” column.
   2. Deck inserts and hanger clips: Fabricate from hot-dip galvanized steel.
   3. Hanger wire: Non-ferrous, minimum 12 gage (0106 inch diameter).
F. Edge Moldings and Trim: Extruded Aluminum to match grid.
   1. Provide profiles indicated.
   2. Edge trim profile: Nominal 1- by 1-inch angle trim, non-ferrous, approved for use with seismic grid end clips.
G. Seismic Accessories:
   1. Seismic Grid End Clips: Non-ferrous

2.03 LAY-IN ACOUSTICAL CEILINGS– MRI Scan Room 1303-A

A. Acoustical Ceiling "ACT-1": USG "Halcyon Healthcare Acoustical Panel" 24”x 48”x 1” 40% recycled content. 0.95 NRC/20CAC or one of the following:
   1. Armstrong
   2. Celotex
   3. or Approved Equal
B. Performance Specifications:
   1. Size: 24 by 48 inches
   2. Weight: No more than 1.0 lb./sf
   3. Fire Rating: Class A
   4. Light Reflectance: 0.80
   6. Noise Reduction Coefficient: 0.95
7. Edge profile: Square.

C. Grid: Armstrong 15/16 Clean Room Co-Extruded Aluminum, white, or comparable product by the following:
   1. USG
   2. Celotex
   3. or Approved Equal

2.04 CEILING SUSPENSION SYSTEMS – Control 1303

A. Face Profile: 15/16 in.
B. Material: Match existing suspension systems adjacent.
C. Colors: White
D. Finishes: Manufacturer's standard shop-applied finishes.
E. Attachment Devices for Suspension System:
   1. Anchors and intermediate support members: Provide sizes capable of sustaining 5 times the load-carrying capabilities shown in ASTM C 635, Table 1, “Direct Hung” column.
   2. Deck inserts and hanger clips: Fabricate from hot-dip galvanized steel.
   3. Hanger wire: Non-ferrous, minimum 12 gauge (0.106 inch diameter).
F. Edge Moldings and Trim: Extruded Aluminum to match grid.
   1. Provide profiles indicated.
   2. Edge trim profile: Nominal 1- by 1-inch angle trim, non-ferrous, approved for use with seismic grid end clips.

G. Seismic Accessories:
   1. Seismic Grid End Clips: Non-ferrous

2.05 LAY-IN ACOUSTICAL CEILINGS– Control 1300

A. Acoustical Ceiling "ACT-1": Match performance and appearance of ceiling tiles adjacent by one of the following Manufacturers.
   1. USG
   2. Armstrong
   3. Celotex
   4. or Approved Equal
B. Performance Specifications:
   1. Size: 24 by 48 inches
   2. Weight: No more than 1.0 lb./sf
   3. Fire Rating: Class A
   4. Light Reflectance: 0.80
   6. Noise Reduction Coefficient: 0.95
   7. Edge profile: Square.

C. Grid: 15/16”, white, or comparable product matching existing by one the following:
   1. Armstrong
   2. USG
   3. Celotex
   4. or Approved Equal

2.06 LATERAL FORCE BRACING

A. Seismic Compression Struts: One of the following:
   1. 25 gauge metal studs.
      a. 1-5/8 inch: Up to 6’-2” length.
      b. 2-1/2 inch: Up to 10’-6” length.
   2. Thinwall conduit (EMT)
   3. Purpose-build telescoping strut such as USG "Telescoping Seismic Compression Post" or Chicago Metallic "Dina Strut."

B. Splay Wires: Four 12-gauge wires per seismic compression strut.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions under which products of this section are to be installed and verify that the work properly may commence.

B. Verify that products furnished as work of this section, but not installed under this section, have been properly installed by the entity performing the installation.
3.02 PREPARATION

A. Layout: Position ceiling components to maximize use of full-sized acoustical units and to provide border units which are equal in size and shape at opposing ceiling edges. Use of acoustical units that are smaller than 1/2 full-width is prohibited at ceiling perimeters. Conform to existing ceiling layout.

3.03 SUSPENSION SYSTEM INSTALLATION

A. General:

1. Conform to the requirements of ASTM C 636, manufacturer's installation instructions, and governing regulations.

2. Install hangers plumb and supported solely by building structure or carrying channels. Do not allow hangers to contact any objects or materials in ceiling plenum that are not actual components of ceiling system.

   a) Splay hangers only where necessary to avoid obstacles. Provide counter-splaying, bracing, or other acceptable devices to compensate for lateral stresses caused by splayed hangers.

   b) Install splay hangers or other means of seismic restraint as required to meet the requirements of ASTM E 580.

3. Space hangers at not more than 48 inches on center and within 6 inches of ends of each direct-hung runner or carrying channel, unless indicated otherwise.

4. Loop and tie wire hangers securely to building's structural members; to attachment devices indicated; or, where not indicated, to devices suitable for substrate and capable of permanently supporting ceiling weight without failure or deterioration.

5. Level ceiling suspension system to tolerance of 1/8 inch in 12 feet, with cumulative tolerance not to exceed 1/4 inch. Bending or kinking of hangers is not allowed.

B. Exposed Grid Installation: Install grid members square, with ends of members securely interlocked. Remove and replace dented, bent, or kinked members.

C. Seismic Provisions: Provide lateral force bracing for all ceilings except ceilings less than 1,000 square feet in area that are surrounded by four walls, each of which is braced to structure.

   1. Locate struts and splay wires at spacing not to exceed 12'-0" o.c. and not more than 6'-0" from each wall.

   2. Positively attach compression strut to suspension main beam and to structure above.

   3. Attach 4 splay wires to main beam at seismic compression strut. Array wires at 90 degrees to each other at an angle not exceeding 45 degrees from horizontal.
3.04 TRIM INSTALLATION

A. Install edge moldings and trim units at acoustical ceiling borders, at locations indicated, and where required to cover acoustical unit edges.

   1. Molding and trim attachment: Space screws not more than 16 inches on center and within 3 inches of ends of each trim-piece being installed. Install moldings and trim level with suspension system and within tolerance specified for suspension system.

   2. Miter corners and align butt joints carefully to form tight hairline joints.

B. Seismic Provisions:

   1. Attach grid to wall edge trim on two adjacent walls.

   2. On opposite walls, install seismic grid end clips to attach grid to wall edge trim.

3.05 PANEL INSTALLATION

A. Panel Installation: Install acoustical panels for accurate fit with suspension system and trim members. Scribe and cut panels at ceiling perimeter and at obstructions to provide neat, precise fit.

   1. Square-edge panel installation: Provide installation with panel edges that are hidden from view, by suspension members or trim.

3.06 ADJUST AND CLEAN

A. Use ceiling manufacturer’s recommended methods and materials to clean and touch-up exposed components of ceiling system.

B. Replace ceiling system components that are discolored or damaged in any way, in a manner that results in the ceiling system showing no evidence of replacement work.

END OF SECTION 09 50 00
PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Rubber sheet flooring.
   2. Rubber base.

1.02 RELATED SECTIONS

A. See Section 03 53 00 ‘Concrete Topping’ for floor underlayment and leveling required in all project areas receiving new rubber sheet flooring.

1.03 SYSTEM DESCRIPTION

A. Fire Resistance Requirements:
   1. Fire: Critical Radiant Flux of 0.45 watts/cm² or more per NFPA 253 or ASTM E 648.
   2. Smoke Density: NBS Smoke of 450 or less per ASTM E 662.

1.04 SUBMITTALS

A. Comply with requirements of Section 01 33 00 – Submittal Procedures.

B. Product Data: Manufacturer's product data and installation instructions.

C. Samples: Submit samples of each type, color and pattern of resilient flooring and accessories; and 2-1/2 inches (63 mm) long for accessories.

D. Maintenance instructions for each type of flooring.

E. Seaming diagram.

1.05 EXTRA MATERIALS

A. Furnish extra materials that match products installed.
   1. Package with protective coverings for storage.
   2. Label each package or container with manufacturer's name, brand, color, and room locations.

B. Quantities:
   1. Rubber sheet flooring: Furnish quantity not less than 10 linear feet for every 500 linear feet or fraction thereof, in roll form and in full roll width for each color, pattern, and type of floor covering installed.
1.06 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor covering installation and seaming method indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by floor covering manufacturer for installation techniques required.

2. A technical representative from the Flooring Manufacturer shall attend a pre-installation meeting with flooring installer to review installation methods for the Dryfix Tape System.

PART 2 - PRODUCTS

1.07 RUBBER SHEET FLOOR COVERING


1. Or Approved Equal.

2. Unbacked Rubber Sheet Floor Covering: 0.12 inch (3.0 mm) thick.

3. Wearing Surface: Slip resistant

4. Size: Manufacturers standard

5. Seaming Method: Heat welded

6. Colors and Patterns: As indicated in Drawings.

1.08 WALL BASE

A. Rubber Wall Base: FS SS-W-40, Type I, and complying with requirements specified as follows:

B. Manufacturer:

1. Roppe,

2. Johnsonite,

3. Flexco

4. or Approved Equal.

C. Product: Topset base

D. Size: As indicated in Drawings.

E. Colors: As indicated in Drawings.
1.09 INSTALLATION ACCESSORIES

A. Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.

B. Seamless-Installation Accessories:
   2. Cold Welding Bead: Manufacturer’s standard product for cold welding seams.
   3. Color: Match floor covering or as noted on drawings.

C. Integral Self-Cove Base Accessories:
   1. Cap Strip, Non-restricted areas: Square metal, provided or approved by rubber sheet flooring manufacturer.

PART 3 - EXECUTION

3.01 PREPARATION

A. Inspect the existing concrete floor substrates and topping compounds applied under this Contract to assure acceptable conditions prior to installation. Commencement of installation work constitutes acceptance of existing conditions.

B. Prepare substrates according to manufacturer's written instructions to ensure adhesion of floor coverings.

C. Concrete Substrates: Prepare according to ASTM F 710.
   1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
   2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil or silicone, using mechanical methods recommended by Manufacturer. Do not use solvents.
   3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
   4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.
      a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
      b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
      c. Level all areas to receive new Rubber Sheet Flooring as defined in Section 03 53 00 Concrete Topping and meeting the requirements
of ETS – Lindgren RF Shielding Vendor specifications and details.

d. Do not install floor coverings until they are same temperature as space where they are to be installed.
e. Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
f. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.

3.02 INSTALLATION: RUBBER SHEET FLOORING

A. Comply with manufacturer's written instructions for installing floor coverings.

B. Unroll floor coverings and allow them to stabilize before cutting and fitting.

C. Lay out floor coverings as follows:
   1. Maintain uniformity of floor covering direction.
   2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches (152 mm) away from parallel joints in floor covering substrates.
      a. Scribe and cut floor coverings to butt neatly and tightly to vertical surfaces, permanent equipment
      b. Extend floor coverings into toe spaces, door reveals, closets, and similar openings.
      c. Maintain reference markers, holes, or openings that are in place or marked for future cutting by repeating on floor coverings as marked on substrates. Use chalk or other nonpermanent marking device.
      d. Adhere floor coverings to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.03 SEAMLESS INSTALLATION

A. Heat-Welded and Cold–Welded Seams: Comply with ASTM F 1516. Rout joints and use welding bead to permanently fuse sections into a seamless floor covering. Prepare, weld and finish seams to produce surfaces flush with adjoining floor covering surfaces.

3.04 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of floor coverings.
B. Perform the following operations immediately after completing floor covering installation:
   1. Remove adhesive and other blemishes from floor covering surfaces.
   2. Sweep and vacuum floor coverings thoroughly.
   3. Damp-mop floor coverings to remove marks and soil.

C. Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Rubber flooring initial maintenance (post installation) provided by Contractor:

E. The initial cleaning process is mandatory to remove a factory film that is present to protect the surface during installation and handling. If this process is not completed satisfactorily the floor will have a dirty appearance and must be replaced at Contractor’s expense.

F. Clean floor surface after adhesive has fully cured, no sooner than 72 hours after installation.

G. Clean surfaces in accordance with manufacturer’s requirements for initial cleaning as follows:
   1. Vacuum floor to remove dirt or grit, including all seams and corners.
   2. Remove adhesive residue.
   3. Apply manufacturer recommended stripper with clean mop to floor area. Allow solution to dwell a minimum of 10 minutes. Dilution: 2-4 ounces per gallon of lukewarm water.
   4. Scrub the floor thoroughly with a floor side to side scrubber machine using a 3M 5100 pad or equal. Be sure to scrub entire floor surface area.
   5. Wet vacuum the soiled solution, rinse the floor with clean water and allow to dry.
   6. Do not wax.

H. Final Protection: Cover resilient floor surface with non-staining building paper until Substantial Completion in each area.

END OF SECTION 09 65 16
PART 1 - GENERAL

1.01 SUMMARY

A. Section includes surface preparation and the application of paint systems on interior substrates.

1.02 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

H. MPI: Master Painter Institute

1.02 SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
   1. Submit Samples on rigid backing, 8 inches (200 mm) square.
   2. Step coats on Samples to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.
   5. Product List: For each product indicated, include the following:
      a. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
b. Printout of current "Master Painter Institute (MPI) Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

c. VOC content.

1.03 SUBMITTALS

A. Single Source Responsibility: Provide primers and undercoat paint produced by same manufacturer as the finish coats.

B. Coordination of Work:
1. Review sections in which primers are provided to ensure compatibility of the total systems for various substrates.
2. Notify Owner’s Representative of problems anticipated using materials specified.

C. Material Quality: Provide manufacturer's best quality trade sale type paint material of various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable:
1. Proprietary names used to designate colors or materials are not intended to imply that products named are required or to exclude equal products of other manufacturers.  
2. Federal Specifications establish minimum quality level for paint materials, except where other product identification is used.  
3. Products that comply with performance requirements of applicable Federal Specifications, yet differ in composition, may be considered for use when acceptable to Owner.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.05 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
PART 2- PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Benjamin Moore & Co.
   2. ICI Paints.
   3. Kelly-Moore Paints. (Basis of Design)
   7. Rodda Paint Co.
   9. Approved equal.

2.02 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:
   1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

   a. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
      1) Flat Paints and Coatings: 50 g/L.
      2) Nonflat Paints and Coatings: 150 g/L.
      3) Dry-Fog Coatings: 400 g/L.
      4) Primers, Sealers, and Undercoaters: 200 g/L.
      5) Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
      6) Zinc-Rich Industrial Maintenance Primers: 340 g/L.
7) Pretreatment Wash Primers: 420 g/L.
8) Floor Coatings: 100 g/L.
9) Shellacs, Clear: 730 g/L.
10) Shellacs, Pigmented: 550 g/L.
   b. Colors: As indicated in Drawings.

B. PRIMERS/SEALERS

C. WATER-BASED PAINTS
   1. Latex, Interior, Satin, (Gloss Level 4): MPI #43.

PART 3- EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   1. Concrete: 12 percent.
   3. Wood: 15 percent.
   4. Gypsum Board: 12 percent.
   5. Plaster: 12 percent.

B. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

C. Plaster Substrates: Verify that plaster is fully cured.

D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

F. Application of coating indicates acceptance of surfaces and conditions.
3.02 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
   1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
   1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
   2. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
   3. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.
   4. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
   6. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
   7. Aluminum Substrates: Remove loose surface oxidation.
   8. Wood Substrates:
      a. Scrape and clean knots, and apply coat of knot sealer before applying primer.
      b. Sand surfaces that will be exposed to view, and dust off.
      c. Prime edges, ends, faces, undersides, and backsides of wood.
      d. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
3.02 APPLICATION

A. Apply paints according to manufacturer’s written instructions and to recommendations in "Master Painter Institute (MPI) Manual."

1. Use applicators and techniques suited for paint and substrate indicated.

2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
   a. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
   b. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
   c. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
   d. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
      1) Paint the following work where exposed in equipment rooms:
         a) Equipment, including panelboards and switch gear.
         b) Uninsulated metal piping.
         c) Uninsulated plastic piping.
         d) Pipe hangers and supports.
         e) Metal conduit.
         f) Plastic conduit.
         g) Tanks that do not have factory-applied final finishes.
h) Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

2) Paint the following work where exposed in occupied spaces:
   a) Equipment, including panelboards.
   b) Uninsulated metal piping.
   c) Uninsulated plastic piping.
   d) Pipe hangers and supports.
   e) Metal conduit.
   f) Plastic conduit.
   g) Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
   h) Other items as directed by Owner.

3) Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.03 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

B. Contractor shall touch up and restore painted surfaces damaged by testing.

C. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.04 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Owner, and leave in an undamaged condition.
D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION 09 91 23
PART 1   GENERAL

1.01 WORK INCLUDED

A. General Plumbing Requirements.

B. Plumbing Submittals.

C. Motors.

D. Equipment and Piping Identification.

E. Commissioning.

1.02 GENERAL

A. Includes, but not limited to, furnishing labor, materials, and equipment for completion of work unless indicated or noted otherwise. See Division 1 for sequence of work.

B. All work included in Division 22 shall be the responsibility of a single Plumbing Subcontractor. This Contractor shall obtain and pay for all permits required by State and local authorities governing the installation of the plumbing work. It is the Contractor's responsibility to contact all utility organizations serving the building, prior to bid, and to include all charges for inspections, installation of materials, equipment and connection of all required utilities.

C. The drawings and specifications are complementary and what is called for in either is binding as if called for in both.

D. All plumbing equipment and devices furnished or installed under other Divisions of this specification (or by the Owner) which require connection to any plumbing systems (i.e., plumbing systems or duct systems, or controls) shall be connected under this division of the Specifications.

E. The Contractor shall be responsible for checking field conditions and verifying all measurements and relationships indicated on the drawings before proceeding with the work.

1.03 ELECTRICAL

A. All equipment with an electrical connection shall be factory wired to a junction box for connection to electrical service.

B. Where a piece of equipment specified includes an electric motor, the motor shall be furnished and mounted by this Contractor. Motor starter, disconnect switches and wiring from the electrical panel to the motor control devices and to the motor shall be provided by the Division 26 Contractor unless stated otherwise in the mechanical specification and on the plumbing equipment schedule.
1.04 SYSTEMS DESCRIPTION

A. Site Inspection

1. Examine premises and understand the conditions which may affect performance of work of this Division before submitting proposals for this work.

2. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.

B. Drawings

1. Plumbing drawings show general arrangement of piping, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.

2. Consider electrical drawings part of this work insofar as these drawings furnish information relating to design and construction of building.

3. Because of small scale of plumbing drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.

1.05 SUBMITTALS

A. All material used on the project shall be new and free of defects. The Engineer reserves the right to reject any material, the appearance of which has been damaged on the site or in shipment. The material shall be of approved equal quality to that which is specified. Should the make and type of material differ from that specified, the Contractor may be required to submit catalog and engineering data (samples if requested) necessary to make a comparison and determine its suitability. The Contractor shall also bear the cost of any changes to the plumbing design made necessary by any approved substitutions. Such request for approval shall be made two weeks in advance of the bid opening to allow time to assess its suitability. Failure to obtain approval prior to bid shall require the successful bidder to furnish materials and equipment only as specified herein.

B. The Contractor shall submit to the Engineer, for approval, complete information on all equipment and materials to be provided on the project including six copies of the manufacturer's catalog and engineering data, shop drawings of shop fabricated equipment and instruction data for each item included under this section of the specifications. Submittals shall be presented to the Engineer within 30 calendar days from the date of the contract signing in complete indexed and bound sets. The Contractor shall submit a typed, signed list including all items to be furnished on the project. The signature on the aforementioned list shall
indicate that the contractor has examined the suitability of all material and equipment with respect to compliance with these specifications. The Contractor's approval shall also indicate that physical dimensions of the equipment have been verified with the installation requirements and were found to cause no interference therewith.

C. Review of submittal data by the Engineer or Engineers does not relieve the Contractor of responsibility for quantities, measurements, and compliance with the intent of all contract documents.

D. Furnish submittals on all items and equipment specified in Division 22 and all items indicated on plumbing drawings in a hard-back, three-ring binder.

E. The Contractor shall submit the plumbing cost breakdown including all sub-contractors costs.

1.06 OPERATION AND MAINTENANCE MANUAL FOR PLUMBING SYSTEMS

A. Bind Operation & Maintenance Manual for Plumbing Systems in three-ring, hard-backed binder with clear plastic pocket on spine. Spine of each binder shall have following typewritten lettering inserted:

OPERATION AND MAINTENANCE MANUAL
FOR PLUMBING SYSTEMS

B. Provide master index at beginning of Manual showing items included. Use plastic tab indexes for sections of Manual.

C. First section shall consist of name, address, and phone number of Engineer, General Contractor, and Mechanical, Plumbing, Sheet Metal, Refrigeration, Temperature control, and Electrical subcontractors. Also include complete list of equipment installed with name, address, and phone number of each vendor.

D. Provide section for each type of item of equipment.

F. Submit copies of Operation & Maintenance Manual to Engineer for approval.

G. 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.

H. Operating Instructions shall include:

1. General description of each plumbing system.

2. Step-by-step procedure to follow in putting each piece of plumbing equipment into operation.

H. Maintenance Instructions shall include:
1. Manufacturer’s maintenance instructions for each piece of plumbing equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists operation instructions of equipment, and maintenance and lubrication instruction.

2. Summary list of plumbing equipment requiring lubrication showing name of equipment, location, and type and frequency of lubrication.

3. List of plumbing equipment used indicating name, model, serial number, and nameplate data of each item together with number and name associated with each system item.

1.07 QUALITY ASSURANCE:

A. Requirements of Regulatory Agencies:

1. Perform work in accordance with applicable Codes.

2. In case of differences between building codes, state laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern.

B. Product Approvals: See paragraphs elsewhere in this specification.

C. Manufacture: Use domestic made pipe, pipe fittings, and motors on project.

D. Identification: Motor and equipment name plates as well as applicable UL and AGA labels shall be in place when project is turned over to Owner.

1.08 CODES AND STANDARDS

A. Codes and agencies having jurisdictional authority over plumbing installation.

- Washington State Energy Code
- International Building Code -- Latest Approved Edition
- International Mechanical Code -- Latest Approved Edition
- Uniform Plumbing Code -- Latest Approved Edition
- Local Sewer and Water District Requirements
- State and County Department of Health
- Occupational Safety and Health Administration (OSHA)

1.09 PRODUCT HANDLING AND PROTECTION

A. Contractor is responsible for protection of all material, equipment and apparatus provided under this section from damage, water, corrosion, freezing and dust, both in storage and when installed, until final project acceptance.

B. Provide temporary heated and sheltered storage facilities for material and equipment.

C. Completely cover motors and other moving machinery to protect from dirt and water during construction.
C. Handle and protect equipment and/or material in manner precluding unnecessary fire hazard.

D. Equipment requiring rotation and/or lubrication during storage shall have records maintained and witnessed on a monthly basis and forwarded to the Engineer prior to acceptance.

E. Material or equipment damaged because of improper storage or protection will be rejected.

F. Equipment finish that is damaged by handling, storage, etc. shall be corrected by the Contractor at no additional cost to the Owner.

1.10 WARRANTIES

A. In addition to guarantee specified in General Conditions, guarantee plumbing systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.

B. In order to be protected, secure proper guarantees from suppliers and subcontractors.

C. Provide certificates of warranty for each piece of equipment. Clearly record "start-up" date of each piece of equipment on certificate. Include certificates as part of Operation & Maintenance Manual.

1.11 ABBREVIATIONS

AFF Above Finish Floor
AMCA Air Moving & Conditioning Association
ANSI American National Standards Institute
APWA American Public Works Association
ARI Air Conditioning and Refrigeration Institute
ASHRAE American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME American Society of Mechanical Engineers
ASTM American Society of Testing & Materials
AWWA American Water Works Association
BFF Below Finish Floor
BHP Brake Horsepower
BTU British Thermal Unit
CFC Chloro - Fluorocarbon
CFM Cubic Feet per Minute
DOT US Department of Transportation
EPA Environmental Protection Agency
fpm feet per minute
FS or Fed. Spec. Federal Specifications
HP Horsepower
IEEE Institute of Electrical and Electronics Engineers
1.12 DEFINITIONS

A. Finished Spaces: Spaces used for habitation or occupancy where rough surfaces are plastered, paneled, or otherwise treated to provide a pleasing appearance.

B. Unfinished Spaces: Spaces used for storage or work areas where appearance is not a factor.

C. Concealed Spaces: Spaces out of sight. For example, above ceilings; below floors; between double walls; furred-in areas; pipe and duct shafts; and similar spaces.

D. Exposed: Open to view. For example, pipe running through a room and not covered by other construction.

E. Outside: Open to view up to 5 feet beyond the exterior side of walls, above the roof, and unexcavated or crawl spaces.

F. Conditioned Space: An area, room or space normally occupied and being heated or cooled for human habitation by any equipment.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Any reference to the specifications or on the drawings to any article, device, product, material, fixture, form or type of construction by manufacturer, name, make, or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition.

B. The manufacturer listed as Acceptable Manufacturers are approved for the items indicated without obtaining prior approval. Other manufacturers require prior approval.
C. The listing of a manufacturer as an Acceptable Manufacturer does not necessarily mean that the products of that manufacturer are equal to those specified. The listing is only an indication of those manufacturers which may be capable of manufacturing, or have in the past manufactured, items equal to those specified, and is intended to aid the Contractor in identifying manufacturers.

D. Products provided by Acceptable Manufacturers shall be equal to or superior to the specified manufacturer's item in function, appearance, and quality, and shall fulfill all requirements of the plans and specifications. The Engineer shall be the final judge as to whether an item meets these requirements or not. If a manufacturer is not certain that his product meets these requirements or not, then the manufacturer shall submit data as required to obtain the Design Consultant's approval.

E. The approval of a manufacturer applies to the manufacturer only and does not relieve the Contractor from the responsibility of meeting all applicable requirements of the plans and specifications.

F. Contractor shall be responsible for all costs to other trades and all revisions required to accommodate any products which are different than those specified or shown.

G. In reviewing a manufacturer for acceptance, factors considered include the following: engineering data showing item's performance, proper local representation of manufacturer, likelihood of future manufacturer's local support of product, service availability, previous installation, previous use by Owner/Engineer and record, product quality, availability/quality of maintenance and operation data, capacity/performance compared to specified items, acoustics, items geometry/access utility needs, and similar concerns.

H. If approval is received to use other than specified items, responsibility for specified capacities and insuring that items to be furnished will fit space available lies with this Division.

I. If non-specified equipment is used and it will not fit job site conditions, this Division assumes responsibility for replacement with items named in Specification.

2.02 ACCESS DOORS

A. This contractor shall be responsible for furnishing and installing flush mounted access doors in walls, ceiling and floors and chases where the following equipment is concealed and is not accessible through same.

   1. Valves (shut off)
   2. Trap Primers
B. Doors shall be UL listed 16 ga. cold rolled steel with concealed hinge, screwdriver operated lock and prime coated. Furnish suitable for area mounted.

C. Approved Manufacturers:
1. Milcor
2. Karp
3. Greenheck

2.03 EQUIPMENT AND PIPING IDENTIFICATION

A. General: All piping, valves, and plumbing equipment shall be marked. All markings in concealed accessible spaces shall be reviewed and verified by Architect/Engineer prior to being concealed.

B. Piping: Piping shall be marked as follows

1. Type: Self-sticking colored markers, lettered to identify the pipe contents, and banded at each end with arrow tape indicating the direction of flow. Markers shall be similar and equal to Brady "System 1" and Seton "Opti-Code" markers. Spray painted stencil labeling is not acceptable. Some markers may be special order.

2. Marker Colors and Wording

<table>
<thead>
<tr>
<th>Piping System &amp; Wording</th>
<th>Background</th>
<th>Letters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Cold Water</td>
<td>White</td>
<td>Green</td>
</tr>
<tr>
<td>Domestic Hot Water</td>
<td>White</td>
<td>Red</td>
</tr>
</tbody>
</table>

3. Marker Lettering: Lettering shall identify the material conveyed in each pipe. Systems which have supply and return piping shall have piping labeled as such (i.e. domestic hot water etc.). Size of letters and color field shall comply with ANSI A13.1., repeated here for convenience:

<table>
<thead>
<tr>
<th>Outside Diameter of Pipe or Covering</th>
<th>Length of Color Field</th>
<th>Size of Letters</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4 to 1-1/4 Inches</td>
<td>8 Inches</td>
<td>1/2 Inches</td>
</tr>
<tr>
<td>1-1/2 to 2 Inches</td>
<td>8 Inches</td>
<td>3/4 Inches</td>
</tr>
<tr>
<td>2-1/2 to 6 Inches</td>
<td>12 Inches</td>
<td>1-1/4 Inches</td>
</tr>
</tbody>
</table>

4. Locations: Markers shall be installed on all exposed piping adjacent to each shut-off valve, at branches to indicate changes of direction, where pipes pass through walls and floors, on 20 foot centers or at least one in
each room on each pipe. Markers shall be installed on all concealed accessible piping (i.e., piping above suspended ceilings, behind access doors, in accessible chases, etc.) near the point of access, except that, for piping above suspended ceilings, markers shall be installed the same as if the piping was exposed (i.e., same as if the suspended ceiling was not in place). Markers shall be installed so as to be easily read by a person standing on the floor. Provide additional direction of flow arrows at each pipe connections at all control valves.

C. Valves shall be marked as follows:

1. Identification tags made of brass or aluminum, stamped with valve number and abbreviation of system served (HTG, PLBG, CW, HW, GAS, AC). Tags shall be installed on all valves except stops at plumbing fixtures. Tags shall be not less than 1-1/2 inch in diameter, markings shall be stamped and black filled, and lettering shall be minimum 1/4-inch high with numbers minimum 1/2-inch high. Tags shall be wired to each valve with No. 6 polished nickel-steel jack chain.

D. All plumbing equipment which was scheduled on the Contract Drawings shall be marked with the name of the item; i.e., Pump No. 1 etc. The identification shall be the same as shown on the Contract Drawings. The marking shall be located on two different sides of the equipment so as to be easily read, with at least one marking visible to a person standing at floor level near the unit (assuming any necessary access to a concealed unit has been made). Lettering shall be a minimum of 2" high. Marking shall be with engraved phenolic labels, white letters on black background. Equipment marking is not required for; air outlets and inlets, plumbing fixtures.

E. All mechanical control equipment shall be marked with phenolic labels. Equipment shall be marked to match the tags used in the programming of the control equipment.

PART 3 EXECUTION

3.01 WORKMANSHIP

A. This Contractor shall provide completed systems with a neat and finished appearance. If, in the judgment of the Engineer, any portion of the work has not been performed in a workmanlike manner or is left in a rough, unfinished state, this Contractor will be required to remove, reinstall or replace same and patch and paint surrounding surfaces in a manner acceptable to the Engineer, without increase in cost to the Owner.

3.02 CLOSEOUT SUBMITTALS

A. Requirements: Final approval of plumbing installation will be recommended upon completion of the following
1. Completion of all punchlist items
2. Operation instruction period to Owner's satisfaction
3. Permit Submittal
4. Valve list posted
5. Reproducible As-Built drawings delivered to Engineer
6. Asbestos Free Statement
7. Guarantees
8. Equipment Manufacturer of all plumbing units shall provide start-up logs.

3.03 FINAL INSPECTION

A. Final Inspection

1. Prior to acceptance of the plumbing work, the Contractor shall put all plumbing systems into operation for a period of not less than 5 working days so that they may be inspected by the Engineer and the Owner's representatives.
2. The time of the final inspection shall be mutually agreed to by the Owner, Engineer, and Contractor.
3. The Contractor shall furnish adequate staff to operate the plumbing systems during inspection.

3.04 OPERATION AND MAINTENANCE TRAINING

A. Upon completion of the work, and after all tests and final inspection of the work by the Authority(s) having jurisdiction, the Contractor shall demonstrate and instruct the Owner's designated operation and maintenance personnel in the operation and maintenance of the various plumbing systems. The Contractor shall arrange scheduled instruction periods with the Owner. The Contractor's representatives shall be Superintendents or Foremen knowledgeable in each system and Supplier's Representative when so specified.

B. Costs for time involved by Contractor shall be included in the bid.

3.05 PREPARATION

A. Existing Buildings

1. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses.
2. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown.
3. This work shall be scheduled such that utility services and/or existing systems for the facility are not interrupted during normal operating hours, without prior written permission of the Owner's representative. Work that
is performed during normal operational hours shall not interfere with the normal function of the facility's daily operation.

4. The Plumbing Contractor shall be responsible for the removal of all existing plumbing equipment and utilities indicated to be removed on the drawings. The Plumbing Contractor shall also be responsible for the removal and reinstatement of all existing plumbing equipment and utilities that will interfere with installation and operation of any new construction indicated or required and shall be responsible for the removal of all existing plumbing equipment and utilities indicated to be abandoned that will interfere with installation and operation of any new construction indicated or required. All plumbing equipment (other than piping) to be removed shall remain the property of the Owner, and shall be transported - stored - or disposed of, as directed by the Owner. This will be at no cost to the Owner.

5. The Plumbing Contractor shall provide proof of EPA certified training and EPA registered and tested recovery and recycling equipment with his initial submittals. The Contractor shall evacuate, store, transport, and reclaim all CFC’s evacuated from any of the units scheduled for removal to the ARI purity standard.

3.06 INSTALLATION

A. Install plumbing equipment to permit easy access for normal maintenance, and so that parts requiring periodic replacement or maintenance, (e.g., coils, heat exchanger bundles, sheaves, filters, meters, bearings, etc.) can be removed. Relocate items which interfere with access.

B. Provide access doors in equipment, ducts, and walls/ceilings as required to allow for inspection and proper maintenance.

C. If circumstances at a particular location make the accessible installation of an item difficult or inconvenient, the situation shall be discussed with the Engineer before installing the item in a poor access location.

D. Belts, pulleys, couplings, projecting set screws, keys and other rotating parts which may pose a danger to personnel, shall be fully enclosed or guarded in accordance with OSHA regulations.

E. Dissimilar Metals: Provide separations between all dissimilar metals. Where not specified in another way, use 10 mil black plastic tape wrapped at point of contact or plastic centering inserts.

F. Provide offsets around all electrical panels (and similar electrical equipment) to maintain space clear above and below panel to structure and clearance of 3 feet directly in front of panel, except where indicated otherwise or required by NEC to be more. Such offsets are typically not shown on the drawings, but are required per this paragraph.
G. Safety Protection: All piping and related items installed by this Contractor that present a safety hazard (i.e., items installed at/near head height, items projecting into maintenance access paths, etc.) shall be covered (at hazardous area) with 3/4" thick elastomeric insulation and 2" wide reflective red/white striped self-sticking safety tape.

H. Equipment Access: Access to equipment is of utmost importance. Contractor shall apply extra attention to the laying out of pipe routings, and in coordinating all work. Poor access to equipment will not be accepted. Contractor shall note that in essentially all areas, piping routed in ceiling space needs to run in joist space, necessitating elbows/fittings/transitions at crosses with other trades, at structural beams, and at all connections to mains and branches. Dashed areas at HVAC units indicate equipment access areas. These (and all other) access areas shall be clear of obstructions. The Division 22 contractor is responsible to coordinate and ensure that all trades stay clear of access areas for any Division 22 furnished equipment.

I. Insure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents.

3.07 ADJUSTMENT AND CLEANING

A. Properly lubricate equipment before Owner's acceptance.

B. Clean exposed piping, equipment, and fixtures, remove debris from site. Repair damaged finishes and leave everything in working order.

C. All work areas shall be left broom clean and free of debris. Sweep mechanical rooms at completion of work, and dispose of waste. Dispose of all existing waste in mechanical rooms in addition to waste generated by this work.

3.08 COMMISSIONING

A. The Contractor has specific responsibilities relating to demonstrating the equipment and systems provided have been installed and function per the contract specifications. These responsibilities include, but are not limited to the following

1. Complete all equipment and system start-up and checkout procedures, and to ensure the complete readiness of equipment and systems, prior to the start of the functional performance testing phase of the commissioning process.

2. Functional test all plumbing systems in accordance with the Washington State Energy Code. Demonstrate system performance to the Engineer.

3. Provide to the Owner a written commissioning process and the results of the functional performance testing.
B. Owner shall not accept equipment and systems, and Owner shall not make final payment, until all equipment and systems have been successfully commissioned and all specified requirements have been satisfied.

END OF SECTION 22 05 00
PART 1  GENERAL

1.01  WORK INCLUDED

A.  Thermometer
B.  Pressure Gauges
C.  Strainers
D.  Unions
E.  Flexible Connectors

PART 2  PRODUCTS

2.01  APPROVED MANUFACTURERS

A.  Flexible Connectors: Flexonics, Metraflex, Resistoflex, Universal

2.02  THERMOMETERS

A.  Adjustable angle type, with brass stem, separable brass sockets, 7-inch scale, aluminum case, red reading mercury, white face with black numerals, and markings in degrees F.  Provide sockets with extension necks where installed on insulated piping.

B.  Thermometer Temperature Ranges:

<table>
<thead>
<tr>
<th>Measuring</th>
<th>Range Degrees F</th>
<th>Increments Degrees F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Cold Water</td>
<td>0 - 100</td>
<td>1</td>
</tr>
<tr>
<td>Domestic Hot Water</td>
<td>30 - 180</td>
<td>2</td>
</tr>
</tbody>
</table>

2.03  PRESSURE GAUGES

A.  Pressure Gauges: 4-1/2-inch dial (except natural gas gauges which shall have 2-1/2 inch dial), stem mounting, aluminum or stainless steel case, white face with black numerals, phosphor bronze bourdon tube, 1/4-inch NPT bottom connection.  Provide a shut-off cock for all gauges, coil siphon for all steam gauges, and snubber on all liquid line gauges.

B.  Pressure Gauge Ranges:

<table>
<thead>
<tr>
<th>Measuring</th>
<th>Range PSIG</th>
<th>Intervals PSIG</th>
<th>Inter-Graduations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating Hot Water</td>
<td>0 - 200</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>Chilled Water</td>
<td>0 - 120</td>
<td>20</td>
<td>2</td>
</tr>
</tbody>
</table>
2.04 STRAINERS
   A. Water Strainers: "Y" type, same size as the pipe in which they are installed, with cast iron or semi-steel bodies rated for 125 psi working pressure, and with removable cover and sediment basket. Basket screen shall be stainless steel or monel, with a net free area of at least 3 times that of the entering pipe. Provide with blowdown valve where shown on the drawings.

2.05 UNIONS
   A. Dielectric Unions: Rated at 250 psi at 180 deg. F., conforming to ANSI B16.39. Type and size to match piping.
   B. Unions on Copper Pipe:
      1. In 2-Inch Pipe and Smaller: Wrought copper solder joint copper to copper union.
      2. In 2-1/2-Inch Pipe and Larger: Brass flange unions.

2.06 FLEXIBLE CONNECTORS
   A. Double Bellows Type: Steel Flanges, Nylon reinforced neoprene body, Kinetics model KinFlex or approved.

PART 3 EXECUTION

3.01 INSTALLATION
   A. Unions: Install unions in pipe connections to control valves, coils, regulators, reducers, all equipment, and where it may be necessary to disconnect the equipment or piping for repairs or maintenance; and as indicated.
   B. Dielectric Unions: Install dielectric unions at all connections between dissimilar piping materials.

END OF SECTION
PART 1  GENERAL

1.01  WORK INCLUDED

A.  Pipe.

B.  Pipe Fittings.

C.  Pipe Joining and Connections.

1.02  SUBMITTALS

A.  Shall comply with Section 220500.

B.  Product submittals are required for all pipe and pipe fittings to be used on this project.

1.03  GENERAL REQUIREMENTS

A.  Application:  See each individual system specification sections for call-out of piping materials to be used for that system.

1.04  REFERENCES

A.  ANSI/ASTM A53:  Pipe, Steel, Black and Hot Dipped Zinc Coated, Welded and Seamless.

B.  ANSI/ASTM A120:  Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized), Welded and Seamless for Ordinary Uses.

C.  ANSI/ASTM B88:  Seamless Copper Water Tube.

D.  ANSI/ASTM B32:  Solder Metal.


F.  ANSI B16.18:  Cast Bronze Solder Joint Pressure Fittings.

G.  ANSI B16.24:  Cast Copper and Bronze Flange Fittings.


J.  CISPI 310:  Cast Iron Soil Pipe Couplings for Hubless Cast.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Products shall comply with Section 220500, Acceptable Manufacturers.

B. Steel Pipe and Fittings: U.S. Steel, Bethlehem, Walworth, Flagg, Grinnell, Felker.

C. Copper Pipe and Fittings: Mueller, Nibco, Flagg, Elkhart.

D. Cast Iron Pipe: U.S. Steel, Tyler, U.S. Pipe & Foundry

E. Ductile Iron Pipe and Fittings: Pacific States, Union Foundry

F. Plastic Pipe and Fittings: Tyler, Chemtrol, Western Plastics, Spears, GPK.

G. Miscellaneous Fittings/Materials: As called out in individual specifications.

2.02 GALVANIZED STEEL PIPE AND FITTINGS

A. Galvanized Steel Pipe: Seamless or welded, hot-dipped galvanized steel pipe, per ANSI/ASTM A120. Schedule 40 unless indicated otherwise.

B. Fittings: Galvanized malleable iron fittings, 150 lb. per ANSI B16.3.

2.03 COPPER PIPE AND FITTINGS

A. Pipe: Seamless copper tubing, type K, L, or M as indicated, per ANSI/ASTM B88.

B. Fittings: Soldered joints with 95-5 tin-antimony solder per ANSI/ASTM B32 or "Silvabrite 100" (95.5 tin/4 copper/0.5 silver) solder. Solder shall be lead-free. Wrought copper fittings per ANSI B16.22, cast bronze fittings per ANSI B16.18, cast flange fittings 150 lb. per ANSI B16.24. Underground joints shall be brazed, with BCuP-4, BCuP-5, or BAg-1 filler metals (per American Welding Society Standards).

C. Refrigerant Pipe and Fittings: Piping shall be ACR Type L copper tubing, with silver brazed joints using filler metals per American Welding Society Standards, and wrought copper fittings.

2.04 NO-HUB CAST IRON PIPE AND FITTINGS

A. Pipe: Service weight no-hub cast iron pipe per CISPI-301.

B. Fittings: Mechanical joints, stainless steel couplings with neoprene gaskets per

L. ANSI/ASTM F477: Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
ASTM C564 and CISPI-310. Below grade couplings shall be cast iron, conforming to CISP 301-78, and shall be MG Coupling Co. or approved.

2.05 CAST IRON SOIL PIPE AND FITTINGS

A. Pipe: Service weight cast iron per ANSI/ASTM A74 coated with tar pitch.

B. Fittings: Bell and spigot joints, with neoprene gaskets per ASTM C564, and CISPI-HSN.

2.06 DUCTILE IRON PIPE AND FITTINGS

A. Pipe: Ductile iron pipe shall conform to AWWA C151 and shall be Thickness Class 50 minimum. Pipe shall have cement mortar lining conforming to AWWA C104/ANSI A21.4; standard thickness.

B. Fittings: Fittings shall conform to AWWA C110; fittings with push-on joint ends shall conform to the same requirements as fittings with mechanical-joint ends, except that the bell design shall be modified, as approved, for push-on joint. Fittings shall have pressure rating at least equivalent to that of the pipe. Fittings shall have cement-mortar lining conforming to AWWA C104/A21.4, standard thickness.

2.07 COPPER DWV PIPE AND FITTINGS

A. Pipe: Copper drainage tube (DWV), per ASTM B306.

B. Fittings: Wrought copper and wrought copper alloy solder-joint drainage fittings, per ANSI B16.29; or cast copper alloy solder joint drainage fittings, DWV, per ANSI B16.23.

PART 3 EXECUTION

3.01 PIPE INSTALLATION – GENERAL

A. All piping in finished areas shall be installed concealed unless specifically noted otherwise.

B. Install piping at such heights and in such a manner so as not to obstruct any portion of windows, doorways, or passageways.

C. Coordinate installation of piping with all trades which are affected by installation to avoid conflicts.

D. Offset or reroute piping as required to clear any interferences which may occur.

E. Consult all drawings for location of pipe spaces, ducts, electrical equipment, ceiling heights, door openings, window openings, and other details and report discrepancies or possible conflicts to Architect/Engineer before installing pipe.
F. Allow sufficient clearances for installation of pipe insulation in thickness specified. If interferences occur, reroute piping to accommodate insulation.

G. Pitch all piping and provide drain valves so that all piping and equipment can be drained.

H. Provide escutcheons where pipe passes through walls, floors, or ceilings.

I. Install all exposed piping parallel to the closest wall and in a neat, workmanlike manner.

J. Do not run any piping above electrical panels (and similar electrical equipment). Provide offsets around such panels as necessary.

3.02 PIPE JOINING

A. General: Prior to the joining of any section of pipe to a pipe run, the section shall be thoroughly cleaned inside and out, and the ends shall be reamed to remove any cutting burrs.

B. Threaded Connections: Cut piping carefully, ream, thread and work into place without springing. Use teflon tape or lead and graphite lubricant--on male threads only.

C. Caulked Connections: Cast iron pipe shall be made with picked oakum and at least 1-1/2 inches of molten lead or joined with neoprene gaskets in accordance with manufacturer's assembly instructions.

D. Hubless Connections: Made with hubless type coupling assemblies in accordance with manufacturer's recommendations

E. Soldered Connections: Polish contact surfaces of fittings and pipes with emery cloth before fluxing male and female surfaces of joints. Steel wool and sandpaper not permitted for polishing.

F. Unions: Install unions in pipe connections to valves, coils, and any other equipment where it may be necessary to disconnect the equipment or piping for repairs or maintenance; and as indicated. Where flanged connections occur at equipment additional unions are not required unless indicated otherwise.

G. Insulating Unions: Install dielectric insulating unions or insulating type flexible connectors between all connections of copper piping and steel piping or steel equipment. Where flanged connections occur use insulating type flanges.
END OF SECTION 22 05 20
PART 1  GENERAL

1.01  WORK INCLUDED

A. Pipe Hangers

B. Equipment Hangers

1.02  QUALITY ASSURANCE


B. All methods, materials and workmanship shall conform to the Uniform Building Code (UBC) and Uniform Mechanical Code (UMC), as amended and adopted by the authority having jurisdiction.

1.03  SUBMITTALS

A. Submittals shall comply with Section 220500.

B. Submit product data. Indicate where such items are to be used.

C. Shop drawings are required for all equipment supports and fabricated supports or assemblies.

PART 2  PRODUCTS

2.01  ACCEPTABLE MANUFACTURERS


2.02  GENERAL HANGERS AND SUPPORTS

A. Hanger Rods: Threaded hot rolled steel, electro-galvanized or cadmium plated. Hanger rods shall be sized so that the total load (including pipe or duct, insulation, hangers, and fluid) does not exceed the following

<table>
<thead>
<tr>
<th>Nominal Rod Diameter</th>
<th>Maximum Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4 Inch</td>
<td>240 Pounds</td>
</tr>
<tr>
<td>5/16 Inch</td>
<td>440 Pounds</td>
</tr>
<tr>
<td>3/8 Inch</td>
<td>610 Pounds</td>
</tr>
<tr>
<td>1/2 Inch</td>
<td>1130 Pounds</td>
</tr>
</tbody>
</table>

B. Hanger Straps: Galvanized steel. Straps shall be sized so that the total load does not exceed the following
C. **Beam Attachments:** Shall be of the following type

<table>
<thead>
<tr>
<th>MSS Type</th>
<th>Elcen Figure No.</th>
<th>Grinnell Figure No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>33,34</td>
<td>131</td>
</tr>
<tr>
<td>22</td>
<td>67</td>
<td>66</td>
</tr>
<tr>
<td>23</td>
<td>29A</td>
<td>87</td>
</tr>
<tr>
<td>28</td>
<td>95</td>
<td>292,228</td>
</tr>
<tr>
<td>30</td>
<td>95</td>
<td>229</td>
</tr>
</tbody>
</table>

D. **Steel:** Structural steel per ASTM A36.

E. **Wood:** Shall be fire treated.

### 2.03 PIPE HANGERS AND SUPPORTS

A. All hangers used directly on copper pipe shall be copper plated or have a factory applied 1/16-inch thick (minimum) plastic coating on all contact surfaces.

B. All other hangers, supports, and hardware shall be cadmium plated or galvanized.

C. **Pipe Hangers and Supports:** Shall be of the following type (numbers are 'MSS')

<table>
<thead>
<tr>
<th>Maximum System Temperature</th>
<th>Insulated Pipe Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 to 450 Degrees</td>
<td>1, 3, 7, 9, 10, 41, 42, 43, 44, 45, 46, E</td>
</tr>
<tr>
<td>60 to 120 Degrees</td>
<td>1, 3, 7, 9, 10</td>
</tr>
<tr>
<td>33 to 59 Degrees</td>
<td>1, 3, 5, 7, 9, 10, 41, 42, 43, 44, 45, 46, E</td>
</tr>
</tbody>
</table>

D. **Vertical Pipe Supports:** MSS Type 8 riser clamp (elcen Fig. 39 and 339; Grinnel Fig. 261 and 261C).

E. **Trapeze Hangers:** Shall be constructed of carbon steel angles, channels or other structural shapes with flat surface for point of support. Trapeze hangers shall be supported with hanger rods suspended from concrete inserts or approved structural clips. Provide a steel washer plate (Elcen Fig. 84 or equal) where hanger rod nuts bear on trapeze hanger.

F. **Insulated Pipe Supports**

1. Insulation material at pipe support shall consist of expanded perlite insert with flame resistant jacket of nylon reinforced kraft paper bonded to
aluminum foil cover on insulation, with sheet metal shield. Expanded perlite shall have no more than 5% deformation at 100 psi and a thermal conductivity no more than 0.32 Btu/hr./sq. ft./degree F/1-inch thick.

2. Expanded perlite insert shall be same thickness as adjoining pipe insulation, sized to match pipe used on.

3. Minimum insulation, shield lengths, and shield gauge:

<table>
<thead>
<tr>
<th>Normal Pipe Diameter</th>
<th>Insulation Length</th>
<th>Shield Length</th>
<th>Minimum Shield Gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Inches</td>
<td>In Inches</td>
<td>In Inches</td>
<td></td>
</tr>
<tr>
<td>1/2 to 2</td>
<td>6</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>2-1/2 to 3-1/2</td>
<td>6</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>4 to 5</td>
<td>9</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>6 to 10</td>
<td>9</td>
<td>6</td>
<td>16</td>
</tr>
</tbody>
</table>


PART 3 EXECUTION

3.01 INSTALLATION – GENERAL

A. Provide all necessary bolts, nuts, washers, turnbuckles, rod connectors and any other miscellaneous accessories required for the support and anchoring of all pipes, ducts, and mechanical equipment.

B. Install steel or wood backing in walls (anchored to studs) as required to provide support for items hung from walls. Backing shall be of the same material as the studs or structure they are attached to.

C. All welded steel support assemblies shall have a power wire brush and primer paint finish.

D. Attach to building structure as shown on drawings.

E. Maximum spans between piping supports may be significantly less than the maximum spans allowed herein due to structural limitations of allowable loads on hangers. The most restrictive criteria governs. Reference structural drawings.

3.02 INSTALLATION OF PIPE HANGERS AND SUPPORTS

A. Pipe which is not run underground shall be adequately anchored to the structure to prevent sagging and to keep pipe in alignment.

B. All pipe supports shall be provided with a means of adjustment for the aligning and leveling of the pipe after installation.

C. Installation and sizing of pipe supports and accessories shall be in accordance with the manufacturer’s recommendations and standard MSS SP-89 and MSS SP-69, UPC, and UMC.
D. Provide supports at each change in direction of piping.
E. Where mechanically coupled piping is used, a hanger shall be placed within 2 feet on each side of couplings, with hanger spacing in no case to exceed the following:

<table>
<thead>
<tr>
<th>Normal Pipe Diameter</th>
<th>Maximum Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4 to 1 Inch</td>
<td>7 Feet</td>
</tr>
<tr>
<td>1-1/4 to 1-1/2 Inch</td>
<td>7 Feet</td>
</tr>
<tr>
<td>2 Inches</td>
<td>10 Feet</td>
</tr>
<tr>
<td>2-1/2 Inches</td>
<td>10 Feet</td>
</tr>
<tr>
<td>3 Inches and Larger</td>
<td>12 Feet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Normal Pipe Diameter</th>
<th>Maximum Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanically Coupled Piping</td>
<td></td>
</tr>
<tr>
<td>3/4 to 1 Inch</td>
<td>7 Feet</td>
</tr>
<tr>
<td>1-1/4 to 1-1/2 Inch</td>
<td>7 Feet</td>
</tr>
<tr>
<td>2 Inches</td>
<td>10 Feet</td>
</tr>
<tr>
<td>2-1/2 Inches</td>
<td>10 Feet</td>
</tr>
<tr>
<td>3 Inches and Larger</td>
<td>12 Feet</td>
</tr>
</tbody>
</table>

NOTE: Manufacturer's support instructions shall be used where it is more restrictive than the above. Above is for rigid coupled piping systems. Follow manufacturer's requirements for flexible piping systems, except that in no case is spacing to be less than the above.

F. Copper Tubing: Maximum spacing between supports:

<table>
<thead>
<tr>
<th>Nominal Tubing Diameter</th>
<th>Maximum Span Copper</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 to 1 Inch</td>
<td>5 Feet</td>
</tr>
<tr>
<td>1-1/4 to 1-1/2 Inch</td>
<td>6 Feet</td>
</tr>
<tr>
<td>2 to 2-1/2 Inch</td>
<td>8 Feet</td>
</tr>
<tr>
<td>3 Inches and Larger</td>
<td>10 Feet</td>
</tr>
</tbody>
</table>

F. Three or more pipes running parallel may be supported on trapeze hangers provided the slopes of such pipes allow use of common trapeze. Where trapeze width exceeds 24 inches, provide three (3) hanger rod supports.

G. Provide additional supports at concentrated loads (such as valves, in-line pumps, etc.) on each side of the load. Such supports are in addition to the ones otherwise required.

H. Vertical Piping Supports: Support piping at each floor line with pipe clamps and at intermediate points as required to prevent excessive pipe movement and so as to comply with the maximum spacings cited above. Support all pipe stacks at their bases with a concrete pier or suitable hanger. For vertical pipe drops which occur away from a wall or similar anchoring surface, provide angled bracing from nearest structure to provide rigid anchoring of pipe drop.

J. Pre-Insulated Pipe Supports: Protect all insulated pipe at point of support with pre-insulated pipe supports. Such supports shall be in place at time of installing pipe.

END OF SECTION 22 05 29
PART 1 GENERAL

1.01 WORK INCLUDED

A. Pipe Sleeves
B. Seals

1.02 REFERENCES

A. ASTM E814: Fire Tests of Through-Penetration Fire Stops
B. UL 1479: Through-Penetration Fire Stop Systems.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Products shall comply with Section 220500, Acceptable Manufacturers.
B. Fire Seals: 3M, Down Corning, General Electric, Rectorseal.

2.02 PIPE SLEEVES

A. Size: Inside diameter of pipe sleeves shall be at least 1/2-inch larger than the outside diameter of the pipe or pipe covering, so as to allow free movement of piping.
B. Ends: Sleeve ends shall be cut flush with finished surfaces, except in rooms having floor drains where sleeves shall be extended 3/4-inch above finished floor.
C. Material - Structural: Sleeves through structural elements shall be fabricated from Schedule 40 steel pipe.
D. Material - Non-structural: Sleeves through non-structural elements shall be fabricated from 18 gauge galvanized sheet metal or 24 gauge spiral duct.

2.03 SEALS

A. Seals at exterior of building: Provide a sleeve through exterior walls sealed to the wall system per architectural plans. Core drilled penetrations in concrete do not require a sleeve. Provide modular mechanical seal between the sleeve and penetrating pipe. Eaton Link-Seal or approved.
B. Seals In Other Areas: Packed fiberglass or wool insulation, where no weatherproofing or adhesive properties are required; otherwise, sealants shall be silicone type, as specified in applicable Division 7 Specification Section.
PART 3 EXECUTION

3.01 INSTALLATION OF PIPE SLEEVES

A. Provide pipe sleeves for all piping passing through walls, floors, partitions, roofs, foundations, footings, grade beams, and similar elements, except that sleeves are not required for penetrations through existing single solid elements, having no voids, at the location where the piping passes through the solid elements (e.g., solid wood stud, core drilled solid concrete, etc.). Where a sleeve is required, such sleeve shall continue all the way through any solid items within that element however.

B. Set sleeves plumb or level (or sloped as required for drainage pipe) in proper position, tightly fitted into the work.

C. Fill openings around outside of pipe sleeve with same material as surrounding construction, or with material of equivalent fire and smoke rating.

D. Seal around all pipes inside of pipe sleeve.

E. Insulation shall run continuous through sleeves in non-fire rated elements. Insulation shall not run continuous through sleeves in fire rated elements unless the fire sealant system used is UL accepted for use with insulated pipes.

3.02 INSTALLATION OF SEALS

A. Provide seals around all piping and ducts passing through walls, floors, roofs, foundations, footings, grade beams, partitions, and similar elements.

B. Pipe penetrations through the building envelope shall be sealed water tight.

END OF SECTION 22 05 30
PART 1 GENERAL

1.01 WORK INCLUDED
   A. Pipe Insulation.
   B. Equipment and Specialties Insulation.

1.02 DEFINITIONS
   A. "Run-out" means "piping not more than 12 feet long that runs to an individual fixture or unit."
   B. "Conditioned Areas" means "areas that are directly and intentionally supplied by heated or cooled air".

1.03 QUALITY ASSURANCE
   A. All insulation shall have a fire hazard rating not to exceed 25 for flame spread and 50 for smoke development, as tested by ASTM E-84, NFPA 255, and UL-723.

1.04 SUBMITTALS
   A. All submittals shall comply with Section 220500.
   B. Provide product data on all insulation materials to be used. Indicate thicknesses to be used.

1.05 GENERAL REQUIREMENTS
   A. Code Compliance: Contractor shall insulate all systems with the materials and thicknesses as specified herein, but in no case shall the insulation be less than that required by the Washington State Energy Code (latest edition and amendments) or Energy Code enforced by the authority having jurisdiction. Contractor shall, in addition to insulating those systems/items specified herein, provide insulation where required by Code.
   B. Insulation at Hangers: Insulation shall be continuous through hangers on all insulated systems (except ductwork.) Inserts at hangers are specified and are considered as part of the hanger and support system. Inserts are required to be installed at the time of pipe installation and are intended to be installed by the Contractor installing the pine hangers/supports.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS
   A. Products shall comply with Section 220500, Acceptable Manufacturers.
   B. Insulation: Manville, Armstrong, Owens-Corning, CSG, Knauf, Rubatex, Pittsburgh Corning, Imcoa, Halstead.
   C. Accessories: Same as for insulation and Duro Dyne, Gustin Bacon, Childers, RPR, Tee Cee, J. P. Stevens, Buckaroos, Johnson.

2.02 PIPE INSULATION
   A. Fiberglass Insulation: Rigid fiberglass insulation, thermal conductivity shall not exceed 0.24 Btu-inch/hr-sq. ft.-degrees F. at 75 degrees F with jacket consisting of high density white kraft bonded to aluminum foil, with pressure sensitive closure system, integral vapor barrier with 0.02 perm rating.
B. Elastomeric Insulation: Density not less than 5 lbs per cubic foot and thermal conductivity not greater than 0.27 Btu-inch/hr-ft-degrees F. Armstrong "Armaflex" or equal.

C. Foamglas Insulation: Glass cell insulation, Pittsburgh Corning "Foamglas," with thermal conductivity no less than 0.35 Btu-in/hr-sq. ft.-degrees F at 75 degrees F, compressive strength of 100 psi, and water-vapor permeability of 0.00 perm-inch as tested per ASTM and "pittwrap" water-proof membrane.

D. Pipe Fittings (except unions and expansion couplings): Shall be covered using any one of the following methods of the Contractor's choice:
   1. Prefabricated segments of pipe insulation of same materials and thickness as the adjoining pipe insulation, formed to match pipe fitting.
   2. Pre-cut fiberglass insulation and pre-molded PVC covers suitable for the pipe size and insulation thickness encountered. PVC cover shall be equal to Manville "Zeston."
   3. Insulating plastic cement brought up the full height of the adjacent covering.

E. Metal Jacket: Aluminum roll jacketing, with smooth surface, manufactured from 1100, 3003, 3105 or 5005 aluminum alloy conforming to ASTM B-209. Shall be minimum 0.016 inches thick, with an integrally bonded interior moisture barrier over the entire surface in contact with the insulation.

F. P-traps and HW/CW Lines on Handicap Lavatories: Prefabricated insulation specially designed for p-trap application, with white elastomeric insulation, white high gloss PVC cover, and snap together closure. Provide section for insulating HW stop, CW stop, and leads of same material. TRU BRO “LAV GUARD” or equal.

G. Insulation Thickness and Types:
   1. Domestic Hot Water:
      a. Aboveground:
         | Pipe Size       | Fiberglass Insulation Thickness |
         | Run outs Up to 2 Inches | 0.5 Inch |
         | 2 Inches and Less     | 1.0 Inch  |
         | 2.5 Inches to 4 Inches | 2.0 Inch  |
   2. Domestic Cold Water: 1/2 inch thick fiberglass insulation.
   3. Refrigerant Suction Piping:
      a. 1 inch thick elastomeric insulation for pipe sizes 1 inch and less; 1.5 inch thick elastomeric for larger pipe sizes.
   4. Condensate Drain Piping (within the building): 1/2 inch thick fiberglass or elastomeric insulation.
   5. Outdoor Piping: Piping exposed to outside air shall have insulation thickness increased by 0.5 inch from that indicated above. Elastomeric
insulation may be used in lieu of fiberglass, provided the insulation is manufacturer approved for applications proposed.

6. Alternative Insulation Thickness: Insulation thickness indicated is based on the thermal conductivities specified. Contractor at his option may use other insulation thicknesses for insulation with different thermal conductivities provided that the overall heat transfer coefficient is the same as if the specified insulation had been used. Submit calculations showing insulation equivalency for approval.

2.03 EQUIPMENT AND SPECIALTIES INSULATION

A. Equipment: Insulation shall be same material as that specified for the piping system the equipment is installed in. Insulation thickness shall be 1.5 inches.

B. Valves: All valves installed in insulated piping systems shall be insulated. Insulation material and thickness shall be same as that specified for the pipe system the valve is installed in. Insulation shall be removable type on all control valves.

C. Removable Insulation: Shall provide thermal insulating properties equivalent to that which is provided for piping system. Shall consist of 0.25-inch J. P. Stevens "Insulbatte" with glass cloth jacket, 4.0-inch Owens-Corning thermal insulating wool, Type II, fastened with No. 304 stainless steel hooks tied with 0.040-inch soft solid annealed copper wire. Where metal jacketing is required, provide with removable enclosures, of same material as metal jacketing, configured to suit items covered.

PART 3 EXECUTION

3.01 GENERAL

A. Equipment and Floor Protection: Cover existing equipment and finished floors to protect such items from insulation fiber and dust. Keep all such existing areas in a "broom clean" condition at the end of each day. Take precautions in these areas to prevent glass fiber and insulation dust from entering existing ventilating systems.

B. Glass Fiber Insulation:
   1. Finish all insulation ends, no raw edges allowed.
   2. Joints: Tightly butt adjacent insulation sections together without any voids. Provide overlap of jacket material over all circumferential joints.

C. Insulation Thickness: See "Part 2 - Products" for insulation thicknesses.

D. Items To Be Insulated: Provide insulation on all piping, and all items installed in the piping systems, all energy conveying, all energy storage, and all energy consuming devices specified as part of Division 22, except where such insulation has been specifically excluded.

E. Items Excluded From Being Insulated:
   1. Electric motors.
   2. Factory insulated water heaters (except for base).
   3. Fire sprinkler piping.
4. Stops and risers at plumbing fixtures (Except ADA Lavatories).

3.02 PIPE INSULATION INSTALLATION

A. All ends shall be firmly butted together and secured with butt strips of a minimum 3 inch wide. On hot piping, all jacket laps and butt strips shall be secured with outward clinch staples at 4 inch spacing, or by use of a suitable lap adhesive.

B. All piping shall be insulated except where specifically excluded.

C. Elastomeric Pipe Insulation: Shall be completely sealed to provide a vapor proof barrier.

D. Pipe Hangers: Provide insulation tight up to pre-insulated pipe supports at pipe hangers.

E. Pipe Sleeves: For insulated pipe, do not run insulation through sleeve, except where fire sealant system used is UL approved for use with insulated pipes, then install insulation in full sized thickness completely through the pipe sleeve.

F. No pipe covering materials shall be applied until the pipe runs to be covered have been tested by the Contractor and reviewed by the Architect-Engineer, and no covered sections of pipe shall be buried or concealed in the structure until said insulation and covering work has been reviewed.

G. Handicap Lavatories: Insulate P-trap and HW supplies below lavatory where exposed.

H. Items in piping that require access (i.e. flow measurement devices) shall have removable insulation provided.

I. Provide metal jacket over piping insulation for all outside exposed piping.

3.03 EQUIPMENT AND SPECIALTIES INSTALLATION

A. All equipment where access is required shall have insulation installed so that it can be easily removed and reinstalled without requiring new insulation. Items requiring such removable insulation include, but are not limited to, the following:

1. Control Valves.
2. Strainers.

B. Specialties Requiring Insulation: All items connected in an insulated piping system shall be insulated, except the following:

1. Factory Insulated Items.
2. Water Meters.
3. Hose Bibbs.
4. Relief Valves.
PART 1  GENERAL

1.01  WORK INCLUDED
A.  Non Potable Water Piping.
B.  Valves.
C.  Testing and Inspection.

1.02  SUBMITTALS
A.  Submittals shall comply with Section 220500.
B.  Submit product information on all items to be used.

1.03  GENERAL REQUIREMENTS
A.  Solder:  Only lead-free solder shall be used on potable water systems.
B.  All work and products shall comply with the governing codes (reference Section 220500).

PART 2  PRODUCTS

2.01  ACCEPTABLE MANUFACTURERS
A.  Products shall comply with Section 220500, Acceptable Manufacturers.
B.  Valves:  Crane, Grinnell, Nibco, Stockham, Walworth, Milwaukee, Kitz, Red-White, Watts.
C.  Pressure Reducing Valves:  Watts, Cla-Val, Bell & Gossett, Wilkins.
D.  Trap Primers:  JR. Smith, Precision Plumbing Products.
B.  Additional manufacturers are as listed for each individual item.

2.02  PIPE AND FITTINGS
A.  Pipe and fitting standards shall be as specified in Section 220520, Pipe and Pipe Fittings.
B.  Domestic Water Piping Located Above Ground:  Type L copper tubing with solder joints and wrought copper or cast brass fittings.
C. Domestic Water Piping Located Below Ground: Type K copper tubing with silver brazed joints and wrought copper or cast brass fittings.

D. Trap Primer Piping: Type L or K "soft" or "hard" (bending temper) copper, with compression fittings or soldered joints.

2.03 VALVES

A. Gate Valves


B. Globe Valves

1. 2-1/2 Inches and Smaller: 125 psi-swp bronze globe, threaded bonnet, teflon or bronze disc, solder or threaded connection. Stockham No. B-13T, B-14T, B-16, B-17.

2. 3 Inches and Larger: 125 psi-swp iron body globe, bronze mounted, bronze or teflon disc, flanged. Stockham No. G-512, G-514T.

C. Ball Valves

1. 2-1/2 Inches and Smaller: 125 psi-swp bronze ball, standard port, 2 piece construction, anti-blowout stem, teflon seats, stainless steel or chrome plate ball, extended stem, memory stop, solder or threaded connections as required. Nibco S580, T580.

D. Check Valves: Class 125 bronze check valve, horizontal swing, regrinding type, Y-pattern, renewable discs, complying with MSS SP-80.

E. Pressure Reducing Valves

1. Bronze body construction, renewable nickel alloy seat, with integral strainer and union inlet connections. Adjustable range 25 to 75 lbs. Watts U5 or approved.

F. Pressure Relief Valves: ASME rated pressure relief valve, set for pressure indicated or as required to protect system from over pressure. Valve shall have minimum 400,000 BTU/HR relief capability and no smaller than 3/4-inch connection sizes.

G. Buried Site Isolation Valves: 200 psi nonshock water working pressure, iron body, bronze mounted, non-rising stem type, open counterclockwise, with "o-ring" type packing, standard 2-inch operating nut, complying with ANSI/AWWA C500. Furnish with operating wrench, length to suit installation.
2.04 SPECIALTIES

A. Water Hammer Arrestors: All metal, factory precharged with inert gas, sealed internal bellows; 125 psi working pressure. All wetted parts shall be type 300 stainless steel, brass or copper. Zurn "Shoktrol", Wade "Shokstop", J. R. Smith "Hydrotral", or Josam equivalent; in P.D.I. (Plumbing and Drainage Institute) sizes as indicated.

B. Trap Primer Valve:
   1. For Single Drains: Cast bronze trap primer valve, 1/2-inch connections, for serving single floor drain. J.R. Smith No. 2699 or approved.
   2. For Single and Multiple Drains: Manufactured of corrosion resistant copper and brass, with valve and line pressure adjustment with manifold for serving multiple drains. Primer valve activated by drop-in water pressure. Precision Plumbing Products "Prime Rite" or approved.
   3. Valve Box: Cast iron box, rated for H2O loading, adjustable type with flanged top section and flared base. Style to suit valve used with and depth, and as acceptable to local code officials. Valve box cover shall be cast with words "WATER".

2.05 BACKFLOW PREVENTERS

A. Reduced Pressure Type: Washington State approved, with air gap drain and resilient seated full flow shutoff valves and test cocks. Size [and capacity] as shown on drawings. Febco Models 825Y, 825 or approved.

B. Double Check Type: Washington State approved, with resilient seated full flow shutoff valves and test cocks. Size [and capacity] as shown on the drawings. Febco Model 805, 805Y or approved.

2.06 DOMESTIC WATER DIAPHRAGM TANK

A. Diaphragm type thermal expansion absorber. Amtrol or approved.
B. Construction: Welded steel construction, with rigid polypropylene liner, butyl diaphragm, air charging valve, and ASME certified.
C. Capacity: 4.7 gallon tank volume (minimum).

PART 3 EXECUTION

3.01 INSTALLATION OF PIPING AND FITTINGS

A. Installation and joining of all piping shall comply with Section 220520.
B. Provide all non-potable water, domestic hot water, and cold water piping as indicated and as required to allow supply connections to each fixture and equipment item requiring water supply.

C. Run all piping concealed unless piping is specifically noted as to be run exposed.

D. Provide supply connections to equipment furnished by others in accordance with Section 220500

E. Install all piping sloped to low points to allow the system to be drained.

3.02 INSTALLATION OF VALVES

A. For Valves 2-Inch and Smaller: Provide ball valves unless drawings indicate globe valves.

B. Provide isolation valves as shown on the drawings. In addition to those shown, provide added valves to allow for the isolation of each group of fixtures and all individual equipment items.

C. Install valves so as to be easily accessible and oriented to permit ease of operation. Valve stem shall be directed toward operator in either the vertical or horizontal direction. Provide access doors or panels to valves built into construction.

D. Provide pressure reducing valves as shown on drawings, complete with by-pass line, isolation valves, unions, and pressure gauges. Set initial pressure as shown, and adjust as required so that all fixtures/devices served have sufficient water pressure.

E. Provide drain valves at the base of all risers.

F. Provide drain valves at piping low points where the piping cannot be drained through fixtures or hose bibbs.

G. Provide balancing valves in hot water circulation piping where indicated and where required to allow for equal distribution of hot water circulation flows.

H. Butterfly valves installed at equipment or other system components which may be disconnected from the system shall be lug type suitable for dead end service. This includes butterfly valves at water heaters, pressure reducing valves, and similar equipment.

3.03 INSTALLATION OF SPECIALTIES

A. Water Hammer Arrestors: Install per manufacturer's instructions. Provide ball isolation valve in piping to arrestor. Where access cannot be provided at water line location, extend water hammer arrestor piping and locate above ceiling
out of plumbing chase. Provide ceiling access doors as required. Provide water hammer arrestors at each flush valve or at the end of a bank of flush valves. Size water hammer arrestors per P.D.I.

B. Trap Primers: Provide trap primers to all vented floor drains and where required by the governing code. Install as shown on drawings and provide with an isolation valve in the branch line to the trap primer valve.

C. Access Covers and Doors: Provide access to all valves, water hammer arrestors, trap primers, backflow preventers, and any other piping accessories which would otherwise be inaccessible.

D. Provide backflow preventers of type, and in locations, as shown on the drawings.

E. Backflow devices shall be installed, inspected, and tested in accordance with the applicable portions of the Washington Administrative Code and other applicable regulations as set forth by the Washington State Department of Social and Health Services.

F. Install heat tracing as shown on drawings and in accordance with manufacturer's instructions and NEC requirements.

3.04 WATER SERVICE CONNECTIONS

A. Provide connection to water main outside the building as shown on the drawings.

B. Provide sleeve in floor for entrance of service main into building, seal watertight; anchor service main firmly to building floor and walls. Seals shall comply with Section 220530, Supports, Sleeves, and Seals.

3.05 TESTING AND INSPECTION

A. All piping shall be tested, inspected, and approved (by the local authority having jurisdiction) prior to being concealed or covered.

B. Testing shall be witnessed by the plumbing inspector and the Architect/Engineer. Notify Architect/Engineer 48 hours prior to date of testing.

C. Piping shall be hydrostatically tested for a period of 2 hours, during which time no drop in pressure or leakage shall occur.

D. Test pressure shall be not less than 150 percent of the maximum to which the pipe will ordinarily be subjected; but in no case less than 150 psig.

F. Any leaks or defective piping disclosed by testing and inspection shall be repaired with new materials and the system re-tested.

3.06 FLUSHING AND DISINFECTION
A. System Flushing: After tests are completed, all water piping shall be flushed. In general, sufficient water shall be used to produce a minimum water velocity of 2.5 feet per second through piping being flushed. Flushing shall be continued until discharge water shows no discoloration. System shall be drained at low points. Strainer screens shall be removed, cleaned, and replaced in line. System valves and fixture faucets shall be opened and re-closed to completely flush system. After flushing and cleaning, systems shall be prepared for disinfection service by immediately filling water piping with clean, fresh potable water. Any stoppage, discoloration, or other damage to the finish, furnishings, or parts of the building, due to the Contractor’s failure to properly clean the piping system, shall be repaired by the Contractor.

B. Adjust the hot water circulation system for uniform circulation throughout the system.

C. Upon completion of the job and prior to final acceptance, the plumbing system shall be disinfected with Chlorine solution. Review procedures and disinfection with the authority having jurisdiction to insure that all work complies with code requirements. Verify any deviations from specified procedures with the Engineer prior to proceeding. The chlorinating material shall be either liquid chlorine conforming to AWWA B301 or hypochlorite conforming to AWWA B300 (or as otherwise required by the authority having jurisdiction). Water chlorination procedure shall be in accordance with AWWA M20 (or procedure acceptable to authority having jurisdiction). The chlorinating material shall provide a dosage of not less than 50 parts per million and shall be introduced into the system in an approved manner. The treated water shall be retained in the pipe long enough to destroy all non-spore-forming bacteria.

D. The retention time shall be at least 24 hours and shall produce not less than 10 ppm of chlorine at the extreme end of the system at the end of the retention period. All valves in the system being sterilized shall be opened and closed several times during the contact period. The system shall then be flushed with clean water until the residual chlorine is reduced to less than 1.0 ppm. During the flushing period all valves and faucets shall be opened and closed several times.

E. The Contractor shall employ an approved agency to take test samples at several points of the system in properly sterilized containers and arrange with the Health Department having jurisdiction to test the samples. Should the samples not test satisfactory, the system shall be re-sterilized and re-flushed until satisfactory samples are obtained.

F. The Contractor shall furnish a letter to the Engineer stating that Chlorination has been completed. The letter shall also include a copy of a certificate from the Health Department having jurisdiction stating that samples taken have been found acceptable.
END OF SECTION 22 11 00
PART 1  GENERAL

1.01  WORK INCLUDED
A. Medical Gas Piping
B. Gas Outlets/Vacuum Inlets
C. Testing and Inspection.
D. Sterilization.

1.02  SUBMITTALS
A. Submittals shall comply with Section 220500.
B. Submit product information on all items to be used.

1.03  REFERENCES
A.  2015 UPC: Health Care Facilities and Medical Gas and Medical Vacuum Systems
B. CGA G-4.1
C. NFPA 99

1.04  GENERAL REQUIREMENTS
A. Solder: Only lead-free solder shall be used on potable water systems.
B. All work and products shall comply with the governing codes (reference Section 220500).

PART 2  PRODUCTS

2.01  ACCEPTABLE MANUFACTURERS
A. Products shall comply with Section 220500, Acceptable Manufacturers.
B. Medical Gas Outlets/Vacuum Inlets: Amico, Allied Health Care
C. Additional manufacturers are as listed for each individual item.

2.02  MEDICAL GAS PIPING
A. Pipe and fitting standards shall be as specified in Section 220520, Pipe and Pipe Fittings.
B. Tubes, valves, fittings, station outlets, and other piping components in medical gas systems shall have been cleaned for oxygen service by the manufacturer
prior to installation in accordance with CGA G-4.1 except that fittings shall be permitted to be cleaned by a supplier or agency other than the manufacturer.

C. Each length of tube shall be delivered plugged or capped by the manufacturer and kept sealed until prepared for installation. Fittings, valves, and other components shall be delivered sealed, labeled, and kept sealed until prepared for installation.

D. Tubes shall be hard-drawn, seamless copper ASTM B819 medical gas tube, Type L when operating pressures are less than 185 psi and pipe size is under 3-1/8 in. O.D.

E. Tubes shall be hard-drawn, seamless copper ASTM B819 medical gas tube, Type K when operating pressure exceeds 185 psi and pipe size exceeds 3-1/8 in. O.D.

2.02 MEDICAL VACUUM SYSTEMS

A. Pipe and fitting standards shall be as specified in Section 220520, Pipe and Pipe Fittings.

B. Tubes, valves, fittings, station outlets, and other piping components in medical gas systems shall have been cleaned for oxygen service by the manufacturer prior to installation in accordance with CGA G-4.1 except that fittings shall be permitted to be cleaned by a supplier or agency other than the manufacturer.

C. Piping for medical vacuum systems shall be constructed of one of the following:
   1. Hard-drawn seamless copper tube in accordance with one of the following:
      a. ASTM B88 copper tube (Type K, L, M)
      b. ASTM B280 copper ACR tube
      c. ASTM B819 copper medical gas tubing (Type K or L)

2.03 JOINTS AND CONNECTIONS

A. Medical gas and medical vacuum systems shall have turns, offsets, and other changes in direction made using the following fittings or joining methods.
   1. Brazed in accordance with the following
      a. Brazed joints shall be made using a brazing alloy that exhibits a melting temperature in excess of 1000 F to retain the integrity of the piping system in the event of fire exposure.
      b. Fittings for tubes, turns, offsets, and other changes in direction shall be made with wrought-copper capillary fittings in accordance with ASME B16.22 or brazed fittings in accordance with ASME B16.50
      c. Copper cast alloy fittings shall not be permitted.
      d. Brazed tube joints shall be socket type.
      e. Filler metals shall bond with and be metallurgically compatible with the base metals being joined.
f. Copper to copper joints shall be brazed using a copper-phosphorus or copper-phosphorus-silver brazing filler metal without flux.

g. Joints to be brazed in place shall be accessible for necessary preparation, assembly, heating, filler application, cooling, cleaning, and inspection.

h. Tube ends shall be cut square.

i. The interior surface of tubes, fittings, and other components that are cleaned for oxygen service shall be stored and handled to avoid contamination prior to assembly and brazing. Any cleaning or re-cleaning must be performed in accordance with UPC 1309.3.6

j. Flux shall only be used where brazing dissimilar metals.

k. Where being brazed, joints shall be continuously purged with oil-free, dry nitrogen NF to prevent the formation of copper oxide on the inside surfaces of the joint.

l. Tube ends shall be inserted fully into the socket or to a mechanically limited depth that is not less than the minimum cup depth in accordance with ASME B16.50

m. Brazed joints that are identified as defective shall be replaced.

2. Threaded in accordance with the following:

a. Be limited to connections for pressure and vacuum indicators, alarm devices, check valves, and source equipment on the source side of the source valve.

b. Be tapered pipe threads in accordance with ASME B1.20.1

c. Be made up with polytetrafluorethylene tape or other thread sealant recommended for oxygen service, with the sealant applied to the male threads only and care taken to ensure sealant does not enter the pipe.

2.04 MEDICAL OUTLETS and VACUUM INLETS

A. Flat plate type medical gas outlets. Ohmeda Diamond Compatable. All outlets shall be UL listed, comply with NFPA 99, and flow rates shall exceed these requirements.

B. Outlets shall include a universal rough-in assembly in order to accept quick disconnects or DISS front adapters. They shall also be interchangeable at any time.

C. Outlets shall be of modular design and include a gas specific mounting plate designed to permit on-site ganging of multiple outlets, in any order, on 5” spacing.

D. Outlet bodies shall be gas specific by indexing each gas service to a gas specific out pin indexing arrangement on the respective identification module.

E. Each outlet shall be 100% pressure tested and cleaned for medical gas service.

F. MRI outlets shall be manufactured from non ferrous materials.

G. All outlets shall be cleaned and degreased for medical gas service, factory assembled and tested.

H. Outlets shall have double seals to prevent gas leakage.
I. Outlets shall be manufactured with a 7-3/4" length type “K” 1/2” outside diameter (3/8” nominal) size copper inlet pipe stub which is silver brazed to the outlet body. The body shall be of 1-5/16” diameter, one piece brass construction.

J. For positive pressure gas services, the outlets shall be equipped with a primary and secondary check valve and the secondary check valve shall be rated at a maximum of 200 psi in the event the primary check valve is removed for maintenance.

PART 3  EXECUTION

3.01 INSTALLATION OF PIPING AND FITTINGS

A. Installation and joining of all piping shall comply with Section 220520.

B. Provide all medical gas and vacuum piping as indicated and as required to allow supply connections to each fixture and equipment item requiring medical gas or vacuum.

C. Run all piping concealed unless piping is specifically noted as to be run exposed.

D. Provide supply connections to equipment furnished by others in accordance with Section 220500

E. Install all piping sloped to low points to allow the system to be drained.

3.05 INITIAL TESTING AND INSPECTION

A. All piping shall be tested, inspected, and approved (by the local authority having jurisdiction) prior to being concealed or covered.

B. Testing shall be witnessed by the plumbing inspector and the Architect/Engineer. Notify Architect/Engineer 48 hours prior to date of testing.

C. Piping shall be hydrostatically tested until each joint has been examined for leakage by means of a leak detectant that is safe for use with oxygen and does not contain ammonia.

D. Test pressure shall be not less than 150 percent of the maximum to which the pipe will ordinarily be subjected; but in no case less than 150 psig.

F. Any leaks or defective piping disclosed by testing and inspection shall be repaired with new materials and the system re-tested.

3.06 Standing Pressure Test

A. After successful completion of the initial gas pressure tests, medical gas distribution piping shall be subjected to a standing pressure test by a party qualified.

B. Tests shall be conducted after the final installation of station outlet valve bodies, face plates, and other distribution system components.
C. The source valve shall be closed during testing.

D. The piping system shall be subjected to a 24 hour standing pressure test using oil-free, dry nitrogen NF.

E. Test pressures shall be 20 percent above the normal system operating line pressure.

F. At the conclusion of the tests, there shall not be a change in the test pressure except that attributed to change in ambient temperature.

G. Leaks shall be located, repaired or replaced.

H. The 23 hour standing pressure test shall be witnessed by the Authority Having Jurisdiction. A form indicating this test has been performed and witnessed shall be provided to the verifier at the start of the tests.

END OF SECTION 22 60 70
PART 1 GENERAL

1.01 WORK INCLUDED

A. Cryogenic Vent Piping
B. Cryogenic Vent Insulation
C. Testing and Inspection.

1.02 SUBMITTALS

A. Submittals shall comply with Section 220500.
B. Submit product information on all items to be used.
C. Welder certifications.

1.03 REFERENCES

A. 2015 UPC: Health Care Facilities and Medical Gas and Medical Vacuum Systems
B. ASTM A312 Specification for seamless, welded, and heavily cold worked austenitic stainless steel pipe.
D. ASTM A403 Specification for wrought austenitic stainless steel fittings.
E. NFPA 99 Health Care Facilities Code

1.04 GENERAL REQUIREMENTS

A. All work and products shall comply with the governing codes (reference Section 220500).

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Products shall comply with Section 220500, Acceptable Manufacturers.
B. Pipe and Fittings: Bristol Metals, Savoy
C. Pipe Insulation: Armstrong Cryogenic, Owens Corning Foamglass
D. Additional manufacturers are as listed for each individual item.

2.02 CRYOGENIC VENT PIPING

A. Pipe shall be Schedule 10 ANSI 304 Stainless Steel Seamless (ASTM A312) or Electric Fusion Welded (ASTM A358)
B. Fittings shall be Butt Weld type ANSI 304 Stainless Steel wrought austenic stainless steel fittings. ASTM A403WR

C. Each length of pipe shall be delivered plugged or capped by the manufacturer and kept sealed until prepared for installation. Fittings, valves, and other components shall be delivered sealed, labeled, and kept sealed until prepared for installation.

2.03 JOINTS AND CONNECTIONS

A. All joints shall be welded with like filler material.

B. Elbows: Elbows shall be long radius elbows. The centerline bend radius shall be a minimum of 1.5 times the pipe diameter.

C. Concentric reducer: concentric reducer shall have a minimum expansion length of 2.5 x (D2-D1)

D. RF Wave Guide Connection: A 215mm x 3mm flange welded to the end of the pipe is required to make the connection from the contractor provided vent pipe to the MRI Manufacturer’s wave guide. See manufactures installation drawings.

2.04 CRYOGENIC VENT INSULATION

A. Insulation that can withstand a minimum temperature of 406.7 degrees Fahrenheit. Expanded Polystyrene or fiberglass.

B. Thickness: 3” thick with a minimum insulation value of R-11.

C. Vapor barrier: The closed cell insulation shall form a vapor barrier without the need for Vapor barrier must be non metallic

D. Insulation shall be a two layer system of prefabricated shells with staggered joints, or a three layered flexible system with staggered joints.

E. Contraction Joint: The pipe shall be allowed to contract without damaging the insulation. Provide contraction joints as recommended by the insulation manufacturer. Each straight run of pipe shall be allowed to contract 1.5 inches without damaging the insulation.

2.05 WELDER

A. Welder shall be experienced at welding stainless steel pipe. Welder shall be certified by American Welding Society for welding pressure pipe, and for stainless steel.

PART 3 EXECUTION

3.01 INSTALLATION OF PIPING AND FITTINGS

A. Installation and joining of all piping shall comply with Section 220520.
B. Run all piping concealed unless piping is specifically noted as to be run exposed.

C. Provide supply connections to equipment furnished by others in accordance with Section 220500

D. Install all piping sloped to low points to allow the system to be drained.

3.05 INITIAL TESTING AND INSPECTION

A. All piping shall be tested, inspected, and approved (by the local authority having jurisdiction) prior to being concealed or covered.

B. Testing shall be witnessed by the plumbing inspector and the Architect/Engineer. Notify Architect/Engineer 48 hours prior to date of testing.

C. Piping shall be pneumatically tested until each joint has been examined for leakage by means of a leak detectant that is safe for use with oxygen and does not contain ammonia.

D. Test pressure shall be not less than 150 percent of the maximum to which the pipe will ordinarily be subjected; but in no case less than 150 psig.

E. Any leaks or defective piping disclosed by testing and inspection shall be repaired with new materials and the system re-tested.

END OF SECTION 22 63 50
PART 1  GENERAL

1.01  WORK INCLUDED

A. General HVAC Requirements.

B. HVAC Submittals.

C. Motors.

D. Equipment and Piping Identification.

E. Commissioning.

1.02  GENERAL

A. Includes, but not limited to, furnishing labor, materials, and equipment for completion of work unless indicated or noted otherwise. See Division 1 for sequence of work.

B. All work included in Division 23 shall be the responsibility of a single HVAC Subcontractor. This Contractor shall obtain and pay for all permits required by State and local authorities governing the installation of the HVAC work. It is the Contractor's responsibility to contact all utility organizations serving the building, prior to bid, and to include all charges for inspections, installation of materials, equipment and connection of all required utilities.

C. Furnish exact location of electrical connections and complete information on motor controls to Division 26.

D. The drawings and specifications are complementary and what is called for in either is binding as if called for in both.

E. The ductwork and accessibility to HVAC equipment shall take precedence over all other equipment in the ceiling interstitial spaces or other mechanical areas including, but not limited to, domestic water piping and electrical conduit.

F. All HVAC equipment and devices furnished or installed under other Divisions of this specification (or by the Owner) which require connection to any mechanical systems (i.e., plumbing systems or duct systems, or controls) shall be connected under this division of the Specifications.

G. The Contractor shall be responsible for checking field conditions and verifying all measurements and relationships indicated on the drawings before proceeding with the work.
1.03 ELECTRICAL

A. All electrical work, conduit, boxes and devices in connection with control wiring as required to install the control equipment as specified herein or shown on the drawings shall be furnished and installed complete by the Division 23 Contractor.

B. All electrical work performed under this section of the Specifications shall conform to all applicable portions of the Division 26 specifications and shall conform to all governing codes.

C. All equipment shall be factory wired to a junction box for connection to electrical service.

D. Where a piece of equipment specified includes an electric motor, the motor shall be furnished and mounted by this Contractor. Motor starter, disconnect switches and wiring from the electrical panel to the motor control devices and to the motor shall be provided by the Division 26 Contractor unless stated otherwise in the HVAC specification and on the HVAC equipment schedule.

1.04 SYSTEMS DESCRIPTION

A. Site Inspection

1. Examine premises and understand the conditions which may affect performance of work of this Division before submitting proposals for this work.

2. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.

B. Drawings:

1. HVAC drawings show general arrangement of ductwork, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.

2. Consider electrical drawings part of this work insofar as these drawings furnish information relating to design and construction of building.

3. Because of small scale of HVAC drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.

1.05 SUBMITTALS

A. All material used on the project shall be new and free of defects. The Engineer reserves the right to reject any material, the appearance of which has been damaged on the site or in shipment. The material shall be of approved equal quality to that which is specified. Should the make and type of material differ
from that specified, the Contractor may be required to submit catalog and engineering data (samples if requested) necessary to make a comparison and determine its suitability. The Contractor shall also bear the cost of any changes to the electrical design made necessary by any approved substitutions. Such request for approval shall be made two weeks in advance of the bid opening to allow time to assess its suitability. Failure to obtain approval prior to bid shall require the successful bidder to furnish materials and equipment only as specified herein.

B. The Contractor shall submit to the Engineer, for approval, complete information on all equipment and materials to be provided on the project including six copies of the manufacturer’s catalog and engineering data, shop drawings of shop fabricated equipment and instruction data for each item included under this section of the specifications. Submittals shall be presented to the Engineer within 30 calendar days from the date of the contract signing in complete indexed and bound sets. The Contractor shall submit a typed, signed list including all items to be furnished on the project. The signature on the aforementioned list shall indicate that the contractor has examined the suitability of all material and equipment with respect to compliance with these specifications. The Contractor’s approval shall also indicate that physical dimensions of the equipment have been verified with the installation requirements and were found to cause no interference therewith.

C. Review of submittal data by the Engineer or Engineer does not relieve the Contractor of responsibility for quantities, measurements, and compliance with the intent of all contract documents.

D. Furnish submittals on all items and equipment specified in Division 23 and all items indicated on HVAC drawings in a hard-back, three-ring binder.

E. The Contractor shall submit the HVAC cost breakdown including all sub-contractors costs.

1.06 OPERATION AND MAINTENANCE MANUAL FOR HVAC SYSTEMS

A. Bind Operation & Maintenance Manual for HVAC Systems in three-ring, hard-backed binder with clear plastic pocket on spine. Spine of each binder shall have following typewritten lettering inserted:

   OPERATION AND MAINTENANCE MANUAL
   FOR HVAC SYSTEMS

B. Provide master index at beginning of Manual showing items included. Use plastic tab indexes for sections of Manual.

C. First section shall consist of name, address, and phone number of Engineer, General Contractor, and Mechanical, Plumbing, Sheet Metal, Refrigeration, Temperature control, and Electrical subcontractors. Also include complete list of equipment installed with name, address, and phone number of each vendor.
D. Provide section for each type of item of equipment.

E. Submit copies of Operation & Maintenance Manual to Engineer for approval.

F. 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.

G. Operating Instructions shall include

1. General description of each HVAC system.

2. Step-by-step procedure to follow in putting each piece of HVAC equipment into operation.

H. Maintenance Instructions shall include

1. Manufacturer’s maintenance instructions for each piece of HVAC equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists operation instructions of equipment, and maintenance and lubrication instruction.

2. Summary list of HVAC equipment requiring lubrication showing name of equipment, location, and type and frequency of lubrication.

3. List of HVAC equipment used indicating name, model, serial number, and nameplate data of each item together with number and name associated with each system item.

1.07 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies

1. Perform work in accordance with applicable Codes.

2. In case of differences between building codes, state laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern.

B. Product Approvals: See paragraphs elsewhere in this specification.

C. Manufacture: Use domestic made duct, duct fittings, and motors on Project.

D. Identification: Motor and equipment name plates as well as applicable UL and AGA labels shall be in place when Project is turned over to Owner.
1.08 CODES AND STANDARDS

A. Codes and agencies having jurisdictional authority over HVAC installation.
   Washington State Energy Code
   International Building Code -- Latest Approved Edition
   International Mechanical Code -- Latest Approved Edition
   International Fuel Gas Code -- Latest Approved Edition
   State and County Department of Health
   Occupational Safety and Health Administration (OSHA)
   Washington Industrial Safety and Health Act (WISHA)

1.09 PRODUCT HANDLING AND PROTECTION

A. Contractor is responsible for protection of all material, equipment and apparatus provided under this section from damage, water, corrosion, freezing and dust, both in storage and when installed, until final project acceptance.

B. Provide temporary heated and sheltered storage facilities for material and equipment.

C. Completely cover motors and other moving machinery to protect from dirt and water during construction.

D. Handle and protect equipment and/or material in manner precluding unnecessary fire hazard.

E. Equipment requiring rotation and/or lubrication during storage shall have records maintained and witnessed on a monthly basis and forwarded to the Engineer prior to acceptance.

F. Material or equipment damaged because of improper storage or protection will be rejected.

G. Equipment finish that is damaged by handling, storage, etc. shall be corrected by the Contractor at no additional cost to the Owner.

1.10 WARRANTIES

A. In addition to guarantee specified in General Conditions, guarantee heating, cooling, and plumbing systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.

B. In order to be protected, secure proper guarantees from suppliers and subcontractors.

C. Provide certificates of warranty for each piece of equipment. Clearly record "start-up" date of each piece of equipment on certificate. Include certificates as part of Operation & Maintenance Manual.
1.11 ABBREVIATIONS

AFF  Above Finish Floor
AMCA  Air Moving & Conditioning Association
ANSI  American National Standards Institute
APWA  American Public Works Association
ARI  Air Conditioning and Refrigeration Institute
ASHRAE  American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME  American Society of Mechanical Engineers
ASTM  American Society of Testing & Materials
AWWA  American Water Works Association
BFF  Below Finish Floor
BHP  Brake Horsepower
BTU  British Thermal Unit
CFC  Chloro - Flurocarbon
CFM  Cubic Feet per Minute
DOT  US Department of Transportation
EPA  Environmental Protection Agency
fpm  feet per minute
FS or Fed. Spec. Federal Specifications
HP  Horsepower
IEEE  Institute of Electrical and Electronics Engineers
KW  Kilowatt
MBH  One Thousand British Thermal Units per Hour
MS or Mil.Spec. Military Specifications
MSS  Manufacturers Standardization Society
NEC  National Electrical Code
NEMA  National Electrical Manufacturers Association
per  in accordance with
PVC  Polyvinyl Chloride
SMACNA  Sheet Metal and Air Conditioning Contractors National Association
SP  Static Pressure
UL  Underwriter's Laboratories
w.g.  Water Gauge (inches of water)
WQA  Water Quality Association

Additional abbreviations are as listed on the drawings or elsewhere in these specifications.

1.12 DEFINITIONS

A. Finished Spaces: Spaces used for habitation or occupancy where rough surfaces are plastered, panelled, or otherwise treated to provide a pleasing appearance.

B. Unfinished Spaces: Spaces used for storage or work areas where appearance is not a factor.
C. Concealed Spaces: Spaces out of sight. For example, above ceilings; below floors; between double walls; furred-in areas; pipe and duct shafts; and similar spaces.

D. Exposed: Open to view. For example, duct running through a room and not covered by other construction.

E. Outside: Open to view up to 5 feet beyond the exterior side of walls, above the roof, and unexcavated or crawl spaces.

F. Conditioned Space: An area, room or space normally occupied and being heated or cooled for human habitation by any equipment.

1.13 FREON RECYCLING AND HVAC DISPOSAL

A. This Subsection addresses requirements for collection and recycling of chlorinated fluorocarbon (CFC) refrigerants. Existing HVAC units identified for removal on the project drawings contain CFC’s (FREON 22).

B. Federal law requires contractors handling CFC’s to use only technicians certified under training requirements provided by Section 82 of the Clean Air Act as implemented by the U. S. Environmental Protection Agency (EPA) (40 CFR 82, Part F). In addition, contractors must use only recovery and recycling equipment registered at the regional EPA office. The contractor must have certification that this equipment has been tested by Underwriters Laboratory (UL) or Air-Conditioning and Refrigerant Institute (ARI). Refrigerant taken off-site must be transported in transport containers certified by the U.S. Department of Transportation (DOT) and must be reclaimed to the ARI Standard 700-1993 purity as documented by laboratory analysis.

C. The Contractor shall provide the following documentation with his initial submittals to the Engineer:

1. Proof of certification of technician training to recover and recycle CFC’s;
2. Proof that his recovery and recycling equipment is registered with the Region 10 EPA Office and has been tested by either UL or ARI; and
3. Proof that his transport containers meet DOT specifications.

D. The Contractor shall provide certification of freon evacuation for either/both HVAC units designated for disposal and shall provide EPA mandated records showing the following:

1. The date, and quantity and type of refrigerant removed;
2. The technician’s name and certification number;
3. Certification that the unit was evacuated of freon to a vacuum of 0 millimeters of mercury;
4. The recycling facility name and address; and
5. Laboratory analysis certifying the freon had been reclaimed to ARI Standard 700-1993 purity.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Any reference to the specifications or on the drawings to any article, device, product, material, fixture, form or type of construction by manufacturer, name, make, or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition.

B. The manufacturer listed as Acceptable Manufacturers are approved for the items indicated without obtaining prior approval. Other manufacturers require prior approval.

C. The listing of a manufacturer as an Acceptable Manufacturer does not necessarily mean that the products of that manufacturer are equal to those specified. The listing is only an indication of those manufacturers which may be capable of manufacturing, or have in the past manufactured, items equal to those specified, and is intended to aid the Contractor in identifying manufacturers.

D. Products provided by Acceptable Manufacturers shall be equal to or superior to the specified manufacturer's item in function, appearance, and quality, and shall fulfill all requirements of the plans and specifications. The Engineer shall be the final judge as to whether an item meets these requirements or not. If a manufacturer is not certain that his product meets these requirements or not, then the manufacturer shall submit data as required to obtain the Design Consultant's approval.

D. The approval of a manufacturer applies to the manufacturer only and does not relieve the Contractor from the responsibility of meeting all applicable requirements of the plans and specifications.

E. Contractor shall be responsible for all costs to other trades and all revisions required to accommodate any products which are different than those specified or shown.

F. In reviewing a manufacturer for acceptance, factors considered include the following: engineering data showing item's performance, proper local representation of manufacturer, likelihood of future manufacturer's local support of product, service availability, previous installation, previous use by Owner/Engineer and record, product quality, availability/quality of maintenance and operation data, capacity/performance compared to specified items, acoustics, items geometry/access utility needs, and similar concerns.

H. If approval is received to use other than specified items, responsibility for specified capacities and insuring that items to be furnished will fit space available lies with this Division.
I. If non-specified equipment is used and it will not fit job site conditions, this Division assumes responsibility for replacement with items named in Specification.

2.02 ACCESS DOORS

A. This contractor shall be responsible for furnishing and installing flush mounted access doors in walls, ceiling and floors and chases where the following equipment is concealed and is not accessible through same.

1. Valves (shut off)
2. Dampers (balancing)
3. Electric Heater Control Panels
4. Fire Smoke Dampers
5. HVAC Controls and Actuators

B. Doors shall be UL listed 16 ga. cold rolled steel with concealed hinge, screwdriver operated lock and prime coated. Furnish suitable for area mounted.

C. Approved Manufacturers

1. Milcor
2. Karp
3. Greenheck

2.03 EQUIPMENT AND PIPING IDENTIFICATION

A. General: All ducting, valves, and HVAC equipment shall be marked. All markings in concealed accessible spaces shall be reviewed and verified by Architect/Engineer prior to being concealed.

B. Valves shall be marked as follows

1. Identification tags made of brass or aluminum, stamped with valve number and abbreviation of system served (HTG, PLBG, CW, HW, GAS, AC). Tags shall be installed on all valves except stops at plumbing fixtures. Tags shall be not less than 1-1/2 inch in diameter, markings shall be stamped and black filled, and lettering shall be minimum 1/4-inch high with numbers minimum 1/2-inch high. Tags shall be wired to each valve with No. 6 polished nickel-steel jack chain.

C. All HVAC equipment which was scheduled on the Contract Drawings shall be marked with the name of the item; i.e., Heating Ventilating Unit No. 1, Exhaust Fan No. 2, Boiler No. 1 etc. The identification shall be the same as shown on the Contract Drawings. The marking shall be located on two different sides of the equipment so as to be easily read, with at least one marking visible to a person standing at floor level near the unit (assuming any necessary access to a
concealed unit has been made). Lettering shall be a minimum of 2" high. Marking shall be with engraved phenolic labels, white letters on black background. Equipment marking is not required for; air outlets and inlets, plumbing fixtures.

D. All HVAC control equipment shall be marked with phenolic labels. Equipment shall be marked to match the tags used in the programming of the control equipment.

PART 3 EXECUTION

3.01 WORKMANSHIP

A. This Contractor shall provide completed systems with a neat and finished appearance. If, in the judgment of the Engineer, any portion of the work has not been performed in a workmanlike manner or is left in a rough, unfinished state, this Contractor will be required to remove, reinstall or replace same and patch and paint surrounding surfaces in a manner acceptable to the Engineer, without increase in cost to the Owner.

3.02 CLOSEOUT SUBMITTALS

A. Requirements: Final approval of mechanical installation will be recommended upon completion of the following

1. Completion of all punchlist items
2. Operation instruction period to Owner's satisfaction
3. Permit Submittal
4. Valve list posted
5. Reproducible As-Built drawings delivered to Engineer
6. Asbestos Free Statement
7. Guarantees
8. Equipment Manufacturer of all HVAC compressor units shall provide start-up logs.

3.03 FINAL INSPECTION

A. Final Inspection

1. Prior to acceptance of the HVAC work, the Contractor shall put all HVAC systems into operation for a period of not less than 5 working days so that they may be inspected by the Engineer and the Owner's representatives.

2. The time of the final inspection shall be mutually agreed to by the Owner, Engineer, and Contractor.
3. The Contractor shall furnish adequate staff to operate the HVAC systems during inspection.

3.04 OPERATION AND MAINTENANCE TRAINING

A. Upon completion of the work, and after all tests and final inspection of the work by the Authority(s) having jurisdiction, the Contractor shall demonstrate and instruct the Owner's designated operation and maintenance personnel in the operation and maintenance of the various HVAC systems. The Contractor shall arrange scheduled instruction periods with the Owner. The Contractor's representatives shall be Superintendents or Foremen knowledgeable in each system and Supplier's Representative when so specified.

B. Scheduled instruction periods shall be

- HVAC System Controls 2 Hours
- HVAC Equipment Maintenance 2 Hours

C. Costs for time involved by Contractor shall be included in the bid.

3.05 PREPARATION

A. Existing Buildings

1. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses.

2. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown.

3. This work shall be scheduled such that utility services and/or existing systems for the facility are not interrupted during normal operating hours, without prior written permission of the Owner's representative. Work that is performed during normal operational hours shall not interfere with the normal function of the facility's daily operation.

4. The HVAC Contractor shall be responsible for the removal of all existing HVAC equipment and utilities indicated to be removed on the drawings. The HVAC Contractor shall also be responsible for the removal and reinstallation of all existing HVAC equipment and utilities that will interfere with installation and operation of any new construction indicated or required and shall be responsible for the removal of all existing HVAC equipment and utilities indicated to be abandoned that will interfere with installation and operation of any new construction indicated or required. All HVAC equipment (other than piping) to be removed shall remain the property of the Owner, and shall be transported - stored - or disposed of, as directed by the Owner. This will be at no cost to the Owner.

5. The HVAC Contractor shall provide proof of EPA certified training and EPA registered and tested recovery and recycling equipment with his initial submittals. The Contractor shall evacuate, store, transport, and
reclaim all CFC’s evacuated from any of the units scheduled for removal to the ARI purity standard.

3.06 INSTALLATION

A. Install HVAC equipment to permit easy access for normal maintenance, and so that parts requiring periodic replacement or maintenance, (e.g., coils, heat exchanger bundles, sheaves, filters, meters, bearings, etc.) can be removed. Relocate items which interfere with access.

B. Provide access doors in equipment, ducts, and walls/ceilings as required to allow for inspection and proper maintenance.

C. If circumstances at a particular location make the accessible installation of an item difficult or inconvenient, the situation shall be discussed with the Engineer before installing the item in a poor access location.

D. Belts, pulleys, couplings, projecting set screws, keys and other rotating parts which may pose a danger to personnel, shall be fully enclosed or guarded in accordance with OSHA regulations.

E. Dissimilar Metals: Provide separations between all dissimilar metals. Where not specified in another way, use 10 mil black plastic tape wrapped at point of contact or plastic centering inserts.

F. Provide offsets around all electrical panels (and similar electrical equipment) to maintain space clear above and below panel to structure and clearance of 3 feet directly in front of panel, except where indicated otherwise or required by NEC to be more. Such offsets are typically not shown on the drawings, but are required per this paragraph.

G. Safety Protection: All ductwork, piping and related items installed by this Contractor that present a safety hazard (i.e., items installed at/near head height, items projecting into maintenance access paths, etc.) shall be covered (at hazardous area) with 3/4" thick elastomeric insulation and 2" wide reflective red/white striped self-sticking safety tape.

H. Equipment Access: Access to equipment is of utmost importance. Contractor shall apply extra attention to the laying out of duct routings, and in coordinating all work. Poor access to equipment will not be accepted. Dashed areas at HVAC units indicate equipment access areas. These (and all other) access areas shall be clear of obstructions. The Division 23 contractor is responsible to coordinate and insure that all trades stay clear of access areas for any Division 23 furnished equipment.

I. Insure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents.
3.07. ADJUSTMENT AND CLEANING

A. Properly lubricate equipment before Owner's acceptance.

B. Clean exposed ductwork, equipment, and fixtures, remove debris from site. Repair damaged finishes and leave everything in working order.

C. All work areas shall be left broom clean and free of debris. Sweep HVAC rooms at completion of work, and dispose of waste. Dispose of all existing waste in HVAC rooms in addition to waste generated by this work.

3.08 COMMISSIONING

A. The Contractor has specific responsibilities relating to demonstrating the equipment and systems provided have been installed and function per the contract specifications. These responsibilities include, but are not limited to the following

1. Complete all equipment and system start-up and checkout procedures, and to insure the complete readiness of equipment and systems, prior to the start of the functional performance testing phase of the commissioning process.

2. Functional test all HVAC systems in accordance with the Washington State Energy Code. Demonstrate system performance to the Engineer.

3. Provide to the Owner a written commissioning process and the results of the functional performance testing.

B. Owner shall not accept equipment and systems, and Owner shall not make final payment, until all equipment and systems have been successfully commissioned and all specified requirements have been satisfied.

END OF SECTION 23 05 00
PART 1 GENERAL

1.01 WORK INCLUDED

A. Duct Hangers

B. Equipment Hangers

1.02 QUALITY ASSURANCE


B. All methods, materials and workmanship shall conform to the Uniform Building Code (UBC) and Uniform Mechanical Code (UMC), as amended and adopted by the authority having jurisdiction.

1.03 SUBMITTALS

A. Submittals shall comply with Section 230500.

B. Submit product data. Indicate where such items are to be used.

C. Shop drawings are required for all equipment supports and fabricated supports or assemblies.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS


2.02 GENERAL HANGERS AND SUPPORTS

A. Hanger Rods: Threaded hot rolled steel, electro-galvanized or cadmium plated. Hanger rods shall be sized so that the total load (including pipe or duct, insulation, hangers, and fluid) does not exceed the following:

<table>
<thead>
<tr>
<th>Nominal Rod Diameter</th>
<th>Maximum Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4 Inch</td>
<td>240 Pounds</td>
</tr>
<tr>
<td>5/16 Inch</td>
<td>440 Pounds</td>
</tr>
<tr>
<td>3/8 Inch</td>
<td>610 Pounds</td>
</tr>
<tr>
<td>1/2 Inch</td>
<td>1130 Pounds</td>
</tr>
</tbody>
</table>
B. Hanger Straps: Galvanized steel. Straps shall be sized so that the total load does not exceed the following:

<table>
<thead>
<tr>
<th>Strap Size</th>
<th>Maximum Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>1” x 22 Gauge</td>
<td>230 Pounds</td>
</tr>
<tr>
<td>1” x 20 Gauge</td>
<td>290 Pounds</td>
</tr>
<tr>
<td>1” x 18 Gauge</td>
<td>380 Pounds</td>
</tr>
<tr>
<td>1’ x 16 Gauge</td>
<td>630 Pounds</td>
</tr>
</tbody>
</table>

C. Beam Attachments: Shall be of the following type:

<table>
<thead>
<tr>
<th>MSS Type</th>
<th>Eicen Figure No.</th>
<th>Grinnell Figure No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>33,34</td>
<td>131</td>
</tr>
<tr>
<td>22</td>
<td>67</td>
<td>66</td>
</tr>
<tr>
<td>23</td>
<td>29A</td>
<td>87</td>
</tr>
<tr>
<td>28</td>
<td>95</td>
<td>292, 228</td>
</tr>
<tr>
<td>30</td>
<td>95</td>
<td>229</td>
</tr>
</tbody>
</table>

C. Steel: Structural steel per ASTM A36.

D. Wood: Shall be fire treated.

2.03 DUCT HANGERS AND SUPPORTS

A. Hangers: As shown in SMACNA HVAC Duct Construction Standards.

B. Vertical Duct Supports at Wall: 1-1/2” x 1/8” (minimum) strap or 1-1/2” x 1-1/2” x 1/8” (minimum) angle bracket and as shown in SMACNA HVAC Duct Construction Standards Figure 4-7.

D. Hanger Attachments to Structure: As shown in SMACNA HVAC Duct Construction Standard Figures 4-1, 4-2, 4-3 to suit building construction and as allowed on structural drawings. Where C-clamps are provided, retainer clips shall be used. Friction beam clamps shall not be used.

E. Hanger Attachments to Ducts: As shown in SMACNA HVAC Duct Construction Standards Figure 4-4.

F. Rooftop Supports: Polyethylene platform with galvanized steel strut. Foam bottom for contact with roof membrane. Load rated for a minimum of 1000 Lbs. Provide galvanized steel straps sized as hanger straps, Erico Caddy Pyramid ST or approved.

PART 3 EXECUTION

3.01 INSTALLATION – GENERAL

A. Provide all necessary bolts, nuts, washers, turnbuckles, rod connectors and any other miscellaneous accessories required for the support and anchoring of all ducts, and HVAC equipment.
B. Install steel or wood backing in walls (anchored to studs) as required to provide support for items hung from walls. Backing shall be of the same material as the studs or structure they are attached to.

B. All welded steel support assemblies shall have a power wire brush and primer paint finish.

C. Attach to building structure as shown on drawings.

D. Maximum spans between piping supports may be significantly less than the maximum spans allowed herein due to structural limitations of allowable loads on hangers. The most restrictive criteria governs. Reference structural drawings.

3.02 INSTALLATION OF DUCT HANGERS AND SUPPORTS

A. Provide anchors and supports for all ductwork.

B. Rectangular Duct: Supports and hangers shall be of size and spacing as shown in SMACNA HVAC Duct Construction Standards for the appropriate class of duct. (Hangers maximum allowable loads shall not be as shown in SMACNA Tables but shall be as specified in these specifications.)

C. Round Duct: Supports and hangers shall be of size and spacing as shown in SMACNA HVAC Duct Construction Standards for the appropriate class of duct.

D. Maximum Hanger Spacing (provided duct gauge and reinforcement comply with SMACNA Standards for such spacing):

<table>
<thead>
<tr>
<th>Duct Area</th>
<th>Maximum Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 4 sq. ft. (27&quot; dia)</td>
<td>8 Feet</td>
</tr>
<tr>
<td>4.1 to 10 sq. ft. (28&quot; to 42&quot; dia)</td>
<td>6 Feet</td>
</tr>
<tr>
<td>10.1 sq. ft. and up (43&quot; dia and up)</td>
<td>4 Feet</td>
</tr>
</tbody>
</table>

E. Provide supports at each change in direction of duct. Locate hangers at inside and outside corners of elbows, or at each end of fitting, on each side.

F. Provide additional supports at each side concentrated loads (such as modulating dampers, duct heaters, sound attenuators, etc.)

G. Provide supports for exterior ductwork per SMACNA HVAC Duct Construction Standards or as detailed on the drawings.

3.03 INSTALLATION OF HVAC EQUIPMENT ANCHORS AND SUPPORTS

A. Provide anchoring and supports for all HVAC equipment.

B. Heating, Ventilating and Air Conditioning equipment where suspended from structure shall be supported per SMACNA HVAC Duct Construction Standards or as shown on the drawings.
C. Equipment shall be supported and anchored in such a way so that no equipment vibration is transmitted to the building structure.

D. Added supports and bracing shall be provided per Section 230548
PART 1 GENERAL

1.01 WORK INCLUDED

A. Vibration Isolators

B. Seismic Restraints

PART 2 PRODUCTS

2.01 NEOPRENE ISOLATORS

A. Suspension Isolators: Shall be double deflection neoprene type, with isolator encased in open steel bracket and minimum 3/8-inch deflection. Hanger rod shall be isolated from steel bracket with neoprene grommets. Mason Series HD, Amber Booth "BRD" or approved.

2.02 SPRING ISOLATORS

A. General: The load carried by each isolator shall be carefully calculated and isolators selected so that the static deflection will be the same and the supported equipment will remain level. Isolators shall be so designed that the ends of the springs will remain parallel during and after deflection to operating height. At operating height, springs shall have additional travel to complete (solid) compression equal to at least 50 percent of the operating deflection. Suspension isolator springs shall have a static deflection (as shown on drawings) not less than 1-1/2", except that for units with components rotating at 1000 rpm and less, the static deflection shall be not less than 2 inches. Floor isolator springs shall have deflection of not less than 1 inch. All isolators shall provide at least 96% isolation efficiency. Note: Deflections other than these may be used where circumstances warrant and more optimum isolation results can be achieved.

B. Suspension Type Spring Isolators: Shall consist of a rigid steel frame, a stable steel spring in the bottom part of the frame, and double deflection neoprene isolating pad at the top of the frame. Where supporting rods pass through the frame, a clearance of not less than on half rod diameter shall be provided all around the rod. Mason Series DNHS, Amber Booth "BSSR" or approved.

2.03 SEISMIC RESTRAINTS

A. Materials: Steel shall be per STM A36; hangers and other devices shall be as shown in "Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Piping Systems". Sheet metal used for bracing shall be no less than 16 gauge. Cable bracing may be used provided that opposed acting cables are provided on the items being braced to provide bracing equal to that provided by rigid angle bracing.
PART 3 EXECUTION

3.01 INSTALLATION

A. Vibration Isolation:

1. Motorized equipment shall be suspended from spring vibration isolators either integral or external to the equipment.

2. Unless otherwise indicated, resilient mounts for motorized equipment shall be of the type and size to provide maximum ten percent transmissibility. Use unhoused, free-standing stable steel springs which are preferred over housed spring assemblies. The horizontal stiffness of the spring shall be approximately equal to its vertical stiffness. The Spring deflection shall be selected based on the equipment power range (HP), speed range (RPM), and static deflection of the supporting structural floor. For large equipment such as fans the steel spring static deflection of the supporting structural floor. It is a specific recommendation that whenever a steel spring is used, two pads of ribbed waffle-pattern neoprene be used in series with the spring.

3. The design of vibration dampening shall consider lateral load as well as vertical load and be suitably snubbed against earthquake forces.

4. A list of isolators accompanied by certified transmissibility ratings for the required duty shall be submitted for each item of equipment.

5. Unless noted otherwise, all vibration isolating equipment shall be of the same make and shall be submitted as one group.

6. Special equipment, such as compressors shall be selected on an individual basis.

3.02 SEISMIC CONTROL

A. Provide earthquake snubbers for all equipment that is supported on spring isolators and weighing over 300 lbs. including base. Provide minimum of four snubbers for equipment weighing less than 2,000 lbs., and eight snubbers for heavier equipment.

B. Ductwork: Longitudinal and transverse bracing shall be required for all round ducts 28 inches in diameter and larger, for rectangular ducts 6 square feet and larger, and on all duct systems used for life safety and smoke control installed in either the horizontal or vertical position. Bracing shall be applied as follows:

1. Transverse bracing shall occur at maximum intervals of 30 feet, at each duct turn and at the end of a duct run.

2. Longitudinal bracing shall occur at maximum intervals of 60 feet. Transverse bracing for one duct section may also act as longitudinal bracing for a duct section connected perpendicular to it, if bracing is installed within 4 feet of the intersection and sized and installed on the larger duct.
3. Groups of ducts may be combined in a larger size frame using overall dimensions and maximum weight of ducts. At least two sides of each duct must be connected to the angles of the brace.

4. Walls, including non-bearing fixed partitions which have ducts running through them, may replace a transverse brace.

5. Bracing may be omitted when the top of the duct is suspended 12 inches or less from the supporting structural members and on roof top ductwork.

END OF SECTION 23 05 48
PART 1 GENERAL

1.01 WORK INCLUDED

A. Qualifications of Cleaning Contractor
B. Duct Cleaning.
C. Duct Access Doors.
D. Pre-Installation Conference.

1.02 DEFINITIONS

A. Duct Sizes: All duct dimensions shown are inside clear dimensions. Where inside duct lining is specified or indicated, duct dimensions are to the inside face of lining.

1.03 QUALITY ASSURANCE

A. Fabricate and install ductwork in accordance with SMACNA duct construction publications and ASHRAE handbooks.
B. Materials and installations shall comply with NFPA 90A, NFPA 90B, and the UMC

1.04 SUBMITTALS

A. Submittals shall comply with Section 230500.
B. Submit photographs of the ducts before and after cleaning.
C. Submit cleaning contractor’s qualifications for approval.

1.05 QUALIFICATIONS OF CLEANING CONTRACTOR

A. Experience: The HVAC system cleaning contractor shall submit records of experience in the field of HVAC system cleaning. A minimum of 3 years of experience and recent references shall be submitted. Bids shall only be considered from firms which are regularly engaged in HVAC system maintenance with an emphasis on HVAC system cleaning.
B. Equipment, Materials and Labor: The HVAC system cleaning contractor shall possess and furnish all necessary equipment, materials and labor to adequately perform the specified services.

1.06 REFERENCES


D. NFPA 90B: Standard for the Installation of Warm Air Heating and Air Conditioning Systems.

E. IMC: International Mechanical Code.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Products shall comply with Section 230500, Acceptable Manufacturers.

B. Duct Access Doors: Ductmate.

C. Duct Sealant and Tape: Durkee-Atwood, Hardcast, Duro-Dyne, Benjamin Foster, Products Research, Chemical Corp.

2.02 GENERAL MATERIALS

A. Duct Access Doors: Construct of galvanized sheet steel, insulated, double latch, rectangular or spiral pipe design as required. 10”x6” minimum size.

B. Duct Sealant: Shall be fire resistant with a flame spread rating of 25 or less, and a smoke developed rating of 50 or less. Sealant shall also be water resistant and compatible with mating materials and types of joints or connections being sealed, specifically made for sealing ducts. Exterior duct sealant shall be specifically intended for outdoor use as a duct sealant.

PART 3 EXECUTION

3.01 DUCT ACCESS DOOR INSTALLATION

A. Install duct access doors where indicated on drawings, at each elbow with turning vanes, and as required to facilitate duct cleaning.

B. Install duct access doors on flat sections of duct in a manner to prevent air leakage when closed. Provide a bead of duct sealant around the duct access door frame.

3.02 HVAC SYSTEM COMPONENT INSTRUCTIONS AND SITE PREPARATIONS

A. HVAC System Component Inspections: Prior to the commencement of any cleaning work, the HVAC system cleaning contractor shall perform a visual inspection of the HVAC system to determine appropriate methods, tools, and equipment required to satisfactorily complete this project. The cleanliness
inspection should include air handling units and representative areas of the HVAC system components and ductwork. In HVAC systems that include multiple air handling units, a representative sample of the units should be inspected.

B. The cleanliness inspection shall be conducted without negatively impacting the indoor environment through excessive disruption of settled dust, microbial amplification or other debris. In cases where contamination is suspected, and/or in sensitive environments where even small amounts of contaminant may be of concern, environmental engineering control measures should be implemented.

C. Damaged system components found during the inspection shall be documented and brought to the attention of the Engineer.

3.03 DUCT CLEANING AND TESTING

A. Containment: Debris removed during cleaning shall be collected and precautions must be taken to ensure that Debris is not otherwise dispersed outside the HVAC system during the cleaning process.

B. Particulate Collection: Where the Particulate Collection Equipment is exhausting inside the building, HEPA filtration with 99.97% collection efficiency for 0.3-micron size (or greater) particles shall be used. When the Particulate Collection Equipment is exhausting outside the building, Mechanical Cleaning operations shall be undertaken only with Particulate Collection Equipment in place, including adequate filtration to contain Debris removed from the HVAC system. When the Particulate Collection Equipment is exhausting outside the building, precautions shall be taken to locate the equipment down wind and away from all air intakes and other points of entry into the building.

C. Component Cleaning: Cleaning methods shall be employed such that all HVAC system components must be Visibly Clean as defined in applicable standards (see NADCA Standards). Upon completion, all components must be returned to those settings recorded just prior to cleaning operations.

D. Air-Volume Control Devices: Dampers and any air-directional mechanical devices inside the HVAC system must have their position marked prior to cleaning and, upon completion, must be restored to their marked position.

E. Air distribution devices (registers, grilles & diffusers): The contractor shall clean all air distribution devices.

F. Coils: All heating and cooling coils in ducts and units shall be cleaned to visibly clean.

G. Health and Safety Standards: Cleaning contractors shall comply with applicable federal, state, and local requirements for protecting the health and safety of the contractor’s employees, building occupants, and the environment. In particular, all applicable standards of the Occupational Safety and Health Administration (OSHA) shall be followed when working in accordance with this specification.

3.04 MECHANICAL CLEANING METHODOLOGY
A. Source Removal Cleaning Methods: The HVAC system shall be cleaned using Source Removal mechanical cleaning methods designed to extract contaminants from within the HVAC system and safely remove contaminants from the facility. It is the contractor’s responsibility to select Source Removal methods that will render the HVAC system Visibly Clean and capable of passing cleaning verification methods (See applicable NADCA Standards) and other specified tests, in accordance with all general requirements. No cleaning method, or combination of methods, shall be used which could potentially damage components of the HVAC system or negatively alter the integrity of the system.

1. All methods used shall incorporate the use of vacuum collection devices that are operated continuously during cleaning. A vacuum device shall be connected to the downstream end of the section being cleaned through a predetermined opening. The vacuum collection device must be of sufficient power to render all areas being cleaned under negative pressure, such that containment of debris and the protection of the indoor environment are assured.

2. All vacuum devices exhausting air inside the building shall be equipped with HEPA filters (minimum efficiency), including hand-held vacuums and wet-vacuums.

3. All vacuum devices exhausting air outside the facility shall be equipped with Particulate Collection including adequate filtration to contain Debris removed from the HVAC system. Such devices shall exhaust in a manner that will not allow contaminants to re-enter the facility. Release of debris outdoors must not violate any outdoor environmental standards, codes or regulations.

4. All methods require mechanical agitation devices to dislodge debris adhered to interior HVAC system surfaces, such that debris may be safely conveyed to vacuum collection devices. Acceptable methods will include those, which will not potentially damage the integrity of the ductwork, nor damage porous surface materials such as liners inside the ductwork or system components.

B. Methods of Cleaning Fibrous Glass Insulated Components: Fibrous glass thermal or acoustical insulation elements present in any equipment or ductwork shall be thoroughly cleaned with HEPA vacuuming equipment, while the HVAC system is under constant negative pressure, and not permitted to get wet in accordance with applicable NADCA and NAIMA standards and recommendations. Cleaning methods used shall not cause damage to fibrous glass components and will render the system capable of passing Cleaning Verification Tests (see NADCA Standards).

C. Methods of Cleaning Coils: Where possible steam clean coils with high pressure hot water or steam. Where coils do not have drain pans or can not be made wet without hand cleaning with grease dissolving cleaning solution and brush. Remove large debris with compressed air. Comb coil fins to remove dents.
END OF SECTION 23 05 70
PART 1  GENERAL

1.01  WORK INCLUDED

A. Air Balancing.

B. Hydronic System Balancing

C. Report.

1.02  REFERENCES

A. Associated Air Balance Council: National Standards for Field Measurements and Instrumentation.


1.03  GENERAL REQUIREMENTS

A. General: The air and hydronic balancing shall be done by a company which specializes in this type of work and is totally independent and separate from the company or contractor which has installed the systems to be balanced.

B. Prior to beginning balancing, submit the name of the company the Contractor proposes to have do the balancing to the Architect/Engineer for approval.

C. Engineer: The final report of this work shall be stamped by a licensed Mechanical Engineer and accompanied by a statement from this engineer that the work complies with the Associated Air Balance Council Standards and these project specifications.

D. Notify the Architect in writing of all problems or discrepancies between actual conditions and what design documents show as work proceeds.

E. The Balancer shall be directly responsible to the Engineer and shall perform this work as directed by the Engineer.

PART 2  PRODUCTS

2.01  GENERAL INSTRUMENTATION

A. Balancing equipment shall comply with Associated Air Balance Council recommendations for field measurement instrumentation.
B. All measuring instruments shall be accurately calibrated and maintained in good working order. Calibration dates and certifications shall be available at Engineer's request.

C. Instruments shall be capable of:

1. Air velocity instruments, direct reading in feet per minute with 2% accuracy.
2. Static pressure instruments, direct reading in inches water gauge with 2% accuracy.
3. Tachometers, direct reading in revolutions per minute with 1/2% accuracy; or revolution counter accurate with 2 counts per 1,000.
4. Thermometers, direct reading in degrees Fahrenheit with 1/10 of a degree accuracy.
5. Pressure gauges, direct reading in feet of water or psig with 1/2% accuracy.
6. Water flow instruments, direct reading in feet of water or psig with 1/2% accuracy suitable for readout of balancing valve provided.

PART 3 EXECUTION

3.01 GENERAL

A. All air systems shall be completely balanced and adjusted to provide the air and flow rates indicated, and to produce an even heating and cooling effect and control response.

B. Consult and coordinate with the Section 230900 (Controls) Contractor for the adjustment of all control devices to allow for proper system operation.

C. Make final adjustments for flow rates in order to optimize each space's comfort, including such considerations as temperature, drafts, noise, pressurization, and air changes. Where variances are made from design values, state reasons in report (e.g., "too much noise", etc.). All such variances are subject to approval by the Architect/Engineer.

D. All measurements and adjustments shall be in accordance with the Associated Air Balance Council National Standards.

3.02 AIR BALANCING

A. Pre-check of System: Prior to beginning balancing, perform, as a minimum, the following:
1. Verify that clean filters have been installed, that system is free from debris, and that all inlets/outlets are not obstructed.

2. Check all fans and equipment to verify that proper start-up and system preparation has been done by the installing contractor.

3. Check all door/window and similar building opening status to insure building is ready and proper pressurization can be obtained.

4. Open all dampers to full flow position, check positions and operation of all motorized dampers to allow full system flows.

5. Review controls and sequences of operation.

B. Tolerances: All air flow rates (supply, return, and exhaust) shall be adjusted to within plus 5 percent and minus 5 percent of the values shown in the contract documents, except that relative space-to-space pressure relationships shall always be maintained (e.g., restrooms shall be negative relative to other areas, general offices shall be positive, etc.).

D. All diffusers, grilles, and registers shall be adjusted to minimize drafts and to eliminate objectionable noise.

E. Air balancing shall be done with new, clean air filters installed. Adjust air deliveries so that design quantities will be obtained when filters are half dirty. This condition shall be simulated by covering a portion of the filter area.

F. Adjust fan speeds and fan drives as required to produce design air quantities.

G. Measurements and adjustments of the air handling and distribution equipment shall be executed in a manner consistent with the manufacturer's recommendations.

H. At completion of balancing, mark the final position of all balancing dampers and record all data.

I. Air flow measurements in main ducts shall be made with a duct traverse using a pitot tube and micromanometer. Summation of air terminal outlets and inlets is not sufficient. Quantity of duct leakage shall be indicated.

J. Duct traverses in rectangular duct shall measure the center of equal areas in the air flow stream, with centers not more than 6 inches apart. Round duct traverses shall measure at least 20 locations, with locations being the centers of equal annular area. Reference the ACGIH Industrial Ventilation Manual, Chapter 9, Testing of Ventilation Systems.

K. Balance each branch run so that there is at least one wide open run; balance branches relative to one another so that at least one branch damper is wide open.

L. Requirements for All Air Handling Systems: Data to be measured/recorded and provided in report:
1. Floor plans clearly showing and identifying all diffusers, grilles, O.A. louvers, ducts and all other items where air flow rates were measured.
2. Identify manufacturer, model number, size, and type of all air inlets/outlets.
3. Initial, trial, and final air flow measurements for all diffusers, grilles, O.A. louvers, ducts, and all other items where air flow rates were measured.
4. Design air flow rates and percentage final air flow rates are of design values.
5. The connected voltage and corresponding nameplate full load amps, and the initial and final amperages of all fan motors.
6. Initial and final RPMs of all fans.
7. Static pressures on inlet and outlet of all units.
8. Fan initial and final CFMs.
9. Outdoor air CFMs (record minimum and maximum values).
10. Data required for all equipment which are part of balanced systems:
    a. Equipment name and number (as used on drawings).
    b. Service.
    c. Equipment manufacturer and model numbers.
    d. Sheave and belt sizes (where applicable).
    e. Filters sizes and quantities (where applicable).
    f. Motor manufacturer and complete nameplate data.
    g. Design operating conditions.
    h. Actual operating conditions (flows, pressure drops, rpm, etc.).

3.03 HYDRONIC SYSTEM BALANCING

A. Pre-check of System: Prior to beginning balancing, perform, as a minimum, the following:

1. Verify that all strainers have been cleaned.
2. Examine fluid in system to verify treatment and cleaning.
3. Check for proper rotation and operation of all pumps.
4. Verify that expansion tanks are not air bound and properly charged and that system is full of fluid.
5. Verify that all air vents at high points in the fluid system are properly installed and are operating freely. Remove all air from the circulating system.
6. Open all valves to full flow position, including coil and heater stop valves, close any bypass valves, and open fully balancing valves. Set temperature controls so that automatic valves are open to full flow.

7. Check operation of automatic bypass valves and similar flow/pressure controls.

8. Check and set operating temperature of equipment to design requirements when balancing by temperature drop.

9. Check all equipment for proper start-up and system preparation by installing contractor.

10. Review controls and sequences of operation.

B. Tolerances: All water flow rates shall be adjusted to within plus 5 percent and minus 5 percent of the values shown in the contract documents.

C. Adjust control valve bypass valves so that pressure drop is the same for full flow-through bypass valve as for full flow-through control valve and controlled equipment.

D. Set all controls and valves as required to maintain design water and/or air temperatures as shown on the drawings.

E. All adjustments and measurements shall be made in strict accordance with the manufacturer's instructions.

F. Upon completion of flow readings and adjustments, mark all settings and record all data. Permanently mark balanced position of all balancing valves. Stamp indicator plate of balancing valves without memory stop.

G. Requirements for All Hydronic Systems: Data to be measured/recorded and provided in report:

1. Floor plans or schematics showing and identifying all valves, coils, pumps and other items where temperatures, pressure drops, or water flow rates were measured.

2. Identify manufacturer, model number, size and type for all balancing devices.

3. Initial, trial, and final water flow measurements (pressure drops, temperatures, and GPMs) for all items where measurements were made.

4. Design water flow rates, and percentage final water flows are of design values.

5. The connected voltage and corresponding nameplate full load amps, and the initial and final amperages of all pump motors.

6. Pump operating suction and discharge pressures and final total developed head.

7. Pump initial and final GPMs.
8. Entering and leaving fluid temperatures at coils and major equipment.
9. GPM flow of each coil and major equipment.
10. Pressure drop across each coil and major equipment.
11. Pressure drop across bypass valve.
12. Final position of all valves (percent open or setting position on valve).
13. Data required for all equipment which are part of balanced systems:
   a. Equipment name and number (as used on drawings).
   b. Service.
   c. Equipment manufacturers and model number.
   d. Equipment capacities.
   e. Motor manufacturer and complete nameplate data.
   f. Design operating conditions.
   g. Actual operating conditions (flows, pressure drops, etc.).

3.04 BALANCING REPORT

A. General: A balancing report shall be submitted as specified herein, documenting all balancing procedures and measurements.

B. Preliminary Report: Two preliminary review copies of the balancing report shall be submitted to the Architect/Engineer when the balancing work is 90% complete (or as near 90% complete as possible due to uncompleted work of other trades). In addition to containing all the information required of the final report, the preliminary report shall contain a list of all the work required of other trades in order to allow the balancing work to be completed. The Architect/Engineer will review the preliminary report and inform the Contractor of any additional items or revisions required for the final report. Preliminary reports may be omitted where the Architect/Engineer grants approval.

C. Final Report: Shall be included in the Operation and Maintenance Manual. Submit reports to Contractor for inclusion in Manuals (or, when manuals have been already sent to Engineer, send report to Engineer who will insert report into Manual). Provide number of reports as required to match quantity of O&M Manuals, but in no case less than five (5).

D. Report Organization: The report shall be divided into logical sections consistent with the building or system layout (i.e. by floors, building wings, air handling units, or other convenient way). Tabulate data separately for each system. Describe balancing method used for each system.

E. Format: 8-1/2" x 11" size, neat, clean copies, drawings accordion folded. Report shall be typed, shall have a title page, table of contents, and divider sheets with identification tabs between sections. Information shall be placed in a three-ring
notebook, with the front cover labeled with the name of the Job, Owner, Architect/Engineer, Balancing Contractor, and Report Date.

F. General Balancing Information Required:

1. At the beginning of the report, include a summary of problems encountered, deviations from design, remaining problems, recommendations, and comments.

2. List of instruments used in making the measurements and instrument calibration data.

3. Names of personnel performing measurements.

4. Explanation of procedures used in making measurements and balancing each system.

5. List of all correction factors used for all diffusers, grilles, valves, venturi meters, and any other correction factors used.

6. Areas where difficulties were encountered in obtaining design flow rates, or where unstable operating conditions may exist.

7. Note any parts of the system where objectionable drafts or noises may be present and efforts made to eliminate same and why they may still be present.

8. Note where variances from design values occur; explain why.

G. Air Balancing Information: All previously cited required measurement/recorded data, any additional recorded data, and observations.

H. Hydronic Balancing Information: All previously cited required measurement/recorded data, any additional recorded data, and observations.

END OF SECTION 23 05 93
PART 1  GENERAL

1.01  WORK INCLUDED

A.  Duct Insulation.

B.  Equipment and Specialties Insulation.

1.02  DEFINITIONS

A.  "Run-out" means "piping not more than 12 feet long that runs to an individual fixture or unit."

B.  "Conditioned Areas" means "areas that are directly and intentionally supplied by heated or cooled air".

1.03  QUALITY ASSURANCE

A.  All insulation shall have a fire hazard rating not to exceed 25 for flame spread and 50 for smoke development, as tested by ASTM E-84, NFPA 255, and UL-723.

1.04  SUBMITTALS

A.  All submittals shall comply with Section 230500.

B.  Provide product data on all insulation materials to be used. Indicate thicknesses to be used.

1.05  GENERAL REQUIREMENTS

A.  Code Compliance: Contractor shall insulate all systems with the materials and thicknesses as specified herein, but in no case shall the insulation be less than that required by the Washington State Energy Code (latest edition and amendments) or Energy Code enforced by the authority having jurisdiction. Contractor shall, in addition to insulating those systems/items specified herein, provide insulation where required by Code.

B.  Insulation at Hangers: Insulation shall be continuous through hangers on all insulated systems (except ductwork.) Inserts at hangers are specified and are considered as part of the hanger and support system. Inserts are required to be installed at the time of pipe installation and are intended to be installed by the Contractor installing the pipe hangers/supports.

PART 2  PRODUCTS

2.01  ACCEPTABLE MANUFACTURERS
A. Products shall comply with Section 230500, Acceptable Manufacturers.

B. Insulation: Manville, Armstrong, Owens-Corning, CSG, Knauf, Rubatex, Pittsburgh Corning, Imcoa, Halstead.

C. Accessories: Same as for insulation and Duro Dyne, Gustin Bacon, Childers, RPR, Tee Cee, J. P. Stevens, Buckaroos, Johnson.

2.02 DUCT INSULATION

A. Fiberglass Insulation: 1.0 lb. per cubic foot minimum density; thermal conductivity no greater than 0.25 Btu-in/hr-sq. ft.-deg. F. at 75 degrees F with factory applied jacket as specified below.

B. Fiberglass Insulation Jacket: Vapor proof jacket, consisting of aluminum foil cover with open mesh fiberglass, reinforcement, laminated to UL rated Kraft, vapor transmission rate shall not exceed 0.05 perms.

C. Adhesive: Fire retardant, Duro Dyne type FPG or equal.

D. Clips: Cement-on or welded-on pins impaled through glass fiber, with surface washers.

E. Insulation Thickness

1. Supply Air Ductwork Within Building Space with Conditioned Air on Each Side of Space (e.g., mid-floor ceiling spaces, exposed duct): 1.0 inch thick.
2. Supply Air Ductwork Within Building Space Without Conditioned Air on Each Side of Space (e.g., attic, crawl space, area between ceiling and roof): 2.0 inch thick.
3. Supply Air Ductwork on Roof or Exterior of Building: Interior duct lining used--specified in Section 233100.
4. Return Air Ductwork Within Building Space With Conditioned Air on Each Side of Space (e.g., mid-floor ceiling plenums): No insulation required.
5. Return Air Ductwork Within Building Space Without Conditioned Air on Each Side of Space (e.g., attic, crawl space): 1.0 inch thick.
6. Outdoor Air Intake Ductwork Within Building Space With Conditioned Air on Each Side of Space (e.g., ceiling plenums, exposed duct): 2.0 inch thick.
7. Outdoor Air Intake Ductwork Within Building Space Without Conditioned Air on Each Side of Space (e.g., attic, crawl space): 1.0 inch thick.
8. Exhaust Air Ductwork: 2.0 inch thick from point of exhaust airstream backdraft damper to outdoor termination.
9. Alternative Insulation Thickness: Insulation thicknesses indicated are based on the thermal conductivities specified. Contractor at his option may use other insulation thicknesses for insulation with different thermal conductivities provided that the overall heat transfer coefficient is the same as if the specified insulation had been used. Submit calculations showing insulation equivalency for approval.

2.03 EQUIPMENT AND SPECIALTIES INSULATION

A. Equipment: Insulation shall be same material as that specified for the HVAC system the equipment is installed in. Insulation thickness shall be 1.5 inches.

B. Valves: All valves installed in insulated HVAC systems shall be insulated. Insulation material and thickness shall be same as that specified for the HVAC system the valve is installed in. Insulation shall be removable type on all control valves.

C. Removable Insulation: Shall provide thermal insulating properties equivalent to that which is provided for HVAC system. Shall consist of 0.25-inch J. P. Stevens "Insulbatte" with glass cloth jacket, 4.0-inch Owens-Corning thermal insulating wool, Type II, fastened with No. 304 stainless steel hooks tied with 0.040-inch soft solid annealed copper wire. Where metal jacketing is required, provide with removable enclosures, of same material as metal jacketing, configured to suit items covered.

PART 3 EXECUTION

3.01 GENERAL

A. Equipment and Floor Protection: Cover existing equipment and finished floors to protect such items from insulation fiber and dust. Keep all such existing areas in a "broom clean" condition at the end of each day. Take precautions in these areas to prevent glass fiber and insulation dust from entering existing ventilating systems.

B. Glass Fiber Insulation

1. Finish all insulation ends, no raw edges allowed.

2. Joints: Tightly butt adjacent insulation sections together without any voids. Provide overlap of jacket material over all circumferential joints.

C. Insulation Thickness: See "Part 2 - Products" for insulation thicknesses .

D. Items To Be Insulated: Provide insulation on all ductwork, and all items installed in these duct systems, all energy conveying, all energy storage, and all energy consuming devices specified as part of Division 23, except where such insulation has been specifically excluded.
E. Items Excluded From Being Insulated
   1. Electric motors.
   2. Factory insulated or factory lined HVAC units.
   3. Fans.
   4. Internally lined ductwork.

3.02 DUCT INSULATION INSTALLATION

A. Insulate all ducts with specified thickness.

B. Insulation shall be firmly butted at all joints with a maximum allowable
   compression of 25%. All seams shall overlap a minimum of 2 inches and be
   finished with appropriate pressure sensitive tape or glass fabric and vapor
   retardant mastic. Pressure sensitive tapes and glass cloth shall be a minimum 3
   inches wide.

C. For rectangular ducts over 18 inches wide, duct wrap shall be additionally
   secured to the bottom of the ductwork with mechanical fasteners on 18 inch
   centers to reduce sagging. Washers shall be applied without compressing the
   insulation. All seams, joints, penetrations, and damage to the facing shall be
   sealed with vapor retardant mastic.

D. Inside duct lining shall be as specified in Section 230700 - Ductwork.

E. All HVAC supply and outdoor air ducts shall be covered with glass fiber
   insulation. Where duct lining is used, the insulating properties of the lining may
   be credited toward meeting the R value specified for insulation.

3.03 EQUIPMENT AND SPECIALTIES INSTALLATION

A. All equipment where access is required shall have insulation installed so that it
   can be easily removed and reinstalled without requiring new insulation. Items
   requiring such removable insulation include, but are not limited to, the following:

   1. Control Valves.
   2. Strainers.

B. Specialties Requiring Insulation: All items connected in an insulated HVAC
   system shall be insulated, except the following:

   1. Factory Insulated Items.
   2. Diffusers & Grilles.
END OF SECTION 23 07 00
PART 1     GENERAL

1.01 WORK INCLUDED

A. Control System Design.

B. Complete system of automatic heating, ventilating, and air conditioning controls.

C. Control devices, components, and wiring.

D. Testing and adjustment.

E. Operator Training.

1.02 BIDDING

A. Base Bid: Provide modifications to the existing building control system to provide the control sequenced stated here. The existing building controllers are Siemens. Modify the existing graphics to represent the HVAC modifications. Existing controllers and wiring may be reused.

B. Controls for new heat pump are provided with the equipment. These controls are to interface with the existing building control system.

1.03 DEFINITIONS

A. "Conventional control components" means "control valves, dampers, actuators, wiring, air compressors, and other control devices that are not microprocessor based."

1.04 SUBMITTALS

A. Shall comply with Section 230500.

B. Submit a complete list of equipment to be furnished, including product information for each item on the material list. Submit samples of wall sensor and bypass switch.

C. Submit a complete set of shop drawings prior to installation containing the following information: interconnect drawings showing all wiring and control connections, control panel locations, all control device locations, arrangement of devices in panels, sequence of operation for all equipment, ladder diagrams showing switching functions of system and programs, logical outline of intended programs, building floor plans with all proposed thermostatic and other control device locations shown.

D. Submit list of proposed component labeling.

E. Record Drawings: See Section 230500.
F.  Operation and Maintenance Manuals:  See Section 230500. In addition to the information required by that Section, provide (for inclusion in mechanical O&M Manual) the following:

1.  A list of spare parts and prices recommended for purchase by the Owner.
2.  System description and complete sequence of operation.
3.  Reduced size (11" x 17") copies of record drawings.
4.  Input/Output (I/O) summary forms for the system listing all connected analog and binary input and output functions and the number types of all points.
5.  Description of unique devices/controls/programs specific to this system.

1.05 GENERAL REQUIREMENTS

A.  The entire control system shall be installed by skilled electricians and mechanics, all of whom are properly trained and qualified for the work they perform.

B.  One single Contractor shall be responsible to design, furnish and install the complete building controls. Any subcontracted installation work shall be done by Contractors experienced and qualified in the work they perform subject to approval by the Engineer. Submit names(s) of proposed subcontractor(s) who will perform control work and extent of the work they will perform.

C.  System shall be designed, programmed, and commissioned by local office personnel of approved Contractors.

D.  Contractor shall have installed at least ten (10) similar systems in the local area. Such systems shall be on-line and functional to allow review by Owner's representative for approval of alternate Contractors. Submit proposed name of contractor, control manufacturer used, and list of previous contractor installations.

1.06 SPECIAL TOOLS

A.  Special Tools: Provide any special tools needed per Section 230500.

1.07 WARRANTY AND SERVICE

A.  Warranty: After completion of the installation of the control system and acceptance by the Owner, the system shall be warranted as free against defects in manufacturing, programming, workmanship and materials for a period of one year from date of acceptance. In addition, the system shall be warranted to provide the sequence of operation and basic features specified, with the accuracy and flexibility also specified. The system shall be repaired or replaced, including materials and labor, if in owner's reasonable opinion, system is other than as warranted. Preventive and emergency maintenance shall be included.
B. Modifications: For DDC type systems, software and data shall be revised and updated as necessary to reflect system changes thereto during warranty period. Contractor to provide, free of charge, two (2) DDC software sequence modifications (no less than 20 hours of control technician's/programmer's time) as instructed by Owner and EPROM changes as required.

C. Service: During the warranty period the contractor shall maintain a 24 hour emergency phone service and be able to respond by a trained and qualified Controls Engineer familiar with the installed system. For DDC type systems, the Controls Engineer shall be able to communicate with the system for purposes such as program algorithm alterations, program downline loading, troubleshooting, etc.; said response shall be within two (2) hours, with site visits (as necessary) in no less than two (2) weekdays.

D. End of Warranty Service: At the end of the warranty period, the Contractor shall provide a re-check of the entire system operation, including calibration testing of a sample number of components and providing any necessary control adjustments for proper system operation. Such work shall be for a minimum of 20 man-hours.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Products shall comply with Section 230500, Acceptable Manufacturers.

B. Microprocessor Based Controls: Siemens

C. Conventional Control Components and Accessories:

1. Products shall comply with Section 230500, Acceptable Manufacturers.


3. Control Components factory supplied with equipment specified are acceptable if capable of meeting performance and operation requirements.

2.02 BASIC SYSTEM

A. The system shall be a distributed processing type direct digital control (DDC) system. System shall provide complete stand-alone temperature control/monitoring and energy management for this project's building, using a network of various independent standalone control units, terminal unit controls and similar devices interconnected in a communicating network.
B. System shall be latest version of standard commercial building DDC system as manufactured by the approved Contractors.

C. System shall have a fully modular architecture, allowing expansion through the addition of stand-alone control units, slave panels, terminal unit controllers, operator terminals, personal computers, and similar devices.

D. All stand-alone control units shall be interconnected in a communicating network to provide facility wide access via one unit and sharing of information. A Local Area Network (LAN) shall be provided to interconnect stand-alone units for high speed data transmission. Failure of a single or multiple stand-alone unit shall not cause loss of communication between other LAN-connected stand-alone units still active.

2.02 Graphic User Interface (GUI) Modifications

A. System Displays: Central Operator Station (COS) shall display system operation data. Display shall be menu driven using a web browser. System shall use English language and acronyms selected to allow operators to use the system without extensive training or without programming backgrounds. Software shall use command strings in a request-response sequence in which the machine prompts the operator for all required information; operator response required shall be the appropriate parameter input data. Software shall contain edit functions and escape modes to eliminate continuous logic loops requiring system reboot to escape. Coordinate with Owners staff to develop all operational data to satisfaction of Owner. In addition to system displays listed elsewhere, the system shall have:

a. Building plans showing locations of mechanical equipment and areas served.

b. Summary status of mechanical equipment.

c. Detailed status of mechanical equipment:

(1) Equipment identification, location, area served, and description of unit and system.

(2) Provide all information required to be sent to COS for each equipment and any other control loop data indicative of unit operation.

(3) Schematic of system with appropriate temperatures, flows, etc. interposed on schematic. Provide schematic for each HV system, boiler system, chiller system, domestic HW, heat recovery coil and other systems where extensive measurements are made.

(4) Alarm conditions as listed for each equipment under Sequence of Operation portion of specifications.

(5) Unit and zone timeclock schedules.

d. Status of each zone; provide information required to be sent to COS for each heat pump or other zone.
e. Annual Timeclock schedules.
f. Operation Alarms.
g. Record of annual daily OA temperatures.
h. Record of annual daily building temperatures. (selectable from any zone or combination of zones.)
i. All analog signals transmitted to the CPU shall be available for display. Provide organized format and menu for ease of operator display of this information.

18. All setpoints shall be operator adjustable (via common English language commands); all reset schedules shall be operator changeable (via common English language commands); all devices which indicate on/off status to the COS shall have their on/off status manually and automatically controlled from the COS.

2.04 DDC TYPE SYSTEM TEMPERATURE SENSORS

A. Duct Temperature Sensor: Shall be solid state electronic type, employing a resistance type output. The sensor shall include a utility box and gasket to prevent air leakage and vibration noise. For all mixed air and preheat air applications, install bendable averaging duct sensors with a minimum 5 foot long sensor element installed so as to sense a representative sample of the medium being controlled.

2.05 ACCESSORIES

A. Wiring and Conduit: Shall comply with Division 26 specifications. Wiring that performs code required life safety shutdown of equipment or fire alarm interface shall comply with NFPA and local codes for fire alarm system wiring.

B. Control Cabinet: Wall mounted, NEMA Type 1 construction, UL listed minimum 14 gauge sheet metal, hinged front door with latch. Size as required to house controls. Controls/devices shall be logically assembled in cabinet, with all devices and cabinet labeled.

C. Miscellaneous Sensors/Transmitters/Switches/Transformers: Shall be manufacturer's standard, designed for application in commercial building HVAC control systems, compatible with other components so as to provide sequence of operation specified.

PART 3 EXECUTION

3.01 INSTALLATION

A. Provide all computer software and hardware, operator input/output devices, to connect to heat pump controls and display all available information on the existing graphic user interface.
B. Room thermostats shall be mounted 5'-0" above finished floor unless indicated otherwise. Thermostats shall connect to the HVAC or fan unit serving the space the thermostat is located in, unless indicated otherwise. Not all thermostats are shown on the drawings and those shown are preliminary only. Contractor shall indicate all final thermostat locations on submittal drawings. Contractor is responsible to coordinate locations to avoid chalkboards, tackboards, and other interferences.

C. Provide all electrical wiring and devices in accordance with applicable National, State and local codes and Division 16 requirements. All wiring shall be installed in conduit and in accordance with electrical section of these specifications, except that low voltage wiring within the ceiling plenum spaces and in mechanical platform area may be ran without conduit provided that plenum rated cable is used. Install all conduit and wiring parallel to building lines.

D. Component Labeling: All control components, except regular room thermostats, shall be equipped with name plates to identify each control component. Components in finished rooms shall be labeled as to generic item controlled for better user understanding; other devices shall be labeled with the same designation which appears on the Control Diagrams. Contractor shall submit list of proposed labeling prior to installing.

E. Provide complete system totally programmed to provide all specified functions, including but not limited to:
   1. Time and Holiday Schedules.
   2. Alarm Limits.
   3. Optional Start of Each Zone.
   4. Dynamic Graphic of Each Distinct Floor Area.
   5. Dynamic Graphic of Each Mechanical System.
   6. Summary of All Zone Temperatures.
   7. Summary of Data for Each Zone.
   8. All Displays Specified in Sequence of Operation.
   9. Master Menu and Graphics as requested by the Owner.
   10. All Controller Setpoints and Operational Values Required.

I. All devices which indicate on/off status to COS, shall have this on/off status manually or automatically controlled from COS, and shall have positive proof of on or off by differential pressure switch or other applicable device. Fans serving grease ducts or other system where duct pressure sensors may be subject to adverse conditions shall use current sensor with proper activation setpoints or equal device to indicate proper fan operation.
J. Thermostat setpoints (all adjustable) shall be as follows unless indicated otherwise:
   Occupied Heating          82 degrees F
   Unoccupied Heating        75 degrees F

3.02 MONITORING DATA

A. General: The following information shall be provided at each Central Operator's Station. Provide all necessary controls/devices to provide the data indicated.

B. Heat Recovery Units:
   1. Zone temperature.
   2. Zone temperature setpoint.
   3. Zone humidity.
   4. Zone humidity setpoint.
   5. Unit command mode (heating/cooling).
   7. Entering air temperature at heat pump
   8. Actual unit mode (based on comparison of SA and ENT. A temperatures).
  10. Compressor on/off status. (via CT or use of heat pump factory contacts).
  11. Alarm/trouble conditions. (Using heat pump provided alarm contacts).

B. Hydronic Duct Coil
   1. Leaving air temperature.
   2. Percent commanded on.

C. Chiller
   1. Chilled Water Temperature.
   2. Chilled Water flow status.
   3. Chiller on/off command.
   4. On/Off status for each stage.

D. Boiler (heating)
   1. Leaving water temperature
   2. On/off command.

E. Pool Boiler
1. Pool Return Temperature
2. Pool Supply temperature.
3. Pool Pump Status

F. Gas Duct Furnace
   1. Leaving air temperature.
   2. On/off commanded.

PART 4 SEQUENCE OF OPERATION

4.01 GENERAL

A. Provide complete system with sequences of operation as specified herein.

B. Time Control: Central time clock shall provide occupied/unoccupied mode switching for all items indicated as having time clock control.

C. Warm-up Control: Central optimum-start controls shall provide warm-up switching for all items indicated as having a warm-up cycle.

D. Schedules: Provide independent occupied/unoccupied mode schedules and optimum start (i.e., warm-up) cycles for each heat pump, all fans indicated as having "time clock" control (see Fan Schedule), kiln operation, and domestic circulating pumps.

E. All setpoints and differentials shall be adjustable. All DDC systems shall use proportional-integral control action.

F. Provide all actuators and other devices for all equipment where such actuators or related devices are not specified as being furnished by the equipment manufacturer.

G. Various thermostats are not shown on the drawings but are required per the sequence of operation specified. Coordinate with Engineer for location of all such thermostats prior to installing.

H. Provide all control devices and connections to allow hand-off-auto control of all units from units' motor starters and motor control centers.

I. Provide all motor rated relays and/or motor starters as required to allow for automatic control as specified herein where such devices have not been provided by others.

4.02 POOL HEAT RECOVERY UNITS (HRU-2,3 and DC-1)
A. Occupied Mode: Supply and exhaust fans shall run continuously. Outdoor air and exhaust air dampers shall be set to occupied minimum position (2000 CFM adjustable). Humidity controller shall modulate the outdoor air damper open to maintain the maximum allowed return air humidity (70% RH adjustable). Duct heating coil (DC-1) control valve shall modulate open to maintain return air temperature set point (82\(^\circ\)F adjustable).

B. Unoccupied Mode: Unit shall operate as in occupied mode except the outside air dampers shall be in unoccupied minimum position (1000 cfm adjustable)

C. Mode Control: Units' mode of operation shall be determined by central time clock, time clock bypass switch, and interlocked exhaust fan/equipment. Warm-up mode shall be initiated by optimum start controls.

4.03 LOCKER HEAT RECOVERY UNITS (HRU-1 and DH-1)

A. Occupied Mode: Supply and exhaust fans shall run continuously. Outdoor air and exhaust air dampers shall be set to 100% outside air position. Duct furnace DH-1 shall fire in two stages to maintain room temperature.

F. Unoccupied Mode: Unit shall operate cycle on and off as required to maintain night setback. When unit is turned on, exhaust dampers shall be fully closed, and recirculation dampers shall be full open. Duct furnace DH-1 fire in two stages to maintain room night setback temperature.

G. Warm-up Mode: Unit shall run as in the unoccupied mode in recirculation until the space temperature has warmed up to the occupied mode heating setpoint, then unit shall operate specified for the occupied mode.

H. Mode Control: Units' mode of operation shall be determined by central time clock. Warm-up mode shall be initiated by optimum start controls.

4.04 CHILLERS

A. New chillers shall connect to the existing chiller on/off controls on the existing Barber Colman digital control system. Verify programming and submit existing sequence to engineer.

4.05 BOILER and PUMP

A. Base Bid: No work. Existing controls shall remain.

B. Alternate Bid: Remove existing controls and provide new controls.

C. Boiler shall be enabled when the outdoor air temperature is less then 70F. Boiler shall cycle on/off under internal controls to maintain heating water setpoint (180F adjustable).
D. The pump shall run continuously when the outdoor air temperature is less than 70°F.

END OF SECTION 23 09 00
PART 1  GENERAL

1.01  WORK INCLUDED

A. Chilled Water Piping.
B. Valves
C. Air Vents.
D. Flushing and Testing.
E. Chemical Cleaning and Treatment.

1.02  SUBMITTALS

A. All submittals shall comply with Section 23050.
B. Submit product information data for all products to be used.
C. Piping submittals shall be made with Section 220520, "Pipe and Pipe Fittings"; additional piping submittals under this section are not required. However, a submittal indicating the piping materials to be used and references to the corresponding items submitted per Section 220520 is required.
D. Submit name and qualifications of Water Treatment Specialist and chemical product data to Engineer for review.

PART 2  PRODUCTS

2.01  ACCEPTABLE MANUFACTURERS

A. Products shall comply with Section 220500, Acceptable Manufacturers.

2.02  PIPE AND PIPE FITTINGS

A. Pipe and fittings standards shall be as specified in Section 220520 "Pipe and Pipe Fittings" for the applicable piping types specified below.
B. Piping and Fittings Aboveground: Shall be schedule 40 black steel or Type L copper pipe. Fittings and joints on steel pipe shall be threaded on pipe 2 inch and smaller, and welded or flanged type on pipe 2-1/2 inch and larger. The Contractor, at his option, may use mechanically coupled piping system in lieu of threaded or welded piping (see Section 15065 for specifications and limitations). Fittings and joints on copper piping shall be soldered or brazed. "T-Drill" mechanically extracted type joints on copper piping are acceptable.
C. Automatic Air Vent Drain Piping and Miscellaneous Drain Piping: Shall be Type M copper.
2.03 VALVES

A. Drain Valve: Boiler drain compression faucet, 150 psig rated working pressure up to 200 degree F., round handle, rough brass finish; size 1/2-inch where serving piping 1/2-inch through 1-inch in size; size 3/4-inch for larger piping. Hammond 710 or approved.

B. Balancing Valve: Calibrated balance valve, with brass readout valves with integral EPT insert and check valve to minimize fluid loss during balancing. Valve shall have calibrated nameplate and memory stop. Valve shall have a preformed polyurethane insulation. Valve shall be same sized for control of indicated flow. Bell and Gossett "Circuit Setter" or approved.

2.04 AIR VENTS

A. Manual Air Vent: 1/4-inch, 125 psi bronze ball valve (Milwaukee BA_100 or equal), with nipple connecting to pipe and 1/4-inch inside diameter black rubber or type M copper flexible tubing, 24-inch long, provided.

2.05 HEATING COILS

A. Tubes: Shall be 5/8 inch or 1 inch OD copper tubes expanded into full fin collars for permanent fin-tube bond and expanded into cast iron or seamless copper headers for permanent leak-tight joint.

B. Fins: Shall be plate-type aluminum or copper fins with full fin collars for maximum fin-tube contact and accurate spacing, mechanically bonded to tubes for permanent fin-tube bond.

C. Casing: Shall be constructed of minimum 16 gauge galvanized steel, center and end supports.

D. Tests: All coils shall be proof tested at 1.5 times maximum working pressure, then leak tested at maximum working pressure. Minimum test pressures shall be 300 psig proof test and 200 psig leak test.

E. Turbulators: Provide bronze, spring type turbulators inside coils where indicated or required to provide capacity shown.

F. Coatings: Entire coil surface subject to the air stream shall have a heresite coating.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install piping system as shown on the drawings; completely connected to all devices requiring heating hot water or chilled water.
B. Piping and fitting installation shall comply with Section 220520, Pipe and Pipe Fittings.

C. Install piping graded up in the direction of flow (except that the supply piping may be installed with slope parallel to the return piping where piping runs side by side), with automatic air vents installed at each high point in the system, where air may become trapped, and where system is separated from other air vents by vertical drops or rises. Piping pitch shall be 1/4-inch per 10 feet unless such slope is physically not possible and the Engineer has given approval for a different slope. Provide added automatic air vents where shown on the drawings.

D. Provide manual air vents where shown on the drawings and at each high point in the system or where air may become trapped.

E. Use eccentric reducers for changes in pipe sizing, keeping the top of pipes in line.

F. Install drain valves at the low points in the piping system and at the base of each system riser. Provide additional drains as required to allow for complete draining of the system. These drain valves shall take off of the bottom of any horizontal pipe that they are connected to.

G. Install valve types as shown on the drawings. Where valve types are not indicated, the Contractor may use gate or butterfly type valves on piping 2-1/2-inch and larger; and gate, ball, or butterfly type valves on piping 2-inch and smaller.

3.02 TESTING AND CLEANING

A. Scope: Check for leaks after opening the system to water. Remove air at each air vent in the system.

B. Strainer Cleaning: The systems shall be drained and all strainers blown-down and thoroughly cleaned and any temporary bypass hosing or piping removed and the system connected for normal operation. The system shall then have a final pressure test applied (see Flushing and Testing).

END OF SECTION 23 21 00
PART 1   GENERAL

1.01   WORK INCLUDED

   A. Condensate Piping.
   B. Cleaning.

1.02   SUBMITTALS

   A. All submittals shall comply with Section 220500.
   B. Submit product information data for all products to be used.
   C. Piping submittals shall be made with Section 220510, "Pipe and Pipe Fittings"; additional piping submittals under this section are not required. However, a submittal indicating the piping materials to be used and references to the corresponding items submitted per Section 220510 is required.
   D. Submit name and qualifications of Water Treatment Specialist and chemical product data to Engineer for review.

PART 2   PRODUCTS

2.01   ACCEPTABLE MANUFACTURERS

   A. Products shall comply with Section 220500, Acceptable Manufacturers.

2.02   PIPE AND PIPE FITTINGS

   A. Pipe and fittings standards shall be as specified in Section 220510, "Pipe and Pipe Fittings" for the applicable piping types specified below.
   B. Low Pressure Condensate Piping: Shall be schedule 80 black steel. Fittings and joints on steel pipe shall be threaded on pipe 2 inch and smaller, and welded on pipe 2-1/2 inch and larger.

PART 3   EXECUTION

3.01   INSTALLATION

   A. Install piping system as shown on the drawings; completely connected to all devices requiring heating hot water or chilled water.
   B. Piping and fitting installation shall comply with Section 220510, Pipe and Pipe Fittings.
   C. Install piping graded up in the direction of flow (except that the supply piping may be installed with slope parallel to the return piping where piping runs side by
side), with automatic air vents installed at each high point in the system, where air may become trapped, and where system is separated from other air vents by vertical drops or rises. Piping pitch shall be 1/4-inch per 10 feet unless such slop is physically not possible and the Engineer has given approval for a different slope. Provide added automatic air vents where shown on the drawings.

D. Use eccentric reducers for changes in pipe sizing, keeping the top of pipes in line.

3.02 CLEANING

A. Strainer Cleaning: The systems shall be drained and all strainers blown-down and thoroughly cleaned and any temporary bypass hosing or piping removed and the system connected for normal operation. The system shall then have a final pressure test applied (see Section 3.02, Flushing and Testing).

END OF SECTION 23 22 00
PART 1 GENERAL

1.01 WORK INCLUDED
A. Environmental Ductwork Systems.
B. Acoustical Duct Lining.
C. Pre-Installation Conference.
D. Duct Cleaning and Testing.
E. Duct Shop Drawings.

1.02 DEFINITIONS
A. Duct Sizes: All duct dimensions shown are inside clear dimensions. Where inside duct lining is specified or indicated, duct dimensions are to the inside face of lining.
B. Low Pressure System: Velocities less than 2,000 fpm and static pressure in duct 2 inches w.g. or less.
C. Gauges: Steel sheet and wire are U.S. Standard Gauge; aluminum sheet is Brown and Sharpe Gauge.

1.02 QUALITY ASSURANCE
A. Fabricate and install ductwork in accordance with SMACNA duct construction publications and ASHRAE handbooks.
B. Materials and installations shall comply with NFPA 90A, NFPA 90B, and the UMC.

1.03 SUBMITTALS
A. Submittals shall comply with Section 230500.
B. Submit shop drawings for all HVAC ductwork which is to be installed differently than as shown on the drawings.

1.04 DUCT PRESSURE CLASS
A. All ductwork shall be constructed to the static pressure indicated by the fan which serves the ductwork, or to 1-inch (plus or minus as appropriate), whichever is higher.
1.05 PRE-INSTALLATION CONFERENCE

A. General: A pre-installation conference shall be held prior to the Contractor installing any of the materials of this section. The conference shall occur after all submittals have been satisfactorily reviewed by the Architect/Engineer and returned to the Contractor, and approximately 14 days prior to the proposed system installation date and prior to the fabrication of any system piping components. The purpose of this conference is to review the Contractors installation methods, materials, schedule, safety, coordination with all other trades, and related construction/design issues to allow for efficient and proper construction. The Architect/Engineer and Owner will highlight various items of concern, typical problems encountered on similar projects, coordination issues, and related items.

B. Attendance: The pre-installation conference shall be attended by the General Contractor, the Contractor doing the work of this Section, other contractor trades as appropriate to the proper coordination of the work of this section, the Owner's Representatives (at their option), the Engineer, and the Architect.

C. Coordination: The Contractor shall notify the Architect of the Contractor's readiness to hold the pre-installation conference at least 14 days prior to the proposed meeting time, and mutually agreed upon meeting times arranged.

1.06 REFERENCES


D. NFPA 90B: Standard for the Installation of Warm Air Heating and Air Conditioning Systems.

E. UMC: Uniform Mechanical Code.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Products shall comply with Section 230500, Acceptable Manufacturers.

B. Sheet Metal: All domestic manufacturers.

C. Spin-in Fittings: General Environment Corp., Clevepak Corp.

D. Duct Sealant and Tape: Durkee-Atwood, Hardcast, Duro-Dyne, Benjamin Foster, Products Research, Chemical Corp, and Ductwork.
2.02 GENERAL MATERIALS

A. Ducts: Construct of galvanized sheet steel, suitable for lock forming without flaking or cracking, conforming to ASTM A527, having a zinc coating of 1.25 ounces total per square foot for both sides of a sheet, corresponding to coating designation G90 per ASTM A525.

B. Fasteners: Use rivets and bolts throughout; sheet metal screws are acceptable on low pressure ductwork only.

C. Spin-in Fittings: Factory fabricated of galvanized steel, bell-shaped, with die-formed mounting groove and damper. Provide 45 degree extractor when the spin-in fitting is installed in a duct which has a width of 12 inches or more. General Environmental Model SM-1D or SM-1 DEL.

D. Duct Sealant: Shall be fire resistant with a flame spread rating of 25 or less, and a smoke developed rating of 50 or less. Sealant shall also be water resistant and compatible with mating materials and types of joints or connections being sealed, specifically made for sealing ducts. Exterior duct sealant shall be specifically intended for outdoor use as a duct sealant.

E. Duct Tape: Shall be fire resistant with a flame spread rating of 25 or less, and a smoke developed rating of 50 or less. Tape used shall be specifically compounded for maximum adhesion to galvanized steel, and shall be compatible with the duct sealant used.

2.03 LOW PRESSURE DUCT FABRICATION

A. Duct Gauge and Reinforcement: Shall be as shown in SMACNA HVAC Duct Construction Standards according to the pressure classification of the system and the duct dimensions.

B. Joints and Seams: Construct in accordance with SMACNA HVAC Duct Construction Standards. Leakage shall be less than 5% of total system airflow. Button punch or bolt connections in standing seams shall be spaced on centers not greater than 6" apart. Coordinate joint spacing with duct reinforcement requirements so that transverse joints having the required stiffness may be incorporated in the reinforcement spacing schedule.

C. Elbows and Tees: Shall be long-radius type with a center-line radius not less than 1-1/2 times the width or diameter of the duct. Where space does not permit the use of long-radius elbows, short-radius or square elbows with turning vanes shall be used.

D. Transitions: Increase duct sizes gradually. Transitions for diverging air flow shall be made with each side pitched out not more than 20 degrees. Transitions for converging air flow shall be made with each side pitched in not more than 30 degrees.
E. Branch Connections: Duct take-offs from rectangular ductwork to round ductwork shall be made using spin-in fittings (unless a different fitting type is specifically shown). Duct take-offs from rectangular duct to rectangular duct shall be as shown on the drawings and in compliance with SMACNA Standards.

F. Ductmate Systems: Transverse duct joints may be made with Ductmate System, or approved equal. System shall consist of companion flanges of 20 gauge galvanized steel with an integral polymer mastic seal; corner pieces of 12 gauge G90 galvanized steel; 20 gauge G90 galvanized cleats; closed cell, high density gasket type; and galvanized carriage bolts with hex nuts. The flanges shall be securely fastened to the duct walls using self-drilling screws, rivets or spot welding. Fastener spacing shall be as recommended by the manufacturer for the size of duct and the pressure class. The raw duct ends shall be properly seated in the integral mastic seal. A continuous strip of gasket tape, size 1/4" x 3/4", shall be installed between the mating flanges of the companion angles at each transverse joint; and the joint shall be made up using 3/8-inch diameter x 1-inch long plated bolts and nuts. Galvanized drive-on or snap-on cleats shall be used at spacings as recommended by the manufacturer.

2.04 DUCT LINING

A. Material: Flexible, inorganic glass fiber material, maximum thermal conductivity of 0.26 Btu-inch/hr-sq. ft.-degree F at 75 degrees F, coated to prevent erosion, and conforming to SMACNA Duct Liner Application Standard. Lining shall be 1-inch thick on ductwork within the building and 2-inch thick on ductwork exterior of the building.

B. Adhesives: Fire resistant, Type 1, conforming to the Standard for Adhesives for Duct Liner, ASC-A-7001C-1972, of the Adhesive and Sealant Council, as contained in the SMACNA Duct Liner Application Standard.

C. Mechanical Fasteners: Shall conform to the Mechanical Fasteners Standard, MF-1-1975, as contained in the SMACNA Duct Liner Application Standard.

PART 3 EXECUTION

3.01 DUCTWORK INSTALLATION

A. Install all ductwork and plenums in sizes and locations as shown on the drawings, complete with all accessories and connections to provide complete and operable heating, ventilating, air conditioning, and exhaust systems.

B. Ducts shall be installed level and in neat lines with the building construction.

C. All ducts are to be installed concealed unless indicated otherwise.

D. Apply a bead of duct sealant to all spin-in fittings where fitting seals against sheet metal duct.
E. Seal all joints in accordance with Seal Classification as shown in Table 1-2 of the SMACNA HVAC Duct Construction Standards. All "Ductmate" and similar systems shall be installed in strict accordance with manufacturer's instructions.

F. In addition to applying sealant to joints in accordance with the SMACNA requirements, all joint corners and seams shall be sealed and all joints and seams shall be taped over with minimum 3-inch wide duct tape. Such tape is not required on exposed ducts, but all joint corners shall have adhesive applied. Exposed ducts shall be carefully sealed to maintain good appearance.

G. Alternative Duct Sizes: The Contractor, at his option, may use duct sizes other than those shown on the drawings, provided that the Architect/Engineer gives prior approval, and the pressure drop per lineal foot of the proposed duct does not exceed that for the duct shown.

3.02 DUCT CLEANING AND TESTING

A. All ducts shall be wiped or blown clean of all dust and debris prior to the installation of grilles or diffusers.

B. All existing ducts that are to be reused shall be brushed and vacuumed clean of all internal dust and debris.

C. All plenums shall be vacuum cleaned of all dust and debris prior to system operation.

END OF SECTION 23 31 00
PART 1  GENERAL

1.01  WORK INCLUDED

A.  Flexible Connections

B.  Manual Dampers

PART 2  PRODUCTS

2.01  ACCEPTABLE MANUFACTURERS

A.  Products shall comply with Section 230500, Acceptable Manufacturers.

2.02  FLEXIBLE CONNECTIONS

A.  Provide flexible connections at all duct connections to fans, where ducts of dissimilar metals are connected, and where shown on the drawings.

B.  For round ducts, the flexible material shall be secured by zinc-coated, iron clinch type draw bands.

C.  For rectangular ducts, the flexible material shall be locked to metal collars which shall be connected to the duct using normal duct seam construction methods.

D.  Install flexible connections with sufficient slack to permit 2 inches of horizontal or vertical movement of ducts or equipment at flexible connection point without stretching the flexible material.

E.  Where installed exposed to outside weather, provide a galvanized "hat" channel protecting top and vertical stretches of flexible connector from sunlight and weather.

2.03  MANUAL DAMPERS

A.  Dampers shall be fabricated of galvanized steel, two gages heavier than duct in which installed.

B.  Maximum blade width is 12 inches; fabricate multi-blade dampers with opposed blade pattern for ducts larger than 12” x 48”.

C.  Damper regulator sets shall have quadrant dial regulator with locking nut, square end bearing one side, and spring round end bearing other side (small sizes) or open end square bearing (larger sizes), axis of blade the long dimension. Regulator sets shall be Duro-Dyne Model numbers as follows:
Max. Blade Dimension  | Duro-Dyne Regulator Set | Shaft Size
--- | --- | ---
10” and less | KS-145, 145L | 1/4”
11” to 14” | KSR-195, 195L | 3/8”
15” to 23” | SRS-388, SB-138, KP105 | 3/8”
24” and larger | SRS-128, SB-112, KP105 | 1/2”

D. Multiple blade dampers shall have individual quadrants for each blade or one quadrant with interconnected blades.

E. Flush-mounted concealed type damper quadrants shall have prime paint finish, and shall be Ventfabs No. 666 or Young Regulator Co. No. 301.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install duct flexible connections at all duct connections to equipment. Installation shall not allow any “grounding” of vibrating machinery to ducts.

B. Provide balancing dampers where shown and as required to perform balancing.

END OF SECTION
PART 1 GENERAL

1.01 WORK INCLUDED
A. Supply Outlets.

1.02 REFERENCES

1.03 SUBMITTALS
A. Shall comply with Section 230500.
B. Submit product information on all items.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS
A. Products shall comply with Section 230500.

2.02 GENERAL REQUIREMENTS
A. Air outlets shall be of the size, type, and with number of throws as shown on the drawings; and shall match the appearance and performance of the manufacturers' models specified and scheduled on the drawings.
B. Air outlet application shall be based on a noise level of NC 35 maximum.
C. Furnish all necessary screws, clips, duct collars, and transitions required to allow for the air outlet installation and connection to ductwork.
D. Finish: Factory enamel finish, color as selected by Architect/Engineer, except that LSG type and any other wall inlets/outlets used in the same room/area as the LSG shall have brushed aluminum finish.
E. Frame Style: Provide air outlets and inlets with frame style to match ceiling or wall construction installed in. Where supply air outlets or inlets are installed in T-bar ceiling systems, they shall be factory installed in 2’ x 2’ or 2’ x 4’ metal panel to match ceiling layout. Where installed against gypsum board surface, brick or similar hard surface or, where exposed, provide with 1-1/4" wide outer border. Where space does not permit installing 2’ x 2’ metal panel, provide outlets or inlets with 1-1/4" wide outer border. Where air outlets are installed adjacent to surface...
mounted light fixtures, outlets shall have 4-inch deep drop frames. (See reflected ceiling plan and/or electrical lighting plan for ceiling type and allowable space).

2.03 SUPPLY AIR OUTLETS

A. Ceiling Diffuser (CD): Shall be of the sizes and mounting types shown on the plans and outlet schedule. Diffuser shall have curved deflectors, which are individually adjustable from the face of diffuser to regulate air volume and angle of discharge. Diffusers shall be built in four-way discharge pattern. The diffusers shall be constructed of 0.051 aluminum with miscellaneous steel components. The finish shall be an anodic acrylic paint, baked at 315°F for 30 minutes. The pencil hardness must be HB to H. The paint must pass a 100-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering or deterioration of film. The paint must pass a 250-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-inch pound force applied. The manufacturer shall provide published performance data for the ceiling/side wall diffuser. The diffuser shall be tested in accordance with ANSI/ASHRAE Standard 70-1991. Titus 250.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install air outlets in locations shown on the drawings and so as to conform with architectural features and lighting arrangements.

B. Paint ductwork which is visible behind air inlets and outlets flat black.

C. All outlets and inlets exposed to the weather shall be adequately flashed and installed in a manner to assure complete weatherproofness.

D. Sealing and caulking of all outlets and inlets exposed to the weather shall conform to Division 7 requirements.

E. Provide screened openings (SO) on all duct openings where indicated and where openings do not have grilles or registers.

F. Furnish door louvers to the Division 8 Contractor, who will install the door louvers in the doors.

G. Coordinate with the Division 9 Contractor for any necessary painting of air inlets/outlets/louvers/etc. prior to installation.
PART 1  GENERAL

1.01 WORK INCLUDED

A. VRF Heat Pump Outdoor Unit
B. VRF Heat Pump Wall Mounted Indoor Unit
C. Refrigeration Piping

1.02 SUBMITTALS

A. Submittals shall comply with Section 230500.
B. Submit product information on all products.
C. Submit performance data for air conditioning unit, showing performance as a function of saturated suction temperature and ambient temperature. Provide information showing dimensions and location of all connections.

1.03 QUALITY ASSURANCE

A. Unit shall be rated in accordance with ARI standard 590.
B. Unit construction shall be designed to conform to ANSI/ASHRAE 15, NEC, Washington State Energy Code and applicable ASME codes.
C. Unit shall be fully tested at the factory prior to shipment.

1.04 WARRANTY

A. Entire air conditioning units shall be warranted by the manufacturer for 5 years after acceptance by the Owner.

PART 2  PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Products shall comply with Section 230500, Paragraph 2.01, Acceptable Manufacturers.
B. VRF Heat Pump: Mitsubishi

2.02 VRF Heat Pump Outdoor Unit

A. General: Outdoor units shall be equipped with multiple circuit boards that interface to the M-NET controls system and shall perform all functions necessary for operation. The outdoor unit shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory.
The sum of connected capacity of all CITY MULTI indoor units shall range from 50% to 130% of outdoor rated capacity. Outdoor unit shall have a sound rating no higher than 59 dB(A). Both refrigerant lines from the outdoor unit to indoor units shall be individually insulated. The outdoor unit shall have an accumulator with refrigerant level sensors and controls. The outdoor unit shall have a high pressure safety switch, low pressure safety switch and over-current protection and DC bus protection. The outdoor unit shall have rated performance for heat operation at -4°F for the PUMY-P60NKMU (-BS) ambient temperature without additional low ambient controls. The outdoor unit shall be capable of cooling operation down to 23°F outdoor ambient without additional low ambient controls. The outdoor unit shall have a high efficiency oil separator plus additional logic controls to ensure adequate oil volume in the compressor is maintained.

B. Unit Cabinet: The casing shall be fabricated of galvanized steel, bonderized and finished with a powder coated baked enamel.

C. Fan: The unit shall be furnished with two direct drive, variable speed motors. The fans will be forward curved type blades for quiet operation. The fan motor shall have inherent protection, have permanently lubricated bearings, and be completely variable speed. The fan motor shall be mounted for quiet operation. The fan shall be provided with a raised guard to prevent contact with moving parts. The outdoor unit shall have horizontal discharge airflow.

D. Refrigerant: R410A refrigerant shall be required for all S-Series outdoor unit systems.

E. Coil: The outdoor coil shall be of nonferrous construction with lanced or corrugated fins on copper tubing. The coil fins will have a factory applied corrosion resistant blue-fin finish. The coil shall be protected with an integral metal guard. Refrigerant flow from the outdoor unit shall be controlled by means of an inverter driven compressor.

F. Compressor: The compressor shall be a single high performance, inverter driven, modulating capacity scroll compressor. The outdoor unit compressor shall have an inverter to modulate capacity. The capacity shall be completely variable down 29%. The compressor shall be equipped with an internal thermal overload. The compressor shall be mounted to avoid the transmission of vibration.

G. Electrical: The outdoor unit electrical power shall be 208/230 volts, 1-phase, 60 hertz. The unit shall be capable of satisfactory operation within voltage limitations of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz). The outdoor unit shall be controlled by integral microprocessors. The control circuit between the indoor units and the
outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair, non-polar shielded cable to provide total integration of the system.

2.03 VRF Heat Pump Wall Mounted Indoor Unit

A. General: The wall-mounted indoor unit shall have a modulating linear expansion device and a flat front. The indoor unit shall be compatible with the outdoor unit. The unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, and a test run switch. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.

B. Unit Cabinet: Unit shall have the white finish. Multi directional drain and refrigerant piping offering four (4) directions for refrigerant piping and two (2) directions for draining shall be standard. There shall be a separate back plate which secures the unit firmly to the wall.

C. Fan: The indoor fan shall be an assembly with one or two line-flow fan(s) direct driven by a single motor. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings. A manual adjustable guide vane shall be provided with the ability to change the airflow from side to side (left to right). A motorized air sweep louver shall provide an automatic change in airflow by directing the air up and down to provide uniform air distribution.

D. Filter: Return air shall be filtered by means of an easily removable, washable filter.

E. Coil: The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing. All tube joints shall be brazed with phos-copper or silver alloy. The coils shall be pressure tested at the factory. A condensate pan and drain shall be provided under the coil. Both refrigerant lines to the indoor units shall be insulated in accordance with the installation manual.

F. Electrical: The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz)

G. Controls: This unit shall use controls provided by the manufacturer to perform functions necessary to operate the system. The unit shall be able to control external backup heat. The unit shall have a factory built in receiver for wireless remote control. Indoor unit shall compensate for the higher temperature sensed by the return air sensor compared to the temperature at level of the occupant when in HEAT mode. Disabling of
compensation shall be possible for individual units to accommodate instances when compensation is not required. Control board shall include contacts for control of external heat source. External heat may be energized as second stage with 1.8°F – 9.0°F adjustable deadband from set point. Indoor unit shall include no less than four (4) digital inputs capable of being used for customizable control strategies. Indoor unit shall include no less than three (3) digital outputs capable of being used for customizable control strategies.

2.04 REFRIGERATION PIPING

A. ACR Type L copper tubing, with silver brazed joints and wrought copper fittings. Mechanical flared fittings may be used at connections to equipment.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install all equipment at locations and as shown on the drawings.
B. Install in strict accordance with manufacturer's instructions.
C. Connect and install all items shipped loose with units.

3.02 LEAK TESTING AND EVACUATION

A. Connect a vacuum pump to the piping system and evacuate the system to 500 microns, and let stand for a minimum of 12 hours. If the vacuum reading remains unchanged, the system may be charged with refrigerant.

3.03 REFRIGERATION SYSTEM

A. Install all refrigeration system components as recommended by the air conditioner manufacturer. At a minimum these shall include a site glass, service valves, expansion valves, and external filter/drier.

3.02 START-UP

A. General: Start-up and subsequent system checks shall be done by the manufacturer's authorized service representative.
B. Initial Checks: Prior to operating units, checks shall be made to insure that all equipment, piping, and controls are connected and operating properly. As a minimum, check for: proper voltage and phases, correct compressor oil level, valves open, correct electrical connections, complete control connections, overload heaters installed in compressor motor starter, hi and lo pressure cutouts properly set and connected, unit heaters operational, condenser fans rotating correctly, fans lubricated, coils clear of obstructions, and other items as listed by the manufacturer are properly provided/connected and operating to insure safe
and proper unit operation.

C. 72 Hour Checks: Provide checks in accordance with manufacturer's instructions; as a minimum review the following:

1. Observe the compressor oil level. If low, operate the system for three to four hours, checking the oil level frequently. If it remains low, add oil.

2. Check the refrigerant flow in the liquid line sight glass. The flow should be solid with no evidence of flash gas. If bubbles of flash gas appear, check the system for leaks; repair if necessary and add refrigerant.

3. Check the temperature of the liquid line from the inlet of the filter-drier to the expansion valve. The temperature should be uniform. If a decided temperature difference exists across a valve or fitting, a restriction is evident. The restriction is causing a pressure drop which, in turn, is causing the refrigerant to flash. Such a pressure drop produces bubbles of flash gas which will appear in the sight glass. Remove and clean the restricted part.

4. Measure the superheat of the suction gas. If necessary, readjust the superheat setting of the expansion valve.

5. Observe the system operating pressures. If they appear normal, close the gauge valves.

D. One Week Check: After the system has been in full operation for one week, provide these final checks and adjustments:

1. Replace the core of the compressor filter-drier. (Or if start-up has occurred in off season, provide extra cores to Owner).

2. Observe the general operation of the system: system pressures, compressor oil level, liquid line sight glass, condensing equipment, etc.

E. Written Report: When all of the above checks have been completed, a written report from the manufacturer's authorized service representative shall be provided. This report shall list all units checked, items checked, check results, any items which may impair proper unit operation, and the name and phone number of the actual individual(s) doing the check. The report shall include a statement stating whether or not all units are operating as specified. Separate data/record sheets shall be provided for each of the above units.

3.03 OWNER INSTRUCTION

A. After all testing and adjustments have been satisfactorily completed, the Owner shall be provided with operator instructions (including start-up, shut-down, emergency, maintenance, and repair instructions) by the manufacturer's authorized service representative.
B. Time Period: Instruction period shall be for a minimum of four (4) hours.

C. Instruction and notification shall comply with Section 230500.

END OF SECTION 23 81 00
PART 1  GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 0 and 1 Specification Sections, apply to this Section.

1.02 WORK INCLUDED

A. Perform tests of the electrical system to assure code compliance and proper system operation according to the intent of the contract documents. Retain the services of approved testing agency(s) to comply with the ground fault protection systems and medium voltage testing requirements of this section.

B. Applicable Codes, Standards & References for Tests:

All inspections and tests shall be in accordance with the following applicable codes and standards except as provided otherwise herein.

1. National Electrical Code - NEC
2. National Electrical Manufacturer's Association - NEMA
4. Institute of Electrical and Electronic Engineers - IEEE
5. National Electrical Testing Association - NETA
6. American National Standards Institute - ANSI
7. State and Local Codes and Ordinances
8. Insulated Cable Engineers Associate - ICEA
9. Association of Edison Illuminating Companies - AEIC

1.03 CIRCUIT TESTS

A. The Contractor shall perform routine insulation resistance, continuity and grounding tests for all distribution and utilization equipment prior to their connection and energization. A standard megger-type instrument shall be used to demonstrate that insulation values are acceptable, ground system is continuous and the neutral system is isolated from the grounding system except at the systems' single ground point.

B. System defects, indicated by the circuit tests, shall be corrected. Tests shall be repeated until satisfactory results are obtained.

1.04 GROUNDING TEST

A. Measure the ohmic value of the Electrical Service Entrance "System Ground" with reference to "Earth Ground" using multiple terminal, fall of potential methods and suitable test instruments.
B. Maximum resistance to ground shall be less than 10 ohms unless lower values are specified in the contract documents. Notify the Architect/Engineer if this resistance value is not obtained for the initially installed system; and then provide corrective measures required to reduce ground resistance to less than 10 ohms.

1.05 MOTOR AND EQUIPMENT TESTS

A. Verify proper rotation of all motors before placing into service.

B. Measure and record electrical data for each motor installed under this contract. Data shall include these items:

1. Motor description
2. Controller description
3. Motor nameplate amperes
4. Actual measured motor running amperes
5. Overload heater manufacturer and catalog numbers
6. Overload heater ampere range
7. Voltage (measured) and phase

C. Motor controller overload heaters shall be sized to the actual motor nameplate full load current; do not oversize overload heaters.

1.06 PHASE BALANCE TESTS

A. Verify the balance of the electrical system’s phase currents. Reassign load connections if necessary to obtain a balance is acceptable to the Engineer.

1.07 GROUND FAULT PROTECTION SYSTEMS TEST

A. Visual and Mechanical Inspection

1. Inspect neutral main bonding connection to assure:
   a. Zero sequence is grounded upstream of sensor.
   b. Ground connection is made ahead of neutral disconnect link.

2. Inspect control power transformer to insure adequate capacity for system.

3. Monitor panels (if present) shall be manually operated for:
   a. Trip test
   b. No trip test
   c. Non-automatic reset
   Proper operation and sequence shall be recorded.

4. Zero sequence systems shall be inspected for symmetrical alignment of core balance transformers about all current carrying conductors.
5. Ground fault device circuit nameplate identification shall be verified by device operation.

6. Pickup and time delay settings shall be set in accordance with Engineer's instructions or as shown.

B. Ground Fault System Electrical Tests

1. System neutral insulation resistance shall be measured to insure no shunt ground paths exist, neutral-ground disconnect link shall be removed, neutral insulation resistance measured and link replaced.

2. The relay pickup current shall be determined by current injection at the sensor and the circuit interrupting device operated.

3. The relay timing shall be tested by injecting one hundred fifty percent (150 %) and three hundred percent (300 %) of pickup current into sensor. Total trip time shall be electrically measured.

4. System operation shall be tested at fifty five percent (55%) rated voltage.

5. Zone interlock systems shall be tested by simultaneous sensor current injection and monitoring zone blocking function.

C. Test Parameters

1. System neutral insulation resistance shall comply with applicable industry standards.

2. Relay pickup current shall be within ten percent (10%) of device dial or fixed setting.

3. Relay timing shall be in accordance with manufacturer's published time-current characteristic curves.

D. Ground Fault System Testing. Contractor shall retain the services of a National Electrical Testing Association member firm, or a firm approved by the Engineer.

E. Apply label certifying satisfactory test completion in accordance with NETA Labeling Procedure.

1.08 ARC FLASH AND PERSONNEL PROTECTIVE EQUIPMENT (NEC 110-16)

A. Contractor shall prepare an arc flash and Personnel Protective Equipment study. Contractor shall provide labeling of the electrical equipment within the facility. All labels shall have a permanent marked date of the label installation.

1.09 SHORT CIRCUIT AND PROTECTIVE DEVICE COORDINATION STUDY

A. Contractor shall prepare a short circuit and protective device coordination study of the electrical equipment within the facility.

PART 2 PRODUCTS

2.01 MATERIALS AND INSTRUMENTATION
A. Contractor and/or testing agency shall supply all apparatus and materials required for indicated tests.

B. Contractor shall include all costs associated with testing in bid proposal.

2.02 TEST REPORT(S)

A. Furnish four (4) bound copies of test reports, as specified herein, for inclusion into the project operation and maintenance manuals. Each test report shall include the following items:

1. Name, address and telephone number of the testing agency.
2. Name(s) of personnel conducting the tests
3. Type of test
4. Description of test procedure
5. List of items tested
6. List of actual test equipment including make, model(s), serial number(s) and calibration date(s) as applicable.
7. Test results
8. Conclusion and recommendations
9. Appendix, including appropriate test forms

PART 3   EXECUTION

3.01 TESTING PROCEDURE

A. Submit a copy of test procedure(s) to the Engineer prior to testing.

B. All tests shall be conducted according to applicable industry standards.

3.02 SCHEDULING

A. Notify Architect/Engineer and Owner at least five (5) working days prior to performance of any test.

END OF SECTION 26 01 26
PART 1   GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

1.02 GENERAL CONDITIONS

A. Bidding documents including Division 1 General Conditions, Supplementary General Conditions, Published Addenda and related work in other Divisions form an integral part of these Specifications and shall be binding on the Division 26 Contractor for all work performed under Division 26, Electrical.

B. General requirements for materials and installation methods.

1.03 DEFINITIONS

A. The term "provide" shall mean furnish, install and connect equipment and materials complete in operating condition.

B. The term "approved" as used herein shall mean the written approval of the Engineer.

C. The term "Contractor" as used herein shall mean the organization responsible for accomplishing all work within the contract documents. The plural term "contractors" as used herein shall include all of the trade organizations that comprise the project workforce.

D. The term "drawings" as used herein shall mean all contract drawings for all divisions of work.

E. NEC means National Electrical Code.

F. The term "code" as used herein shall mean all applicable National, State and local codes.

1.04 SCOPE OF WORK

A. The Electrical work consists of furnishing, installing, testing and placing in satisfactory operation all equipment, materials, devices and appurtenances, necessary to provide complete systems according to the intent of the Drawings and Specifications. In general this includes all labor, materials, equipment, tools, etc. to complete the electrical work.

B. Electrical requirements are not limited to electrical drawings and specifications. There is additional electrical work required to be included in the bid, indicated on the architectural, structural, landscape, civil, kitchen and mechanical drawings. Additional electrical work required in the bid is also located in the specifications. Contractor shall review all architectural, structural, landscape, civil, kitchen and mechanical, drawings and specifications for additional electrical requirements and information.
1.05 INTENT OF DRAWINGS

A. The Electrical drawings are intended to serve as working drawings for general layout. Equipment, receptacles, tele/data, switches, panels, lights, disconnects and raceways are partially diagrammatic and do not necessarily indicate actual routings or all appurtenances required for a complete installation.

B. The drawings and specifications are complementary. What is called for in either is binding as if called for in both. In case of conflict within the drawings, specifications or between drawings and specifications the Architect/Engineer will select the method to be taken.

C. Take all working dimensions, device heights, door swings and the like from architectural drawings and check them against those shown or scaled on the electrical drawings. In the event of conflict, report discrepancies to the Architect/Engineer for resolution before proceeding with the work.

D. Minor changes in the locations of raceways, devices and the like, from those shown on the plans, shall be made without extra charge if so directed by the Architect/Engineer before installation.

E. Motor horsepower and apparatus wattages indicated on the plans are estimated requirements of equipment furnished under other Divisions of this contract. Advise the Architect/Engineer in writing of any deviations in actual equipment supplied that affect the electrical installation.

1.06 MANUFACTURERS’ RECOMMENDATIONS

A. Make all installations in strict accordance with manufacturers’ published recommendations and details. All equipment and materials recommended by them shall be considered as part of this contract.

1.07 WORK RELATED TO OTHER DIVISIONS

A. TEMPORARY CONSTRUCTION POWER AND LIGHTING

1. Contractor is responsible for all costs associated with removal of the temporary construction service meter.

2. Provide, maintain and remove, when no longer required, temporary electrical construction wiring from the construction service meter to and within the building for the number of lights and receptacles required. Wiring to construction sheds, outdoor construction machinery, and temporary exterior work areas shall be the responsibility of individual contractors.

3. Provide and maintain construction lighting with portable wiring and temporary energization of the permanent building wiring, complete with lamps. Suitable construction lighting shall be provided in each room where lighting is required for any of the contractors on the job. See NEC ARTICLE 305. Temporary wiring.

4. Contractor is responsible for re-lamping construction lighting after the initial lamping.
5. Provide adequate feeders, circuit breakers and duplex 15-ampere 120-volt receptacles at locations as required. Note: 120 volt construction receptacles shall provide Ground Fault circuit protection in accordance with applicable OSHA safety standards.

6. Portable power cords from the outlets specified herein shall be the responsibility of individual contractors using the cords.

7. Responsibilities outlined in the Paragraph Temporary Construction Power and Lighting are delineated herein to avoid conflicts between the various contractors. Assume all responsibility for safety, Electrical and Safety Code compliance, performance and adequacy of the construction power and lighting installation. The Architect and Engineer assumes no responsibility for the performance or safety and will not inspect nor design this temporary installation as it is not part of the completed structure.

B. MECHANICAL CONTROL WIRING

1. See Division 23.

C. EQUIPMENT FURNISHED BY OTHERS

1. All electrical equipment furnished for this project shall be coordinated with the drawings to insure correctness of Voltage, Phase and Ampacity. Equipment served by single circuit or feeder shall be provided with appropriate internal wiring including fusing of multiple circuits as required by code.

2. Contractors supplying equipment incompatible with the designed electrical service shall be responsible for arranging and providing necessary changes in their supply wiring to suit the equipment.

3. Verify dimensions of equipment to be furnished by others to insure correct clearances and connections.

4. Control Voltages shall not exceed 120 volts. Provide control transformers for higher line voltages. Control transformers shall be connected from phase to neutral.

1.08 SUPERVISION AND COORDINATION

A. Coordinate work with local power, telephone, cable and data utilities to ensure compliance with their specific requirements. Before starting work, contact both power and telephone utilities and make arrangement for their services to this project.

B. Contact Electrical Inspection and obtain permit before starting work. Electrical plans have been submitted for plans review and will be available with payment for electrical permit.

C. Maintain adequate supervision of the Division 26 work and have a responsible person in charge at the site any time work is in progress or when necessary for coordination with other trades.

D. Schedule work to best serve the interests of the Owner. Lay out work by referring to Civil, Landscape, Architectural, Structural, Mechanical and other Contractors to
anticipate their movements. Cooperate with the other contractors on the job and coordinate work to avoid interference with them.

E. Determine a satisfactory space allocation arrangement where electrical material is installed in proximity to work of other trades. No extra payments will be allowed to relocate work that interferes with that of other trades.

1.09 CODES AND REGULATIONS

A. All work shall conform to current applicable National, State and local Codes; these shall be regarded as the minimum standard of quality for material and workmanship. Contractor shall provide all Labor and Material that may be required for compliance with Code Requirements or Code Interpretations, although not specifically detailed on the Drawings or in the Specifications. Contractor shall become familiar with all the following codes prior to bidding.

ASTM American Society for Testing and Materials
NBFU National Board of Fire Underwriters
NEC National Electrical Code
WAC Washington State Administrative Code
NESC National Electrical Safety Code
NEMA National Electric Manufacturers Association
NFPA National Fire Protection Association
UL Underwriters Laboratories, Inc.
ICEA Insulated Cable Engineers Associations
CBM Certified Ballast Manufacturers
ETL Electrical Testing Laboratories
IFC International Fire Code
IBC International Building Code

B. Nothing in these Drawings and Specifications shall be construed as permitting work not conforming with governing codes.

C. The Contractor shall not be relieved from complying with any requirements of these contract documents which may exceed, but not conflict with, requirements of the governing codes.

D. Contractor shall include in bid all costs to have a Department of Labor & Industries approved firm to evaluate the installation safety, and compliance with code for any equipment specified or furnished that is not UL labeled.

E. For equipment furnished by others that is not UL labeled the contractor shall not connect the equipment to the electrical system until receiving written approval by the electrical authority having jurisdiction.
1.10 PERMITS & FEES
   A. Obtain and pay all fees for licenses, permits and inspections required by laws, ordinances and rules governing work specified herein. Arrange for inspection of work and provide inspectors with all necessary assistance.

1.11 WORKMANSHIP
   A. All work shall be done by competent craftsmen skilled in the specific work to be done. Equipment shall be installed in a neat and workmanlike manner following the best practice of the trade.

1.12 ITEMIZED COST BREAKDOWN
   A. Furnish the Engineer with an itemized contract cost breakdown to allow evaluation of partial payment requests. The cost breakdown shall categorize major items of the contract such as: Job organization and setup, conduit system, primary switchgear, transformers, secondary panel gear, service and feeder wiring, branch circuit wiring, lighting fixtures, wiring devices, trim, fire alarm and special systems.

1.13 OPERATING INSTRUCTIONS
   A. Fully instruct the Owner's designated representatives in the operation and maintenance of all components of the electrical system upon completion of the work and after all tests and final inspection(s) by the Authority(s) Having Jurisdiction.

   B. All costs for contractor's instruction are to be included in the bid proposal. These costs are in addition to contractors costs for commissioning.

   C. Instructors shall be contractor's superintendents or foremen knowledgeable in each system and equipment suppliers representatives for special systems.

   D. Refer to Section 01 7700 Closeout Procedures.

1.14 AS-BUILT RECORD DRAWINGS
   A. Continuously maintain a set of AS-Built Drawings to indicate all significant deviations from the original design and the actual placement of equipment and underground conduits. (Location of conduit stubouts shall be dimensioned from accepted reference lines). Changes shall be shown with red colored pencil while work is in progress. This "As-Built" set shall be clearly marked: "AS-BUILT RECORD DRAWINGS - Do Not Remove From Office." Refer to 01 7800 Closeout Submittals for additional requirements.

   B. Quarterly “As-Built” review refer to 01 7800 Closeout Submittals and 01 3000 Administrative Requirements.

   C. "As-Built Record Drawings" and "Corrected to As-Built" prints shall be delivered to the Engineer for transmittal to the Owner.

1.15 ELECTRICAL EQUIPMENT OPERATION AND MAINTENANCE (O&M) MANUALS
A. Refer to Section 01 70 00 Project Closeout Procedures.

1.16 FINAL INSPECTION

A. Refer to Section 01 70 00 Project Closeout Procedures.

1.17 FINAL ACCEPTANCE

A. Refer to Section 01 70 00 Project Closeout Procedures.

1.18 GUARANTEE

A. The Division 26 Contractor shall provide written guarantee to repair or replace (without additional expense) any defective materials or workmanship which become evident within a period of two (2) years after final acceptance or for such longer period as elsewhere specified. All warranty work shall be to the satisfaction of the Owner.

B. Any material guaranteed by a specific manufacturer for a period in excess of two (2) years shall be specifically noted on the Owner's written guarantee.

C. The Division 26 Contractor will not be expected to perform normal maintenance, such as replacement of incandescent lamps, etc., 60 days beyond date of Beneficial Occupancy by Owner or Final Acceptance, whichever date is earlier.

D. Refer to Section 01 70 00 Project Closeout Procedures.

PART 2 PRODUCTS

2.01 GENERAL

A. All materials shall be new, free from defects, of the quality specified herein and on the drawings. Materials shall be designed to insure satisfactory operation and rated life in the prevailing environmental conditions where they are being installed. They shall be listed by Underwriter's Laboratories or a recognized testing laboratory for use under these conditions.

B. Each type of material shall be of the same make and quality throughout the job. The materials furnished shall be the latest standard design products of manufacturers regularly engaged in their production.

2.02 TECHNICAL DATA

A. Technical information contained herein relies entirely on tests and ratings provided by manufacturers who are solely responsible for their accuracy. The Engineer, by use of this information in no way implies the results of published manufacturer's information has been verified.

2.03 AS SPECIFIED EQUIPMENT

A. This specification generally lists only one make and model number for each item of equipment or material required for the project. This is not intended to be restrictive but is intended to indicate the standard of quality, design and features
2.04 SUBSTITUTION OF MATERIALS

A. Listing of approved materials is not intended to prevent acceptance of other materials provided the substitute products are submitted for approval and have been approved in accordance with the Substitution of Materials requirements.

B. Approval Prior to Installation

1. All substitution requests shall be made on the substitution request form.
2. The Contractor shall be responsible for a substitute item suiting the space limitations shown and for any additional installation costs incurred by the substitution.
3. Approval of substitute materials shall not be construed as authorizing any deviation from the contract drawings and specifications except where such deviation is clearly described in writing on the substitution request form and is approved in writing by the Engineer.
4. Requests shall clearly define and describe the proposed substitute product. Such requests shall be accompanied by samples, record of performance, certified test reports and such additional information as the Engineer may require to satisfactorily evaluate the substitute product(s).

C. Approval Prior to Bid Opening

1. Bidders or vendors may submit prior approval requests for substitute materials that are similar in appearance, quality and performance to those specified herein or on the drawings.
2. All requests shall be made in writing at least seven (7) days prior to date of bid opening using the substitution request form. Written requests for approval received in the engineer’s office less than seven (7) days prior to bid opening will not be accepted.

D. Approval After Contract Award: Substitute products will be considered after contract award only under these conditions:

1. Non-Availability of Specified Materials: The Contractor shall have placed orders for specified materials within ten days after notice to proceed and received written confirmation of non-availability from the supplier(s). The reason of non-availability shall be beyond the contractor's control such as: discontinuation of manufacture, strikes and acts of God.
2. Contract Price Adjustments: The Contractor may submit substitution requests for Owner cost savings. All substitute request forms submitted after award of contract shall clearly indicate the proposed contract price change or the request will not be considered.
3. Where Permitted in the Specifications: For items where "approval prior to bidding" is not required in these specifications. It shall be the contractors'
responsibility to show that a substitute item is equal or superior in performance and quality to the specified item.

E. No Substitute:

1. It is the intent of this specification to require specific materials to be compatible with the existing installation. Certain materials and systems, consequently, are indicated "No Substitute" and shall be provided as specified.

2.05 COMPLETE SYSTEMS

A. All systems specified herein and shown on the drawings shall be complete and operational in every detail. Mention of certain materials in bidding documents shall not be construed as releasing the Contractor from furnishing such additional materials and performing all labor required to provide a complete and operable system.

2.06 SUBMITTALS

A. Purpose of Submittals

1. Submittals processed by the Engineer are not change orders. The Contractor, by the submittal process, demonstrates an understanding of the design concept by indicating equipment and materials intended to be provided and fabrication/installation methods intended to be utilized to meet all requirements of the contract documents.

2. The Engineer's review is for general conformance with the design concept and the contract documents. Markings or comments shall not be construed as relieving the Contractor from compliance with the contract documents.

B. Submittal items: Submittals shall include, but not be limited to the following items

- Raceways
- Wiring Devices
- Disconnects
- Lighting Fixtures
- Nameplates
- Wires and Cables Fuses
- Fused Disconnects
- Arc Flash and PPE Study
- Short Circuit Study
- Automatic Transfer Equipment
- Electric Heating Equipment
- Splicing Kits
- Labels
- Items Requested by Engineer

C. Submittal Format

1. A transmittal letter with reference identification (i.e., Electrical Submittal No. 1, material lists and catalog data, etc.) shall accompany all submittals.

2. All submittals shall be submitted electronically in PDF format.

D. Submittal Completeness
1. The Contractor shall make every effort to ensure the completeness of the initial submittal. Availability of certain shop drawings and catalog materials, however, may prevent this. Submittal shall not be delayed past specified time periods to await delivery of the missing items. The Contractor, instead, shall identify missing items on the transmittal letter and provide page identifying insertion of these materials into the completed submittal brochure at a later date.

E. Engineer’s Selection of Materials for Installation: The Engineer may select specified items that the Contractor shall provide, without change in contract price or time of completeness, under these circumstances:

1. Late and/or Unqualified Partial Submittals: Submittals must be made within the specified time periods; all partial submittals shall indicate manufacturer(s) catalog numbers, pertinent technical information and status of missing items.

2. Failure to follow Re-submittal Procedures: Contractor, within 14 days after the Engineer rejects any items, shall re-submit new materials for approval.

3. Materials have been submitted and rejected twice by the Engineer.

F. Contractor’s Responsibilities: The Contractor is responsible for all submittal details, accuracy of quantities and dimensions, selection of fabrication processes and techniques of assembly.

1. The Contractor shall furnish equipment/material suppliers with all Drawings and Specifications pertinent to their work.

2. The Contractor shall review, stamp and sign all submittals and shop drawings, prior to submitting shop drawings to the Engineer for review. Contractor shall correct them to insure compliance with the specifications and drawings. Obtain Engineer’s written approval before manufacture is started on any special equipment.

3. Deviation from Shop Drawings in fabrication and/or installation of equipment is not permitted unless proposed changes are clearly noted in writing by the Contractor and approved in writing by the Architect/Engineer at the time of submittal.

4. Maintain at least one complete approved submittal brochure on the jobsite for reference during construction.

2.07 ELECTRICAL EQUIPMENT IDENTIFICATION

A. General: These items shall be provided with nameplates:

1. All motors, motor starters, pushbutton stations, control panels and time switches.

2. Disconnect switches, switchboards, panelboards, time clocks, low voltage control panels and circuit breakers, contactors, and relays in separate enclosures.

3. Wall switches controlling receptacles, lighting fixtures or equipment where
the receptacles are not located within sight of the controlling switch.

4. Special systems shall be properly identified at outlets, junction and pull boxes, terminal cabinets and equipment racks.

B. Nameplate Inscription

1. All nameplates shall adequately describe the function or operation of the identified equipment as required.

2. Panelboard and Switchgear nameplates shall include equipment designation, voltage and phase of supply, i.e., Panel A, 200A, 208/120V, 3 phase, 4 wire.

3. Nameplate designations shall be consistent for all components of a particular piece of equipment, such as starter, disconnect switch, Push Button control station(s) and the like.

4. Contractor shall submit a complete list of nameplates for approval.

C. Nameplate Construction

1. Nameplates shall be laminated phenolic plastic with minimum 3/16” high black engraved characters on white background (alternate background colors shall be provided as noted in the specifications or drawings for special applications).

2. Nameplates shall be securely fastened to the equipment with No. 4 round-head phillips, cadmium plated steel, self-tapping screws. Contact cement adhesive only is not acceptable.

3. Motor nameplates may be non-ferrous die-stamped metal, minimum 0.03 inch thick, in lieu of separate phenolic nameplate. Device plates may be identified by engraving directly on the plate. All engraved or stamped lettering shall be filled with contrasting enamel.

PART 3 EXECUTION

3.01 PROTECTION OF WORK

A. Protect all work, wire, cable, materials and equipment installed under this division against damage by other trades, weather conditions or any other causes. Equipment found damaged or in other than new condition will be rejected as defective.

B. Switchgear, transformers, panels, light fixtures and electrical equipment shall be kept covered or enclosed to exclude moisture, dust, dirt, plaster, cement, or paint and shall be free of all such contamination before acceptance. Enclosures and trims shall be in new condition, free of rust, scratches or other finish defects. Properly refinish in a manner acceptable to the Engineer if damaged.

C. Keep conduit and raceways closed with suitable plugs or caps during construction to prevent entrance of dirt, moisture, concrete or foreign objects. Raceways shall be clean and dry before installation of wire and at the time of acceptance.
D. Make up and insulate wiring promptly after installation of conductors. Wire shall not be pulled-in until raceways are complete, all bushings are installed, and raceway terminations are completed. Wire shall not be pulled into conduit embedded in concrete until after the concrete is placed and forms are removed.

3.02 EXISTING CONDITIONS

A. Examine the structure, building, and conditions under which Division 26 work is to be installed for conditions detrimental to proper and timely completion of the work. Do not proceed with work until deficiencies encountered in installation have been corrected. Report any delay or difficulties encountered in installation of Division 26 work which might be unsuitable to connect with work by other Divisions in this specification. Failure to report conditions shall constitute acceptance of other work as being fit and proper for the installation of Division 26 work.

3.03 CUTTING AND PATCHING

A. Obtain permission from the Architect/Engineer prior to cutting. Locate cuttings so they will not weaken structural components. Cut carefully and only the minimum amount necessary. Cut concrete with diamond core drills or saws except where space limitations prevent the use of such equipment.

B. Penetrations of fire rated elements shall be carefully made to maintain that rating after the installation is complete. See Section 07 84 00.

C. All construction materials damaged or cut into during the installation of Division 26 work must be repaired or replaced with materials of like kind and quality as original materials by skilled labor experienced in that particular building trade.

3.04 EXCAVATIONS

A. The contractor shall be fully responsible for the location and protection of all existing utilities. The contractor shall verify all utility locations prior to construction by calling the underground locate line at 1-800-332-2344 a minimum of 48 hours prior to any excavation. The contractor will also be responsible for maintaining all locate marks once the utilities have been located.

B. All excavations are to be so conducted that no walls or footings shall be disturbed or injured in any way.

C. Remove all surplus earth not needed for backfilling and dispose of same as appropriate at a licensed disposal facility.

3.05 PAINTING

A. Painting in general will be covered under another Division of this specification. Items furnished under this Division scratched or marred in shipment or installation are to be refinished by the Contractor to the satisfaction of the Engineer.

B. Junction boxes for telecom shall be painted blue. Fire alarm junction boxes shall be painted red.
3.06 CLEAN UP

A. Contractor shall continually remove debris, cuttings, crates, cartons, etc., created by his work. Such clean up shall be done at sufficient frequency to minimum hazard to the public, other workmen, the building and the Owner's employees. Before acceptance of the installation, Contractor shall carefully clean cabinets, panels, wiring devices, coverplates, etc., to remove dirt, cuttings, paint, plaster, mortar, concrete, etc. Blemishes to finished surfaces or apparatus shall be removed and new finish equal to the original applies.

3.07 LABELING

A. Clearly and properly label the complete electrical system, as specified herein, to indicate the loads served or the function of each item of equipment connected under this contract.

B. Control circuits shall utilize combinations of colors with each conductor identified throughout using wrap around numbers or letters. Identification shall be consistent with the contract drawing requirements and operation and maintenance shop drawings.

C. Labels shall be provided on all disconnects, combination motor starter, and junction boxes indicating the specific panel and branch circuit utilized. Do not provide circuiting labels on light switch and receptacle cover plates.

3.08 MECHANICAL EQUIPMENT CONNECTIONS

A. Provide complete electrical connections for all items of equipment, including incidental wiring, materials, devices and labor necessary for a finished working installation.

B. Mechanical/Electrical equipment connection coordination shall be as follows:
<table>
<thead>
<tr>
<th>ITEM</th>
<th>FURNISHED BY</th>
<th>INSTALLED BY</th>
<th>POWER WIRING BY</th>
<th>CONTROL WIRING BY</th>
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<tbody>
<tr>
<td>Mechanical Equipment Motors</td>
<td>MC</td>
<td>MC</td>
<td>EC</td>
<td>MC</td>
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<tr>
<td>Fused &amp; Unfused Disconnect Switches,</td>
<td>EC</td>
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<tr>
<td>Thermal Overload &amp; Heaters</td>
<td>EC</td>
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<td>EC</td>
<td>MC</td>
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<tr>
<td>Motor Starter &amp; Overload Heaters</td>
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<td>MC</td>
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<td>Manual Operating &amp; Speed Switches</td>
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<tr>
<td>Control Relays &amp; Control Transformers</td>
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<td>Low Voltage Thermostats</td>
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<td>Temperature Control Panels</td>
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<td>DDC Panels</td>
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<td>Motor &amp; Solenoid Valves, Damper Motors,</td>
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<td>PE &amp; EP Switches</td>
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<td>Fire/Smoke Dampers (Actuators)</td>
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<td>EC***</td>
<td>MC/EC*</td>
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<tr>
<td>Duct-Mounted Smoke Detectors</td>
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<tr>
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<tr>
<td>EC = Division 26</td>
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</table>

* Motor interlock by MC, Fire Alarm System Interconnection by EC.

** EC shall provide conduit and wire from nearest un-switched 120V circuit location. Label on “as built” drawings.

*** EC shall provide conduit and wire from nearest 120V panel. Connect to spare circuit breaker and label on “as-built” drawings.

3.09 SUPPORT AND ALIGNMENT

A. Each fastening device and support for electrical equipment, fixtures, panels, outlets and cabinets shall be capable of supporting not less than four times the ultimate weight of the objects fastened to or suspended from the building structure.

B. Install panels, cabinets and equipment level, plumb, and parallel with structural building lines. Switchgear, panels and all electrical enclosures shall fit neatly.
without gaps, openings or distortion. Properly and neatly close all unused openings with approved devices.

C. Fit surface panels, devices and receptacles with neat, appropriate trims, plates or covers, (without over-hanging edges, protruding corners or raw edges) to leave a finished appearance.

D. All junction boxes, pull boxes or other conduit terminating housings located above a suspended ceiling shall be securely suspended from structure or ceiling grid system to prevent sagging or swaying.

3.10 NOISE CONTROL

A. Back-to-back or straight-through installation of wall or partition boxes is not permitted to minimize noise transmission between occupied spaces.

B. Contactors, transformers, starters and similar noise producing devices shall not be placed on walls which are common to occupied spaces. Where such devices must be mounted on walls common to occupied spaces, they shall be shock mounted or isolated in such a manner as to effectively prevent the transmission of their inherent noise to the occupied space.

C. Ballasts, contactors, starters, transformers and like equipment which are found to be noticeably noisier than other similar equipment on the project will be deemed defective and shall be replaced.

END OF SECTION 26 05 00
PART 1   GENERAL

1.01 RELATE DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

1.02 WORK INCLUDED

A. Provide all wire, cable and terminations for a complete installation.

PART 2   PRODUCTS

2.01 PACKAGING

A. Conductors shall be delivered to the job site in approved original cartons, or on reels as recommended by the manufacturer, and shall bear the Underwriter's Label. Reels shall be provided with suitable protection to prevent fork-lift damage to conductors during shipment or storage prior to use.

2.02 SPECIALIZED CONDUCTORS

A. Conductors for specialized systems shall be as recommended by the equipment manufacturer.

2.03 CONDUCTORS - 600 VOLTS

A. Stranded copper, insulated for 600 volts. For long runs provide 90 degree rated wire as identified on drawings.

B. Insulation types THW, THHN, THWN, XHHW, RHH, RHW, or as required to suit installation conditions.

C. Thru wiring in fluorescent fixtures shall be rated for 90 degree C minimum.

2.04 CONNECTORS - 600 Volts

A. Branch circuit conductor splices:

   1. Pre-insulated "twist-on" type or "crimped-on" type as approved (Scotch-lok, Ideal or equal).

B. Cable Splices:

   1. Split-bolt or tool applied sleeves with pre-formed insulated cover, heat shrinkable tubing or approved plastic insulating tape.

C. Terminator lugs of No. 12 wire and smaller:

   1. Spade, insulated type to be tool applied.

D. Terminator lugs for No. 10 wire or larger:
1. Two bolt (or approved positive restraint), tool applied compression type (Burndy or equal).

2.05 INSULATING MATERIALS
   A. Insulating tape or heat shrink tubing shall have the equivalent rating of the applicable conductor insulation (Scotch 3M, RAYCHEM or equal).

2.06 PLASTIC CABLE TIES
   A. Nylon, or equivalent, locking type (T&B or equal).

2.07 METAL CLAD CABLE
   A. Metal clad cable is an acceptable wiring method instead of EMT conduit and wire for lighting and receptacle branch circuits. Metal clad cable is not acceptable from the homerun junction box back to the panel for lighting and receptacle circuits.

PART 3 EXECUTION

3.01 GENERAL
   A. Install all wiring in raceway.

3.02 MINIMUM WIRE SIZE
   Lighting and Power System ............... No. 12 AWG
   Fixture Wire ............................ No. 14 AWG
   Wiring in Fluorescent Fixture Troughs ... No. 12 AWG
   Control Circuits for Motors, etc. ........ No. 14 AWG
   Fire Alarm Line Voltage Wiring .......... No. 14 AWG
   Low Voltage Wiring .......... As recommended by Mfgr

3.03 CONDUCTOR TYPES, REFERENCED ON PLAN
   A. Conductors shall be copper.
   B. Aluminum is not allowed

3.05 CONDUCTOR COLORING CODE
   Conductor color coding shall be as follows:
   A. 208/120 volt system
      A Phase - Black
      B Phase - Red
      C Phase - Blue
      Neutral – White
      Grounding – Green
Switched wires – Other colors

B. 480/277 volt system
   A Phase - Brown
   B Phase - Orange
   C Phase - Yellow
   Neutral - Gray
   Grounding – Green with yellow strip
   Other Colors - Switched Wires

B. Conductors shall have colored insulation except wires larger than #8 may be black with colored tape identification at all terminations and splices.

C. Additional colors may be used where such colors will help in identifying wires and different systems.

3.06 CONDUCTOR INSTALLATION

A. Raceways shall be complete, clean and free of burrs before pulling conductors.

B. U.L. approved pulling compounds may be used with the residue cleaned from the conductors and raceway entrances after the pull is made.

C. Contractor shall obtain the manufacturer's published recommendations for the handling, pulling and terminating of the cable. Contractor shall perform work in accord with manufacturer's recommendations and accept all responsibility for work not in accord with manufacturer's recommendations.

D. Pulleys or blocks shall be used for alignment of the conductors when pulling. Pulling shall be in accordance with manufacturer's specifications regarding pulling tensions, bending radius of the cable and compounds. No mechanical pulling means shall be used for wires No. 8 AWG and smaller. Cables shall be pulled by the conductor, not by the insulation or shielding.

3.07 MOISTURE PROTECTION

A. Cable ends shall be protected at all times from moisture. Provide approved heat-shrink end caps or equivalent for all unterminated cable ends.

3.08 CONDUCTORS IN PANELS AND SWITCHBOARDS

A. Conductors in panels, switchboards and terminal cabinets shall be neatly grouped and formed in a manner to "fan" into terminals with regular spacing.

3.09 CABLE SUPPORTS

A. Provide conductor support devices as required by code in vertical cable runs.

3.10 INSULATION REMOVAL

A. Insulation shall be removed with approved wire stripping tools. Conductors that are
nicked or ringed are unacceptable and shall be cut off and re-stripped.

3.11 INSULATION OF ENERGIZED TERMINATIONS

   A. Insulate all exposed energized connections and splices with approved tape or heat shrink tubing. Tape, if used, shall be half-lapped in two directions.

3.12 TERMINATIONS - COPPER CONDUCTORS 600 VOLTS

   A. Control and special systems wires shall be terminated with a crimped on lug when terminating at a screw connection.

   B. All screw and bolt type connectors shall be made up tight and retightened after an eight hour period. Tighten all bolted connections with a ratcheting type torque wrench per manufacturer's standards.

   C. All tool applied crimped connectors shall be applied per manufacturer's recommendations and physically checked for tightness.

END OF SECTION 26 05 19
PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

1.02 WORK INCLUDED

A. Provide a complete grounding system that complies with the current edition of the National Electrical Code (NEC), and all applicable regulatory codes.

PART 2 PRODUCTS

2.01 GROUND RODS

A. Minimum size: 3/4" diameter by 10'-0" long, copper clad steel rods, or as noted on the drawings.

2.02 GROUND CONDUCTORS

A. Grounding conductors shall be soft drawn, bare, stranded copper unless otherwise noted. Size as shown on the plans and per the National Electrical Code (NEC) Article 250.

1. GROUNDING ELECTRODE CONDUCTORS FOR A.C. SYSTEMS: See NEC table 250.66

2. EQUIPMENT GROUNDING CONDUCTORS:
   a. See NEC table 250.122
   b. Equipment grounding conductors may be insulated; provide green insulation and/or approved permanent identification for conductors larger than No. 6 AWG. Equipment grounding conductors shall be provided in all feeder and branch circuit conduits.

2.03 GROUND ELECTRODE CONNECTORS

A. Connectors for grounding electrode conductor to ground rod shall be of the thermal fusion type; conductor-to-conductor connections may be either thermal fusion or approved hydraulically applied compression type.

2.04 GROUNDING BUSHINGS

A. Grounding bushings shall be matched to the ampacity of the grounding conductor and shall have approved set-screw type grounding lug connectors.

2.05 GROUNDING CONNECTORS

A. Shall meet the requirements of ground bushings, cast, set-screw or bolted type.
2.06 GROUNDING CLAMPS

A. Clamps shall be matched to the ampacity of the grounding conductor. Provide approved raceway hub where grounding conductor is shown protected by conduit or armored cable. Clamps shall be U-bolt type for connection to waterpipes.

PART 3 EXECUTION

3.01 GROUND CONTINUITY

A. Maintain ground continuity throughout the entire electrical system.

B. Permanently connect the electrical system neutral to the water service. The system shall be grounded only at transformer secondaries and at the main distribution board. Branch panel neutrals must be isolated from additional points of grounding.

C. Provide approved grounding bushings or locknuts on all conduits terminating in panelboards, pullboxes or other enclosures to insure continuity of conduit grounding connections.

D. Securely ground lighting fixtures.

E. Provide a separate grounding conductor in all metal or non-metallic conduits and in all flexible metallic conduit runs. Connect to the grounding system in an approved manner.

F. All plug-in receptacles shall be bonded to the box and raceway ground system.

3.02 GROUNDING CONNECTIONS

A. All grounding connections shall be carefully made to insure low system impedance. Locate grounding connections to allow future servicing and expansion.

B. Prior to making mechanical or thermal connections, all conductors shall be clean, dry and bright with the bonding surface thoroughly cleaned of any oxides, mill, scale or other foreign matter.

C. Ground conductors shall be protected from mechanical injury during construction. Provide protective coverings or rigid non-ferrous conduit.

3.03 GROUND RODS

A. Ground rods shall be driven into undisturbed soil to full depth. Provide additional rods, ionic salt solutions and the like where special low-resistant grounds are specified.

3.04 CONCEALED GROUND ELECTRODE SYSTEM

A. Concealed ground electrode systems, shall be installed, inspected, tested and certified for low resistance connections and low resistance to earth ground prior to being covered.
3.05   THROUGH-SLAB GROUND PENETRATIONS

   A. Ground conductors extending through the slab shall be protected by a rigid
      conduit sleeve; the void portion of the sleeve shall be packed with a non-
      hardening type duct seal.

3.06   TESTING

   A. Shall conform to Section 26 01 26.

END OF SECTION 26 05 26
PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

1.02 WORK INCLUDED

A. Provide raceways for a complete electrical system. Include all fittings, hangers and appurtenances required for a complete installation.

B. Provide outlet and pull boxes required to enclose devices, permit pulling conductors, for wire splices and branching.

C. See specification section 04 2000 – Unit Masonry for coordination requirements of electrical raceway and box layout within masonry walls.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide boxes suitable for the location. Boxes shall meet NEMA Standards for various types.

2.02 CONDUITS

A. Galvanized Rigid Steel, thick wall (GRS)

B. Intermediate Metal Conduit (IMC)

C. Electrical Metallic Tubing (EMT)

D. Flexible Metal Conduit with and without polyvinyl chloride jacket

E. Non-metallic, polyvinyl chloride (PVC), schedule 40

2.03 FITTINGS

A. GRS and IMC couplings and connectors shall have threaded connections. Galvanized malleable iron or non-corrosive alloy compatible with galvanized conduit. Running thread or set screw type fittings are not permitted.

B. EMT - Couplings and connectors shall be rain tight, steel or malleable iron, utilizing a split corrugated compression ring and tightening nut or stainless steel locking disk. Set screw fittings are permitted in dry locations. Set screw fittings are not permitted in wet locations or in concrete. Zinc, pot metal, die cast fittings and indenter fittings are not acceptable.

C. Flexible Metal Conduit

1. Dry Locations: malleable iron or steel, Thomas & Betts "Squeeze" type or equal.
2. Damp or Wet Locations: Thomas & Betts "Super Liquid-Tight" with external ground lug.

D. PVC Fittings shall be solvent welded types.
E. Sealoff fittings shall be with filler fiber, poured compound and removable cover.
F. Expansion Couplings shall be O.Z. type EX with ground jumper.

2.04 INTERIOR WIRING, NEMA 1

A. Flush and concealed outlet boxes shall be galvanized stamped steel with screw ears, knock-out plugs, mounting holes, and fixture stud.

B. Surface outlet boxes shall be galvanized stamped steel same as above for use on ceilings and in accessible locations. Contractor shall provide cast iron galvanized for use on walls below 8 feet.

C. Boxes exceeding 4-11/16 inches square shall be welded steel construction with screw cover and factory painted.

D. Surface Metal Raceway boxes shall be of same manufacture to match raceway. Boxes shall accommodate standard devices and device plates.

E. Boxes for casting in concrete or mounting in masonry walls shall be galvanized steel (not aluminum or zinc die castings), specifically designed and listed for that purpose.

2.05 SPECIAL LOCATIONS

A. For indoor damp or dusty locations provide NEMA 4 boxes
B. For corrosive locations provide NEMA 4X boxes
C. For outdoor equipment where a drain is appropriate provide NEMA 3R boxes.
D. For outdoor locations requiring dust and water protection provide NEMA 4 or 4X boxes.

2.06 BELOW GRADE

A. Where exposed to earth, boxes (handholes or vaults) shall be constructed of precast concrete with size, configuration, hinged and locking cover. Structural loading shall be minimum H25 traffic rating.

PART 3 EXECUTION

3.01 GENERAL

A. Install raceways concealed in construction of finished spaces.
B. Cut conduit ends square, ream smooth and extend maximum distance into all couplings and connectors.
C. Provide and install manufactured end caps on all conduit ends during construction to prevent the entrance of water or dirt. Tape, as a cover, is not acceptable.

D. Pull a properly sized mandrel through each conduit prior to installation of conductors or pull-lines to remove any materials trapped within the conduit run.

E. All PVC elbows shall be factory made.

F. Field made elbows are acceptable for steel conduits when made with approved bending tools. Bends that show conduit flattened or deformation are unacceptable and shall be replaced.

G. Conduits shall maintain a minimum 12” clearance from any high temperature surface.

H. The conduit layout shall be carefully planned by the contractor to ensure neat and workmanlike installation.

I. Any work showing inadequate planning may be ordered removed by the Architect/Engineer and shall be replaced in a neat and proper manner at no additional cost to the owner.

3.02 CONDUIT SIZING

A. Conduits shall be sized per code for conductors with type THW insulation, although thinner insulation types are permitted in some cases. Conduit size shall not be reduced if large size is specified on the drawing. Minimum conduit size shall be ¾” trade diameter. Conduit ½” trade diameter may be used for dead end receptacles and switch runs.

3.03 GRS AND IMC

A. Install GRS or IMC for all conduits in wet locations, concrete, underground, exposed to weather, where subject to physical damage and as noted on drawings.

B. Connections shall be watertight in damp locations.

3.04 EMT

A. EMT may be installed for wiring in masonry block, frame construction, furred ceilings, above suspended ceilings and in dry location concrete, exposed dry location unfinished spaces not subject to physical damage. EMT shall not be installed underground, under concrete slabs-on-grade, in concrete slabs-on-grade, exposed to weather, on exterior of buildings or on roofs.

B. Contractor shall coordinate assembly and installation of EMT in masonry block construction to avoid construction delays. Avoid surface cut masonry units wherever such masonry units are to remain unplastered or exposed.

3.05 FLEXIBLE CONDUIT
A. Provide flexible conduit connection to motors and equipment subject to vibration with at least a 60 degree loop to allow for isolation and flexibility. Use liquid-tight for pumps, equipment which is regularly washed down, and for equipment in damp locations. Provide bonding jumper as required by N.E.C.

3.06 PVC CONDUIT

A. PVC conduit may be used underground when permitted by code and where designated as an acceptable substitute for GRS or IMC on the drawings. Field bends, less than 45 degrees, when necessary, shall be formed with factory recommended heater. PVC bends 45 degrees or greater shall be factory made.

3.07 UNDERGROUND RACEWAYS

A. Burial depth of underground raceways shall be not less than NEC minimums and shall be deeper where so noted herein or required to avoid conflicts.

B. Arrange and slope conduits entering buildings to drain away from the point of entry.

C. Conduits passing through the exterior walls below grade and/or bridging areas of naturally unstable soil conditions or previously filled areas shall be placed in a manner to avoid crushing from ground settlement. Backfill under conduit shall be thoroughly compacted. Provide approved deflection fittings on conduits.

3.08 CONDUITS IN FOUNDATION AREA

A. Conduits in foundation areas shall be installed so as not to undermine the footings. Check structural drawings for any specific instructions. Backfill over conduits under footings and concrete slabs shall conform to the requirements of the Architect/Structural Engineer.

3.09 STUBUPS THROUGH CONCRETE SLABS OR FINISH GRADE

A. Conduits through concrete slabs shall be steel. Install at such depth that the exposed conduit is vertical and curved section of the elbow is not visible.

B. All steel conduit below grade to 6” above grade shall be wrapped with Scotch 50 Anti Corrosion Protective tape or equal.

3.10 INSERTS AND SLEEVES

A. Furnish and install all inserts and sleeves necessary for Division 26 installation prior to pouring of concrete slabs and walls.

B. In existing concrete slabs and walls utilize drilled-in threaded inserts, installed as recommended by the manufacturer, where additional supports are required. Neatly core drill openings where additional sleeves are required.

3.11 SEALING RACEWAY PENETRATIONS

A. Exterior Wall Surface Above Grade
1. For concrete construction above grade, cast raceway or sleeve in wall or core drill wall and hard pack with a mixture of equal parts of sand and cement. Seal around all penetrations, with caulking approved by Architect/Engineer.

B. Exterior Surface Below Grade

1. Cast raceway into wall/floor or use manufactured seal assembly cast in place. OZ type "FSK" or equal. Change from PVC to steel conduit (couplings or bushings) where necessary to obtain a watertight seal in poured concrete wall or floors.

C. Roof

1. Conduits passing through building roof shall be flashed using a 4 lb. per square foot lead plumbing vent flashing extending not less than 10" from the conduit under the roofing, and not less than 10" above the roof around the conduit. Flashing shall be attached by an approved galvanized or stainless steel clamping band.

D. Fire Rated Construction

1. All seals must meet with the approval of the local Fire Marshal.
2. Concrete or Masonry
   a. Seal around raceway with an approved firestop compound that passes UL test 1479 (ASTM E814) DOW CORNING 3-6548, T & B FLAME SAFE, 3M Fire Barrier Caulk, 3M #Fire Barrier Putty, or equal.
3. Plaster or Gypsum Wallboard
   a. Seal around raceway penetration with plaster and approved fire tape.

E. Acoustical Sealing

1. Provide Acoustical Sealing of all wiring and raceway openings in ceilings, walls and floors which are critical barriers for noise transfer. Acoustical sealing shall consist of resilient caulking to seal all openings around wiring and electrical raceways.

3.12 SEALING CONDUITS

A. Seal interior of all conduits which enter the building through floor, roof or outside walls and may carry water into the building. Seal on the end inside the building, using duct sealing mastic, non-hardening compound type, specifically designed for such service. Pack around wires in the conduit.

B. For exterior wall penetrations below grade, install OZ type "CSB" sealing bushing at interior end of penetrating conduit. Threaded fittings-only are permitted in entering conduits ahead of the sealing bushing.

C. Provide for water drainage so no electrical problems will result if seals leak.
3.13 CONDUIT HANGERS

A. General

1. Provide for supporting all conduits from the building structure. Space supports per NEC. Contractor shall provide supports adequate for the loads and resistant to earthquake forces.

2. Contractor is responsible to calculate lbs/sq ft of proposed main conduit runs and verify with project structural engineer if acceptable or additional structural bracing is required. Contractor shall alter conduit route or provide additional bracing acceptable to the structural engineer.

B. With Suspended Ceiling Areas

1. Contractor may attach 1/2" and 3/4" EMT conduits to ceiling suspension systems provided such systems are structurally suitable. Attachment to suspension systems shall be made with clips specifically manufactured for this purpose. (CADDY or equal)

C. Conduits not attached to the ceiling suspension system shall be fastened with approved pipe straps or separate suspension hangers to ceiling metal inserts and/or structural members.

D. Hangers for Direct Mounted Conduits

1. Hangers attached directly to building surface shall be two hole sheet steel or one hole malleable iron, all galvanized, pipe clamps. (Thomas & Betts or approved equal).

2. Hangers for ground cable and PVC conduit supporting ground cable shall not encircle the cable or conduit in metal, but shall be 2-hole plastic or 1-hole metal clamps.

E. Hangers for Single Suspended Conduit

1. Hangers suspended below ceilings shall utilize steel rods and malleable iron pipe rings sized for the application (Grinnell No. 97 or approved equal). Provide concrete hanger inserts as required.

F. Trapeze Type Suspended Supports

1. Trapeze type supports shall be used where two or more conduits use the same routing. Such hangers shall utilize steel rods, structural steel channels, and clamps of Kindorf, Unistrut or approved equal, sized for the application.

G. Support of Conduit in Steel Stud Walls

1. Attach conduits to studs with approved straps or 18 gauge steel wire secured to steel bars.

3.14 CONTINUITY OF CONDUIT SYSTEM
A. Conduits shall be assembled continuous and secured to boxes, panels, etc., with appropriate fittings to maintain electric continuity.

3.15 PULL-LINES

A. Provide 150 pound plastic pull-lines in conduit-only systems and spare conduits to facilitate future conductor installation.

3.16 ANCHORING

A. All interior boxes shall be firmly anchored directly or with concealed bracing to building studs or joints. Boxes must be so attached that they will not "rock" or "shift" when devices are operated.

B. Exterior boxes shall be fastened to approved hot dipped galvanized mounting supports and racking appropriate for size of enclosure.

3.17 FLUSH MOUNTING

A. All boxes shall have front edge (box or plaster ring) even with the finished surface of the wall or ceiling. Use of long screws with spacers or shims will not be acceptable.

3.18 RECEPTACLES AND SWITCHES

A. Coordinate the work of this Section with the work of other Sections and trades. Study all drawings that form a part of this contract and confer with the various trades involved to eliminate conflicts between the work of this Section and the work of other trades. Check and verify locations with respect to door swings, installation details, cabinet work, and suspended ceilings indicated on contract drawings. Review and coordinate locations of all plumbing, heating, and ventilating equipment and other equipment indicated on the contract drawings of all trades.

B. Centered on Built-In Work: In the case of doors and cabinets, where devices are centered between two such features, rough-in these device locations exact. Relocate any devices which are located off center at no additional cost to the owner.

C. Where more than one device is shown or specified to be at the same elevation or one above the other, align them exactly on centerlines horizontally or vertically. Relocate as directed all such devices including light switches, receptacles, voice/data, signal and thermostat devices which are not so installed, at no additional cost to Owner.

D. Device Outlet Height: Measure from the finished floor to the centerline, unless otherwise noted on electrical or architectural drawings, or required to serve specific equipment.

1. Switches 42 inches, set vertically
2. Receptacles 18 inches set vertically
3. Other As shown on the plans or as directed by the
3.19 LIGHTING FIXTURES
   A. Locate in accordance with approved architectural ceiling layout plans so light fixtures replace full size lay-in ceiling tiles wherever possible. Notify Architect/Engineer of any conflicts between plans prior to rough-in. Contractor shall relocate light fixtures at no additional charge if field coordination is not done prior to installation.

3.20 ELECTRICAL WORK IN COUNTERBACKS, MILLWORK AND CASEWORK
   A. Provide templates, where required, to other trades for drilling and cutting to insure accurate location of electrical devices as field verified prior to rough-in with the Architect.

3.21 CONNECTION TO EQUIPMENT
   A. Provide device back boxes of size and at locations necessary to serve equipment furnished under this or other Divisions of the specifications or by others. A device box is required if equipment has pigtail wires for external connection, does not have space to accommodate circuit wiring or requires wire different from circuit wiring used. Study equipment details to assure proper coordination.

3.22 BLANK COVERS
   A. Provide blank cover or plate over all boxes.

3.23 JUNCTION BOXES OR PULL BOXES IN SUSPENDED CEILINGS
   A. Shall be supported from structure independently from ceiling suspension system.

3.24 DEVICES BOXES CONTAINING EMERGENCY AND NORMAL DEVICES
   A. Permitted only with steel barrier manufactured especially for that purpose of dividing the box into two completely separate compartments.

3.25 DEVICE BOXES CONTAINING MULTIPLE DEVICES FOR SYSTEMS RATED OVER 150 VOLTS TO GROUND
   A. Permitted only with steel barrier manufactured specifically for the purpose of dividing the box into separate compartments for each device having exposed live parts.

END OF SECTION 26 05 33
PART 1   GENERAL

1.01 WORK INCLUDED

A. Cable tray is an approved alternative to conduit raceways for security and communication system wiring as specified in this and other divisions of the contract documents.

B. All cable tray systems shall be provided complete to meet code and contract requirements. All cable trays shall be non-ferro magnetic cable tray manufactured for an MRI room.

PART 2   PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Cope, Inc.

B. P.W. Industries, Inc.

2.02 CABLE TRAY

A. Solid bottom type cable tray will generally be used throughout the installation, except where other types are approved by the Engineer.

B. Cable tray materials, finish, dimensions (length, width and depth) and load classification shall be appropriate for the application and side environmental conditions. Provide adequate tray capacity for a minimum 25% future growth.

2.03 FITTINGS

A. Provide all cable tray fittings such as vertical elbows, horizontal elbows, tees and the like as required for the installation.

B. All fittings shall match straight section characteristics.

C. Radius of fittings shall be suitable for the size of cables installed to comply with applicable code requirements for minimum cable bending radius.

2.04 CONNECTORS

A. Provide all flat, adjustable, offset and expansion type connectors required for the installation.

B. Connector resistances shall comply with referenced standards to insure a continuous, low resistance ground path. Provide approved bonding jumpers for all adjustable and expansion connectors.

2.05 DROPOUTS

A. Dropout fittings shall be utilized to provide smooth transitions at ends of trays.
2.06 TRAY COVERS

A. Solid tray covers shall be used throughout the installation, except where other types are approved by the Engineer.

B. Cover fasteners shall comply with special security requirements.

2.07 DIVIDER STRIPS

A. Provide divider strips as directed by the particular system contractor. Edges of the dividers shall be rolled to protect cables from damage; all dividers shall be securely fastened in place.

2.08 WALL FRAMES

A. Provide interior and/or exterior style wall frame at fire rated partitions and floors as required to comply with 1984 NEC Article 300-21, "Spread of Fire or Products of Combustion."

2.09 SUPPORTS

A. Supports shall be wall bracket suspension type, appropriate for the cable tray load classification.

B. All support components shall be coordinated to ensure a minimum safety factor of 2.0.

2.10 FIRESTOP COMPOUND


PART 3 EXECUTION

3.01 SEALING WALL PENETRATIONS

A. All seals must meet with the approval of the local Fire Marshal.

B. Concrete or Masonry: Cast in place grout wall frame into position. Seal tray and cables with approved firestop compound.

C. Plaster or Gypsum Wallboard: Securely fasten wall frame to structural wall members and seal with plaster and approved fire tape. Seal tray and cables with approved firestop compound.

3.02 SUPPORT OF TRAY

A. Tray support shall be installed at spacings recommended by the manufacturer and applicable standards.
B. Support inserts and hangers shall be installed to ensure a minimum safety factor of 3.0 after allowing for future cable fill.

C. Seismic sway bracing shall be provided for all suspended supports to comply with Uniform Building Code (UBC).

3.03 SUPPORT OF VERTICAL CONDUCTORS

A. Vertical conductors shall be supported to comply with the requirements of NEC Article 300-19, "Supporting Conductors in Vertical Raceways."

3.04 GROUNDING

A. All cable tray shall be installed to maintain electrical continuity throughout the system and comply with grounding requirements of the NEC and this specification.

END OF SECTION 26 05 36
PART 1   GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

1.02 WORK INCLUDED

A. Provide all wiring devices and plates for a complete installation.

PART 2   PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Hubbell
B. Arrow Hart
C. Leviton
D. Pass& Seymour

2.02 MATERIALS

A. Wiring devices shall be specification grade, and the product of a nationally recognized manufacturer regularly engaged in their production.

B. All wiring devices specified in this section shall be the product of one manufacturer. Each type shall have identical appearance and characteristics.

2.03 DEVICE COLOR

A. Switch handles and receptacles: White

B. Red for Emergency Systems.

C. Paint or other surface finish treatments are not acceptable. Verify actual colors with project Architect for special installation conditions.

2.04 SWITCHES

A. Switches shall be 20 ampere, 277 volt, quiet type with plastic handle. Single pole, double pole, 3-way, 4-way or locking type as required. Provide matching styles and color in other devices as required for the conditions of installation.

B. Momentary Contact line voltage switch: Single pole, double throw, 3 wire, normally open. Rating same as above.

2.05 RECEPTACLES

A. Duplex NEMA 5-20R configuration (20 amp, 125V)
B. GFCI Receptacles
   1. Interior: 20A-125V duplex receptacle with trip indicator light.
   2. Exterior: 20A-125V duplex receptacle with trip indicator light and single NEMA 3R "In Use" metal cover, mounted horizontally.

2.06 DEVICE PLATES
   A. Non-metallic with color to match device. Provide pressed steel plates for surface devices in equipment and storage areas.
   B. Identification: Provide engraved device plates with amperage and voltage for all receptacles above 125V, 20 ampere rating.

PART 3 EXECUTION

3.01 MOUNTING
   A. Rigidly fasten each device to the box at proper position with the wall to bring device flush with plate or switch handle the proper distance through the plate.

3.02 ORIENTATION
   A. Set switches vertical with handle operating vertically, up position "ON" and +42" above finished floor.
   B. Set interior receptacles vertical with ground slot up; +18" above finished floor.
   C. Set interior receptacles above counters, horizontal, centered in backsplash or as directed by Architect. Verify prior to rough-in.
   D. Set exterior receptacles horizontal at +18" above finished grade.
   E. Devices and finish plates shall be installed plumb with building lines.

3.03 RECEPTACLE GROUNDING
   A. Provide bare bonding wire between receptacle grounding terminal and box. Plaster ear screws connecting the receptacle frame to the box will not be acceptable for grounding.

3.04 HANDICAPPED ACCESS
   A. Comply with requirements of Washington State handicapped access code.

3.05 TRIM OUT
   A. Provide device plate for each wiring device. Trim plates and devices shall not be installed until final painting is completed. Scratched or splattered plates and devices will not be acceptable.

3.06 RECEPTACLE TESTS
   A. Receptacles shall be checked to insure proper line to neutral, line to ground and
neutral to ground voltages.

END OF SECTION 26 27 26
PART 1  GENERAL

1.01  RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

1.02  WORK INCLUDED

A. Provide fusing and appurtenances for all fusible equipment provided under this contract.

PART 2  PRODUCTS

2.01  LOW VOLTAGE FUSES

A. The low voltage fuse range is considered to extend over the range 600 volts or less. Fuses in this category shall be current limiting types, UL Class R, unless specified otherwise. Provide rejection style fuse clips for all current limiting applications.

B. Fuses shall be as follows or equal:

<table>
<thead>
<tr>
<th>APPLICATION</th>
<th>AMPERE RANGE</th>
<th>UL CLASS</th>
<th>GOULD - SHAWMUT</th>
<th>BUSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor &amp; Branch Circuit</td>
<td>1-100</td>
<td>RK 5</td>
<td>Tri-onic</td>
<td>Fusetron</td>
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<tr>
<td>Feeder</td>
<td>60-100</td>
<td>RK 5</td>
<td>Falt-Trap</td>
<td>Fusetron</td>
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<tr>
<td>All</td>
<td>125-200</td>
<td>RK 1</td>
<td>Amp-Trap 2</td>
<td>Low Peak</td>
</tr>
<tr>
<td>Motor Circuit</td>
<td>225-600</td>
<td>RK 1</td>
<td>Amp-Trap 2</td>
<td>Low Peak</td>
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</tbody>
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2.02  SPARE FUSES

A. Provide 10 % of each rating with a minimum of 3 per rating.

PART 3  EXECUTION

3.01  INSTALLATION

A. Install fuses in all fusible devices provided under this contract.

END OF SECTION 26 28 13
PART 1   GENERAL

1.01   RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions and Divisions 0 and 1 Specification Sections, apply to work of this Section.

1.02   WORK INCLUDED
A. Provide all disconnect switches and enclosed circuit breakers required by NEC for equipment furnished under this and other divisions of these specifications and by the Owner.

PART 2   PRODUCTS

2.01   ACCEPTABLE MANUFACTURERS
A. Siemens
B. General Electric
C. Square D
D. Cutler Hammer

2.02   DISCONNECT SWITCHES
A. Switches shall be NEMA type HD (heavy duty), quick make, quick break, dual rated with electrical characteristics as required by the system voltage and the load served. Switches shall be single throw and have blades to open all ungrounded conductors.
B. Enclosure shall have interlocking cover to prevent opening door when switch is closed. Interlock shall include a defeating scheme for authorized service work.
C. Operator handle shall be lockable in the "off" position.
D. Disconnect enclosures shall be suitable for mounting locations. Provide NEMA 1 for dry locations, NEMA 3R for damp or exterior locations. Provide other NEMA ratings to suit area requirements.
E. All disconnect switches shall be the product of one manufacturer to facilitate future maintenance.

2.03   FUSIBLE DISCONNECTS
A. Fusible disconnect switches provided shall be per 2.2 above with the addition of fuse space and clips to accept only Class R fuses.

2.04   TOGGLE SWITCHES
A. Motor rated toggle type disconnect switches are acceptable for fractional horsepower equipment. Switches shall be suitable for the intended load and
provided with handle guard/lock-off feature (similar to Square D Class 2510).

2.05 ENCLOSED CIRCUIT BREAKERS

A. Circuit breaker operator handle shall be lockable in the "off" position.

B. Circuit breaker enclosures shall be suitable for mounting locations. Provide NEMA 1 for dry locations, NEMA 3R for damp or exterior locations. Provide other NEMA ratings to suit area requirements.

C. All circuit breakers shall be the product of one manufacturer to facilitate future maintenance.

2.06 NAMEPLATES

A. Provide nameplates on all disconnects and fused switches. Nameplates shall be engraved laminated phenolic mounted with screws. Adhesive only will not be acceptable. Each nameplate shall include this information: Load served, voltage, phase, panel, circuit number, fuse size and type.

PART 3 EXECUTION

3.01 DISCONNECT LOCATIONS

A. Install disconnects and enclosed circuit breakers in the same relative location as the equipment being served unless that location is difficult to access or is in an unsuitable environment. Discrete disconnect switches of similar size may be grouped in a central location.

3.02 SUPPORT

A. Secure disconnect switches and enclosed circuit breakers to building structure, equipment unit or approved mounting frame. Support by conduit system only is not acceptable.

3.03 SPLICES

A. Wiring space within disconnect switches and enclosed circuit breakers shall not be used for splicing; provide suitable wire gutters or junction boxes for this purpose.

END OF SECTION 26 28 16
PART 1 GENERAL

1.01 SUMMARY

A. The provisions and intent of the Contract, the General and Supplementary Conditions, Division 1 Specification Sections, and published addenda apply to the work as if specified in this Section.

B. This Section includes interior lighting fixtures, lighting fixtures mounted on exterior building surfaces, LED module, drivers, emergency lighting units, and accessories.

C. Provide the lighting system complete and operational. All light fixtures shall be provided complete with LED module, mounting hardware and accessories required for operation.

D. Provide lighting fixtures of types, sizes and finish as listed on the drawings. Light Fixtures shall be complete assemblies constructed to ensure full life of components and minimize amplification and transmission of component generated noise.

E. Contractor shall include in the bid all costs and documentation for lighting control commissioning. Contractor shall provide the owner a complete report of test procedures and results indicating all lighting controls have been tested, adjusted and operate in accordance with approved plans and specifications per the authority having jurisdiction.

F. Light fixture schedule series numbers are a design series reference and do not necessarily represent the exact catalog number, size, voltage, wattage, type of LED, driver, finish trim, ceiling type, mounting hardware, ceiling trim or special requirements as specified hereinafter or as required by the particular installation(s). Provide complete light fixtures and drivers to correspond with the number of LED’s, wattage, switching and/or size specified. Refer to light fixture schedule, Architectural drawings, and schedules for additional requirements.

G. Light fixture voltage shall match voltage of circuit serving the light fixture. Contractor as part of the billing and submittal process shall verify each light fixture and notify engineer in writing of any conflicts.

1.02 REFERENCES

A. Shall be as follows:

   National Electrical Manufacturer’s Association (NEMA):
   LE 5-1993  Procedure for determining luminaire efficiency ratings.

1.03 QUALITY ASSURANCE

A. Listing and Labeling: Provide light fixtures, emergency lighting units, and accessories Listed and Labeled as defined in NFPA 70, Article 100 and marked for intended use for the location and environment in which installed.
B. Comply with NFPA 70, as adopted and administered by the Authority Having Jurisdiction.

C. NFPA 101 Compliance: Comply with visibility and luminance requirements for exit signs.
   1. Approved light fixtures in mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.04 SUBMITTALS

A. Submittals shall be neatly and clearly marked to indicate the light fixture(s), LED module and drivers fully comply with contract documents. When substitute light fixtures are submitted (if permitted) the data shall clearly cross reference (written and highlighted) the substitute light fixture complies with every detail of the specified light fixture. Light fixtures not fully complying with contract documents are not permitted.

B. Submittals shall have light fixture types and project name clearly indicated and shall be prepared by the authorized manufacturer’s representative serving the project area. A list of manufacturer representatives (including address, telephone and fax numbers) identifying which light fixture types they represent shall be included with submittals. Submittals or requests for prior approval not meeting these requirements will be rejected.

C. For light fixtures mounted in continuous rows, submit scaled drawings prepared by the light fixture manufacturer showing all details of construction, lengths of runs, weight pendant and power feed locations, accessory pieces, finishes method of field assembly and list of materials. Contractor to provide manufacturer with accurate field dimensions where required.

D. Prior to receiving Engineers approval contractor shall schedule a meeting at the Engineers office with the light fixture manufacturer(s) representative, light fixture equipment supplier, engineer and contractor to review ceiling types, mounting heights, LED module, drivers, voltage, controls and colors. Provide shop drawings and catalog data to the engineer a minimum of five (5) days prior to the review meeting.

E. Product Data: For each type of lighting fixture indicated on the drawing E0.00, lighting fixture schedule, arranged in order of light fixture designation. Include data on features, accessories, and the following:
   1. Dimensions of light fixtures.
   2. Certified results of independent laboratory tests for light fixtures and LED module for electrical ratings and photometric data.
   3. Emergency lighting unit battery and charger.
   4. Types of LED’s, color temperatures and (LPW) lumens per watt.

F. Wiring Diagrams: Detail wiring for light fixtures that clearly differentiates between manufacturer-installed and field-installed wiring.
G. Product Certificates: Signed by manufacturer(s) or their designated representatives stating lighting fixtures certifying that products comply with drawing and specification requirements.

H. Dimming Driver Compatibility Certificates: Signed by manufacturer of driver certifying drivers are compatible with dimming systems and equipment with which dimming drivers are to be used.

1.05 SUBSTITUTIONS

A. Lighting fixtures designated for this project are based on the light fixture types and manufacturers specified. If substitution of light fixtures other than those specified is desired, then product information must be submitted, and prior to bid approved by the Engineer. All substation requests must be received in the Engineers office a minimum of 10-days prior to bid time. No requests for substitution will be accepted after this date.

B. Substitution requests shall include all information required under 1.04 SUBMITTALS of this section. Requests for prior approval shall be accompanied by a working light fixture sample (including LED module, drivers, cord and plug). Provide the name of at least one installation where each proposed substitute has been installed for at least six months. Provide the name and telephone number of the Engineer of Record.

1.06 COORDINATION

A. Lighting Fixtures, Mounting Hardware, and Trim: Coordinate layout and installation of lighting fixtures with ceiling system and other construction.

B. Coordination Meetings: Contractor shall meet at least twice with the ceiling installer. Hold first meeting before submittal of shop drawings to coordinate each light fixture mounting condition with ceiling type.

C. During second meeting, coordinate light fixture layout in each area. Contractor shall meet at least twice with the mechanical systems installer prior to fabrication and installation of ductwork. Coordinate depth and location of all light fixtures and ductwork in all areas.

1.07 WARRANTY

A. General Warranty: Special warranty specified in this section shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with other warranties under requirements of the Contract Documents.

B. Special Warranty for Batteries: Written warranty, executed by manufacturer agreeing to replace rechargeable batteries that fail in materials or workmanship within specified warranty period.

C. Special Warranty Period for Batteries: Manufacturer’s standard, but not less than 10 years from date of Substantial Completion. Full warranty shall apply for first year and prorated warranty for last nine years.
D. Light Fixtures Utilizing LED Lamp Technology: Provide manufacturer’s warranty for a period of not less than 5 years from date of substantial completion, including parts and labor for full replacement of defective product.

PART 2 PRODUCTS

2.01 LIGHTING FIXTURES AND LIGHTING FIXTURE COMPONENTS, GENERAL

A. Metal Parts: Free from burrs, sharp corners, and edges.

B. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

C. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit re-lamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during re-lamping and when secured in operating position.

D. Reflecting Surfaces: Minimum reflectance as follows, unless otherwise indicated:
   1. White Surfaces: 85 percent.
   2. Specular Surfaces: 83 percent.
   3. Diffusing Specular Surfaces: 75 percent.
   4. Laminated Silver Metallized Film: 90 percent.

E. Lenses, Diffusers, Covers, and Globes: 100 percent virgin acrylic plastic or annealed crystal glass, unless otherwise indicated.
   1. Plastic: High resistance to yellowing and other changes due to aging, exposure to heat, and ultraviolet radiation.
   2. Lens Thickness: 0.125 inch (3 mm) minimum, unless greater thickness is indicated.

2.02 LED MODULES AND LED DRIVERS

A. General:
   1. LED light fixtures shall be in accordance with IES, NFPA, UL, as shown on the drawings, and as specified.
   2. LED light fixtures shall be Reduction of Hazardous Substances (RoHS)-compliant.
   3. LED drivers shall include the following features unless otherwise indicated:
      a. Minimum efficiency: 85% at full load.
      b. Minimum Operating Ambient Temperature: -20˚ C. (-4˚ F.)
      c. Input Voltage: 120 - 277V (±10%) at 60 Hz.
      d. Integral short circuit, open circuit, and overload protection.
e. Power Factor: ≥ 0.95.

f. Total Harmonic Distortion: ≤ 20%.


4. LED modules shall include the following features unless otherwise indicated:

a. Comply with IES LM-79 and LM-80 requirements.

b. Minimum CRI 80 and color temperature 3500°K unless otherwise specified in LIGHTING FIXTURE SCHEDULE.

c. Minimum Rated Life: 50,000 hours per IES L70.

d. Light output lumens as indicated in specified fixture literature.

B. LED Fixtures:

1. Housing, LED driver, and LED module shall be products of the same manufacturer.

2. LED drivers, modules, and reflector shall be accessible, serviceable, and replaceable from below the ceiling.

2.03 EXIT SIGNS

A. General Requirements: Comply with UL 924 and the following:

1. Sign Colors and Lettering Size: Comply with Authorities Having Jurisdiction.

B. Internally Lighted Signs: As follows:

1. Lamps for AC Operation: Light-emitting diodes, 70,000 hours minimum rated lamp life.

C. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.

1. Battery: Sealed, maintenance-free, nickel-cadmium type with special warranty.

2. Charger: Fully automatic, solid-state type with sealed transfer relay.

3. Operation: Relay automatically energizes lamp from unit when circuit voltage drops to 80 percent of nominal or below. When normal voltage is restored, relay disconnects lamps, and battery is automatically recharged and floated on charger.

4. Self-diagnostic type with test switches and indicator lights.

2.04 EMERGENCY LIGHTING UNITS

A. General Requirements: Self-contained units. Comply with UL 924. Units include the following features:

1. Battery: Sealed, maintenance-free, lead-acid type with minimum 10-year
nominal life and special warranty.

2. Charger: Fully automatic, solid-state type with sealed transfer relay.

3. Operation: Relay automatically turns lamp on when supply circuit voltage drops to 80 percent of nominal voltage or below. LED module automatically disconnects from battery when voltage approaches deep-discharge level.

When normal voltage is restored, relay disconnects lamps, and battery is automatically recharged and floated on charger.

4. Integral Time-Delay Relay: Arranged to hold unit on for fixed interval after restoring power after an outage. Provides adequate time delay to permit high-intensity-discharge lamps to restrike and develop adequate output.

5. Self-diagnostic type with test switches and indicator lights.

2.05 EMERGENCY LED POWER SUPPLY UNIT

A. Internal Type: Self-contained, modular, battery-inverter unit factory mounted within light fixture body. Comply with UL 924.

1. Test Switch and Light-Emitting Diode Indicator Light: Visible and accessible without opening light fixture or entering ceiling space.

2. Battery: Sealed, maintenance-free, nickel-cadmium type with minimum 10-year nominal life.


4. Operation: Relay automatically energizes lamp from unit when normal supply circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects LED module, and battery is automatically recharged and floated on charger.

B. External Type: Self-contained, modular, battery-inverter unit. Comply with UL 924.

1. Test Switch and Light-Emitting Diode Indicator Light: Visible and accessible without entering ceiling space.

2. Battery: Sealed, maintenance-free, nickel-cadmium type with minimum 10-year nominal life.


4. Operation: Relay automatically energizes lamp from unit when normal supply circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects LED module, and battery is automatically recharged and floated on charger.

5. Housing: NEMA 250, Class 1 enclosure.

2.06 LIGHTING FIXTURE SUPPORT COMPONENTS

A. Contractor shall provide “Seismic Controls for Electrical Work” such as channel- and angle-iron supports and nonmetallic channel and angle supports.
B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fitting and ceiling canopy. Finish same as light fixture.

C. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy arranged to mount a single light fixture. Finish same as light fixture.

D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.

E. Hook Hangers: Integrated assembly matched to light fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

F. Aircraft Cable Support: Use cable, anchorages, and intermediate supports recommended by light fixture manufacturer.

2.07 FINISHES

A. Fixtures: Manufacturer’s standard, unless otherwise indicated.
   1. Paint Finish: Applied over corrosion-resistant treatment or primer, free of defects.

2.08 OCCUPANCY SENSORS

A. Provide ceiling mounted occupancy sensors for control of lighting. Sensors shall be ceiling mounted to provide adequate coverage. Wall mounted occupancy sensors shall be Watt Stopper DT-100 complete with power pack. Locate wall mounted sensors at approximately 8'-0” above finished floor. Sensors shall be wired and installed per manufacturer’s direction to maintain switching and circuits shown on drawings.

Where multiple sensors are located in an individual room, sensors shall be wired parallel with the relays such that either sensor will provide input to turn all lights on and reset time delay.

B. The occupancy sensor shall have the following features:
   1. Dual Technology
   2. Low Voltage
   3. Adjustable Sensitivity
   4. Isolated NO/NC Contacts
   5. 30 second - 30 minute time delay

PART 3 EXECUTION

3.01 INSTALLATION

A. Fixtures: Set level, plumb, and square with ceiling and walls, and secure according to manufacturer’s written instructions and approved submittal materials. Install lamps in each light fixture.
B. Verify mounting provisions prior to the ordering of fixtures. Fixtures shall be UL listed for the location, and application in which they are installed.

C. Install lighting fixture diffusers only after construction work, painting and clean up are completed. Prior to final acceptance, remove all, reflectors and diffusers, wash, rinse and reinstall.

3.02 SUPPORT OF LED FIXTURES

A. Recessed Downlight Type: Mount in frames suitable for the ceiling, with the recessed portion of the light fixture securely supported from the ceiling framing. For light fixtures supported by a ceiling suspension system, provide as a minimum or as required by ARJ, two safety chains secured to structural members above suspended ceiling.

B. Surface and Pendant Mounted Type:

1. Where mounted on accessible ceilings, hang from structural members by means of hanger rods through ceiling or as approved.

2. Continuous Runs of Light Fixtures: Straight when sighting from end to end, regardless of irregularities in the ceiling. Where light fixtures are so installed, omit ornamental ends between sections. For surface pendant mounted fixtures of three or more provide a unistrut channel for mounting fixtures. Provide 3/8-inch thread rod secured to structural members for support of unistrut channel.

3. Provide surface mounted fluorescent light fixtures with UL approval for direct mounting on the various ceilings used. Spacers will not be approved where mounted on lay-in ceilings, support light fixtures by at least two positive devices which surround the ceiling runner, and which are supported from the structure above by a No. 12 gauge wire. Spring clips or clamps that connect only to the runner are not acceptable.

3.03 CONNECTIONS

A. Ground equipment

1. 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.

3.04 FIELD QUALITY CONTROL

A. Inspect each installed light fixture for damage. Replace damaged light fixtures and components.

B. Advance Notice: Give dates and times for field tests.

C. Provide instruments to make and record test results.

D. Test as follows:

1. Verify proper operation, switching and phasing of each light fixture after
2. Emergency Lighting: Interrupt electrical supply to demonstrate proper operation. Verify normal transfer to battery source and retransfer to normal.


E. Malfunctioning Light Fixtures and Components: Replace or repair, then retest. Repeat procedure until units operate properly.

3.05 CLEANING AND ADJUSTING

A. Clean light fixtures internally and externally after installation. Use methods and materials recommended by manufacturer.

3.06 FIRE-RATED ENCLOSURES

A. The contractor shall provide 5/8" plasterboard minimum, taped box enclosures for all recessed light fixtures in 1 or 2-hour fire-rated ceilings, as required by local building or fire codes. Enclosure to provide minimum 3” air space around light fixture. Contractor prior to bid shall verify Architectural drawings and specifications for areas where this provision is applicable.

3.07 CEILING TYPES

A. Refer to Architecture drawings. Provide flange trim where light fixtures are installed in GWB ceilings.

B. The Contractor prior to submitting shop drawings to the Engineer for review shall review the Architectural drawings to verify and coordinate the ceiling systems and lighting fixture frame requirements as well as proper ballast voltage. Contractor shall provide a written statement with the shop drawing submittal stating this has been completed.

3.08 OCCUPANCY SENSORS

A. Locate ceiling mounted sensors per manufacturer's recommendation and near the center of the room.

B. Set the time delay to 30 minutes.

C. Set the sensitivity level to 8.

D. Test each occupancy sensor to assure each is working properly.

END OF SECTION 26 50 00