

project manual

THE CHURCH OF
JESUS CHRIST
OF LATTER-DAY SAINTS

Pleasant View 9,10,11 Pleasant View UT South Stake

3602 North 500 West - Pleasant View, Utah

Project Number: 511371723030101



bradley gygi architect & associates, pllc

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electrical engineer

Envision Engineering

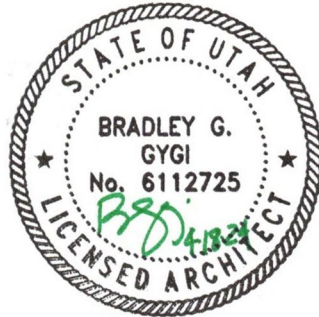
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BIDDING REQUIREMENTS

FOR SMALL PROJECTS (U.S.)

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INVITATION TO BID (U.S.)

1. CONTRACTORS INVITED TO BID THE PROJECT:

To Be Announced

2. PROJECT:

Pleasant View 9,10,11
Pleasant View UT South Stake
Project Number: 511371723030101

3. LOCATION:

3602 North 500 West
Pleasant View, UT

4. OWNER:

The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole
c/o
Brian Childs, Utah North PM Office
435 North Wall St., Ste. D
Ogden, UT 84484

5. CONSULTANT:

Bradley Gygi Architect & Associates, PLLC
PO Box 521048, Salt Lake City, UT 84152

6. DESCRIPTION OF PROJECT:

- A. Rostrum reconfiguration in an existing meetinghouse building.
- B. Products or systems may be provided through relationships the Owner has negotiated with suppliers as indicated in the Specifications.

7. TYPE OF BID: Bids will be on a lump-sum basis. Segregated bids will not be accepted.

8. TIME OF SUBSTANTIAL COMPLETION: The time limit for substantial completion of this work will be sixty (60) calendar days and will be as noted in the Agreement.

9. BID OPENING: Bids will be received by Owners preferred method at time and date at place to be announced. Bids will be publicly opened at time and date at place to be announced.

10. BIDDING DOCUMENTS:

- A. Bidding Documents may be examined at the following plan room locations:

- 1) Dodge Data and Analytics
Office # (859) 885-1091
Fax # (801) 606-7722
email: kim.mccallon@construction.com

Steps for downloading from McGraw-Hill Dodge:

Purchasing Individual Reports/Plans/Specs/Addenda from Dodge Data and Analytics

- Access the web-page <http://dodgeprojects.construction.com/>
- Search the Dodge Database by state (required) using the Dodge Report Number or Project Name for a single project report. To see a listing of all of the LDS projects in a particular state, enter the State name from the drop down box and then enter LDS in the second search box. Click Search.
- Select the project from the results list. By clicking on the blue project description, a more descriptive title will help to make sure you are purchasing the correct documents.
- When you find the correct project, select: Get This Report, Get Plans & Specs, or Monthly Access. Add to Cart and Proceed to Checkout or Continue Shopping. After the purchase, select View This Project.

2)

- B. Bidding Documents may be obtained from the Architect.
 - C. Bidding Documents may be obtained from Owner's electronic bidding tool.
11. **BIDDER'S QUALIFICATIONS:** Bidding by the Contractors will be by invitation only.
12. **OWNER'S RIGHT TO REJECT BIDS:** Owner reserves the right to reject any or all bids and to waive any irregularity therein.

END OF DOCUMENT

INSTRUCTIONS TO BIDDERS (U.S.)

1. DOCUMENTS:

- A. Bidding Documents include Bidding Requirements and proposed Contract Documents. Proposed Contract Documents consist of:
 - 1) Agreement Between Owner and Contractor for Small Project (U.S.)
 - 2) Other documents included by reference
 - 3) Addenda.
- B. Bidding Requirements are those documents identified as such in proposed Project Manual.
- C. Addenda are written or graphic documents issued prior to execution of the Contract which modify or interpret the Bidding Documents. They become part of the Contract Documents as noted in the Agreement Between Owner and Contractor for Small Project (U.S.) upon execution of the Agreement by Owner.

2. BIDDER'S REPRESENTATIONS:

- A. By submitting a bid proposal, bidder represents that
 - 1) Bidder has carefully studied and compared Bidding Documents with each other. Bidder understands the Bidding Documents and the bid is fully in accordance with the requirements of those documents,
 - 2) Bidder has thoroughly examined the site and any building located thereon, has become familiar with local conditions which might directly or indirectly affect contract work, and has correlated its personal observations with requirements of proposed Contract Documents, and
 - 3) Bid is based on materials, equipment, and systems required by Bidding Documents without exception.

3. BIDDING DOCUMENTS:

- A. Copies
 - 1) Owner will provide the Bidding Documents as set forth in the Invitation to Bid.
 - 2) Partial sets of Bidding Documents will not be issued.
- B. Interpretation or Correction of Bidding Documents
 - 1) Bidders will request interpretation or correction of any apparent errors, discrepancies, and omissions in the Bidding Documents.
 - 2) Corrections or changes to Bidding Documents will be made by written Addenda.
- C. Substitutions and Equal Products
 - 1) Generally speaking, substitutions for specified products and systems, as defined in the Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.
 - 2) Base bid only on materials, equipment, systems, suppliers or performance qualities specified in the Bidding documents.
 - 3) Where a specified product is identified as a "quality standard", products of other manufacturers that meet the performance, properties, and characteristics of the specified "quality standard" may be used without specific approval as a substitute.
- D. Addenda - Addenda will be sent to bidders and to locations where Bidding Documents are on file no later than 2 business days prior to bid opening.

4. BIDDING PROCEDURES:

- A. Form and Style of Bids

- 1) Use Owner's online bidding tool.
- 2) Fill in all blanks on online bidding tool. Signatures will be executed by representative of bidder duly authorized to make contracts.
- 3) Bids will bear no information other than that requested on bid form. Do not delete from or add to the information requested on the bid form.

B. Submission of Bids

- 1) Follow the instructions in the Owner's bidding tool when submitting your bid.
- 2) It is bidder's sole responsibility to see that its bid is received at specified time.
- 3) No oral, facsimile transmitted, telegraphic, or telephonic bids, modifications, or cancellations will be considered.

C. Modification or Withdrawal of Bid

- 1) Bidder guarantees there will be no revisions or withdrawal of bid amount for 45 days after bid opening.
- 2) Prior to bid opening, bidders may withdraw bid from Owner's bidding tool.

5. CONSIDERATION OF BIDS:

A. Opening Of Bids - See Invitation to Bid.

B. Rejection of Bids - Owner reserves right to reject any or all bids and to waive any irregularity therein.

C. Acceptance Of Bid

- 1) No bidder will consider itself under contract after opening and reading of bids until Agreement between Owner and Contractor is fully executed.
- 2) Bidder's past performance, organization, subcontractor selection, equipment, and ability to perform and complete its contract in manner and within time specified, together with amount of bid, will be elements considered in award of contract.

6. FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR:

A. Agreement form will be "Small Project Agreement Between Owner and Contractor (U.S.)" and "Supplementary Conditions for Small Project Agreement (U.S.)."

7. MISCELLANEOUS:

A. Pre-Bid Conference. A pre-bid conference may be held at a time and place to be announced.

B. Examination Schedule for Existing Building and Site

- 1) Coordinate with FM Manager for access to the building during bidding.

END OF DOCUMENT

INFORMATION AVAILABLE TO BIDDERS (U.S.)

1. GEOTECHNICAL DATA

- A. No Geotechnical Data provided for this scope of work.

2. ASBESTOS-CONTAINING MATERIAL (ACM)

- A. The building upon which work is being performed has been examined for asbestos-containing material.
- B. Owner will provide a report to the Contractor to maintain on site during construction activities.
- C. Refer to Section 01 3500, Article 1.3 "Environmental Procedures" for requirements to be followed.

END OF DOCUMENT

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CONSTRUCTION MATERIAL ASBESTOS STATEMENT (U.S.)

**PROJECTS FOR:
THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS,
a Utah corporation sole**

Building Name: Pleasant View 9,10,11

Building Plan Type: Fairmont Development

Building Address: 3602 North 500 West - Pleasant View, UT

Building Owner: The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole.

Project Number: 511371723030101

Completion Date: _____

As PROJECT CONSULTANT and principal in charge; based on my best knowledge, information, inspection, and belief; I certify that on the above referenced Project, no asbestos-containing building materials were specified in the construction documents or given approval in shop drawings or submittals.

Project Consultant and Principal in Charge (signature) Date

Bradley Gygi Architect & Associates, PLLC
Company Name

As GENERAL CONTRACTOR in charge of construction; based on my best knowledge, information, inspection, and belief; I affirm that on the above-referenced Project, no asbestos-containing building materials were used in the construction.

General Contractor (signature) Date

Company Name

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**SMALL PROJECT AGREEMENT
BETWEEN OWNER AND CONTRACTOR
Fixed Sum (U.S.)**

The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole ("Owner") and _____ ("Contractor") enter into this *Small Project Agreement Between Owner and Contractor (U.S.)* ("Agreement") and agree as follows:

1. **Property/Project.**

Property/Project Number: _____
Property Address ("Project Site"): _____
Project Type: _____
Project Name ("Project"): _____
Stake Name: _____

2. **Scope of Work.** Contractor will furnish all labor, materials, tools, and equipment necessary to complete the Work in accordance with the Contract Documents. The Work is all labor, materials, tools, equipment, construction, and services required by the Contract Documents (the "Work").

3. **Contract Documents.** Contract Documents consist of:

- a. This Agreement;
- b. Supplementary Conditions for Small Project Agreement Between Owner and Contractor (U.S.);
- c. The Specifications (Division 01 and Divisions _____);
- d. Drawings entitled and dated _____;
- e. Addendum No. with date(s) _____;
- g. All written Field Changes, written Construction Change Directives and written Change Orders when prepared and signed by Owner and Contractor.

4. **Compensation.** Owner will pay Contractor for performance of Contractor's obligations under the Contract Documents the sum of _____ Dollars (_____) (the "Contract Sum"). This Contract Sum includes all labor, materials, equipment, tools, costs, expenses, work and services of Contractor and its subcontractors necessary to perform the Work in accordance with the terms of this Agreement, including without limitation travel, communications, and copying costs.

5. **Payment.**

- a. If the Contract Sum is over \$100,000 or if otherwise requested by Owner, Contractor will submit to Owner a schedule of values which allocates the Contractor's Bid Proposal Amount to various portions of the Work. This schedule, when accepted by Owner will be used as a basis for reviewing Contractor's payment requests.
- b. Not more than once each month, Contractor will submit a payment request to Owner. Owner will pay Contractor for work completed within thirty (30) days after Owner receives:
 - 1) Contractor's payment request for work to date;
 - 2) a certification by Contractor that Contractor has paid for all labor, materials, and equipment relating to the Work covered by prior payment requests and that Contractor will pay for all labor, materials, and equipment relating to the Work covered by the current payment request; and
 - 3) releases of all mechanics' liens and claims of subcontractors, laborers, or material suppliers who supplied labor and/or materials for the Work covered by the payment request.
- c. Owner may modify or reject the payment request if, in Owner's opinion, the Work for which payment is requested is not acceptable or is less complete than represented on the payment request.
- d. Contractor will timely pay subcontractors their portion of fees and expenses that Owner has paid to Contractor.

6. **Extras and Change Orders.** Owner may order changes in the Work by altering, adding to, or deducting from the Work. In the event of such a change, the Contract Sum and/or the time of completion will be adjusted to reflect the change by means of a written Change Order signed by Contractor and Owner. Contractor will not commence work on any change until either: (a) Contractor and Owner have executed a Change Order; or (b) Owner has issued a written order for the change acknowledging that there is a dispute regarding the compensation adjustment relating to the change. If Contractor proceeds with a change in the Work without complying with the preceding sentence, Contractor agrees that it will not be entitled to any additional compensation for such change.
7. **Warranty and Correction of Work.** For all Work, services, labor, materials, products, and equipment provided under the Contract Documents, Contractor provides and extends to Owner all statutory, common law, and standard industry warranties as well as those warranties set forth in Owner's Contract Documents. Unless a longer period is specified by Owner's Contract Documents or otherwise, Contractor, at a minimum and in addition to all other warranties, warrants all Work under the Contract Documents for at least one year. Specifically, and without limitation, Contractor will promptly correct at its own expense:
- any portion of the Work which
 - fails to conform to the requirements of the Contract Documents, or
 - is rejected by the Owner as defective or because it is damaged or rendered unsuitable during installation or resulting from failure to exercise proper protection.
 - any defects due to faulty materials, equipment, or workmanship which appear within a period of one year from the date of completion of the Work or within such longer period of time as may be prescribed by law or the terms of any applicable special warranty required by the Contract Documents.
8. **Time of Completion.** Contractor will complete the Work and have it ready for Owner's inspection within _____ (_____) calendar days from Notice to Proceed issued by Owner. Time is of the essence. If Contractor is delayed at any time in the progress of the Work by any act or neglect of Owner, or by changes in the Work, or by strikes, lockouts, unusual delay in transportation, unavoidable casualties, or acts of nature beyond Contractor's control, then the time for completion will be extended by the time that completion of the Work is delayed. However, Contractor expressly waives any damages for any such delays.
9. **Owner Provided Items.** Owner may provide furnishings, equipment, and/or other items for the Project. Contractor will install items furnished by Owner and/or receive, store, and protect such items on site until the date Owner accepts the Project.
10. **Product Requirements.** Contractor will provide products that comply with Contract Documents, are undamaged, and unless otherwise indicated, are new and unused at time of installation. Contractor will provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and intended use and effect.
11. **Permits, Surveys, and Taxes.** Contractor will obtain and pay for all permits and licenses, and also pay any applicable taxes. Contractor will also obtain and pay for any surveys it needs to perform the Work.
12. **Independent Contractor Relationship.** Contractor is not an agent or employee of Owner but is an independent contractor.
13. **Comply with Laws.** Contractor will comply, and ensure that all subcontractors comply, with all applicable laws, ordinances, rules, regulations, covenants, and restrictions.
14. **Indemnity and Hold Harmless.**
- Contractor will indemnify and hold harmless Owner and Owner's representatives, employees, agents, architects, and consultants from and against any and all claims, liens, damages, liability, demands, costs, judgments, awards, settlements, causes of action, losses and expenses (collectively "Claims" or "Claim"), including but not limited to attorney fees, consultant fees, expert fees, copy costs, and other expenses, arising out of or resulting from performance of or failure to perform the Work, attributable to bodily injury,

sickness, disease, or death, or to injury to or destruction of real or personal property, including loss of use resulting therefrom, except to the extent that such liability arises out of the negligence of Owner, its representatives, agents, and employees. This indemnity includes, without limitation, indemnification of Owner from all losses or injury to Owner's property, except to the extent that such loss or injury arises out of the negligence of Owner, its representatives, agents, and employees. This indemnity applies, without limitation, to include Claims occurring both during performance of the Work and/or subsequent to completion of the Work. In the event that any Claim is caused in part by a party indemnified hereunder, that party will bear the cost of such Claim to the extent it was the cause thereof. In the event that a claimant asserts a Claim for recovery against any party indemnified hereunder, the party indemnified hereunder may tender the defense of such Claim to Contractor. If Contractor rejects such tender of defense and it is later determined that the negligence of the party indemnified hereunder did not cause all of the Claim, Contractor will reimburse the party indemnified hereunder for all costs and expenses incurred by that party in defending against the Claim. Contractor will not be liable hereunder to indemnify any party for damages resulting from the sole negligence of that party.

- b. In addition to the foregoing, Contractor will be liable to defend Owner in any lawsuit filed by any Subcontractor relating to the Project. Where liens have been filed against Owner's property, Contractor (and/or its bonding company which has issued bonds for the Project) will obtain lien releases and record them in the appropriate county and/or local jurisdiction and provide Contractor with title free and clear from any liens of Subcontractors. In the event that Contractor and/or its bonding company are unable to obtain a lien release, Owner in its absolute discretion may require Contractor to provide a bond around the lien or a bond to discharge the lien, at Contractor's sole expense.
 - c. In addition to the foregoing, Contractor will indemnify and hold Owner harmless from any claim of any other contractor resulting from the performance, non-performance or delay in performance of the Work by Contractor.
 - d. The indemnification obligation herein will not be limited by a limitation on the amount or type of damages, compensation or benefits payable by or for Contractor or any subcontractor under workers compensation acts, disability benefit acts, or other employee benefit acts.
15. **Work Restrictions.** Contractor will ensure that Contractor, its agents, employees, and subcontractors:
- a. Do not use or consume alcohol or cannabis, or illegally use drugs, on the Project Site or enter on or perform any Work on the Project Site while under their influence.
 - b. Do not smoke or vape anything on the Project Site. Do not use tobacco in any form on the Project Site.
 - c. Do not perform Work on the Project Site on weekends except for emergency work.
 - d. Refrain from using profanity or being discourteous or uncivil to others on the Project Site or while performing Work under this Agreement.
 - e. Do not view or allow pornographic or other indecent materials on the Project Site.
 - f. Do not play obnoxious and/or loud music on the Project Site. Do not play any music within existing facilities.
 - g. Refrain from wearing immodest, offensive, or obnoxious clothing, while on the Project Site.
 - h. Do not bring weapons on the Project Site.
16. **Safety Hazards.** Contractor will ensure that no work or services will be performed that may pose an undue safety hazard to Contractor, Contractor's employees, or any other person.
17. **Contractor Insurance.** Prior to performing any work, Contractor will obtain and maintain during the term of this Agreement the following insurance:
- a. Workers Compensation Insurance or evidence of exemption.
 - b. Employers Liability Insurance with minimum limits of the greater of \$500,000 E.L. each accident, \$500,000 E. L. disease-each employee, \$500,000 E.L. disease-policy limit or as required by the law of the state in which the Project is located.
 - c. Commercial General Liability Insurance – ISO Form CG 00 01 (12/07) or equivalent Occurrence policy which will provide primary coverage to the additional insureds (the Owner and the Architect) in the event of any Occurrence, Claim, or Suit with:
 - 1) Limits of the greater of: Contractor's actual coverage amounts or the following:

- a) \$2,000,000 General Aggregate;
 - b) \$2,000,000 Products - Comp/Ops Aggregate;
 - c) \$1,000,000 Personal and Advertising Liability;
 - d) \$1,000,000 Each Occurrence; and
 - e) \$50,000 Fire Damage to Rented Premises (Each Occurrence)
- 2) Endorsements attached to the General Liability policy including the following or their equivalent:
- a) ISO Form CG-25-03 (05/09), Amendment of Limits of Insurance (Designated Project or Premises) describing the Agreement and specifying limits as shown above.
 - b) ISO Form CG 20 10 (07/04), Additional Insured – Owners, Lessees, Or Contractors (Form B), naming Owner and Architect as additional insureds.
- d. Automobile Liability Insurance, with:
- 1) Combined Single Limit each accident in the amount of no less than \$500,000, and
 - 2) Coverage applying to "Any Auto" or its equivalent.

Contractor will provide evidence of these insurance coverages to Owner by providing an AIA Form RD 2010 (2010/05) Form or its equivalent: (1) listing Owner as the Certificate Holder and Additional Insured on the general liability and any excess liability policies, (2) listing the insurance companies providing coverage (all companies listed must be rated in A.M. Best Company Key Rating Guide-Property-Casualty and each company must have a rating of B+ Class VII or higher), (3) attaching the endorsements set forth above for the Certificate of Liability Insurance, and (4) bearing the name, address and telephone number of the producer and signed by an authorized representative of the producer. (The signature may be original, stamped, or electronic.) Notwithstanding the foregoing, Owner may, in writing and at its sole discretion, modify these insurance requirements.

18. **Resolution of Disputes.** In the event there is any dispute arising under the Contract Documents which cannot be resolved by agreement between the parties, either party may submit the dispute with all documentation upon which it relies to Director of Architecture, Engineering, and Construction, 50 East North Temple, Salt Lake City, Utah 84150, who will convene a dispute resolution conference within thirty (30) days. The dispute resolution conference will constitute settlement negotiations and any settlement proposal made pursuant to the conference will not be admissible as evidence of liability. In the event that the parties do not resolve their dispute pursuant to the dispute resolution conference, either party may commence legal action to resolve the dispute. Any such action must be commenced within six (6) months from the first day of the dispute resolution conference or be time barred. Submission of the dispute to the Director as outlined above is a condition precedent to the right to commence legal action to resolve any dispute. In the event that either party commences legal action to adjudicate any dispute without first submitting the dispute to the Director, the other party will be entitled to obtain an order dismissing the litigation without prejudice and awarding such other party any costs, attorney fees incurred by that party in obtaining the dismissal, including without limitation copy costs, and other legal and consultant fees and expenses. Pending final resolution of a dispute hereunder, Contractor will proceed diligently with the performance of its obligations pursuant to this Agreement.

19. **Termination by Contractor.** In the event Owner materially breaches any term of the Contract Documents, Contractor will promptly give Written Notice of the breach to Owner. If Owner fails to cure the breach within ten (10) days of the Written Notice, Contractor may terminate this Agreement by giving Written Notice to Owner and recover from Owner the percentage of the Contract Sum represented by the Work completed on the Project site as of the date of termination together with any out of pocket loss Contractor has sustained with respect to materials and equipment as a result of the termination prior to completion of the Work, less any offsets. Contractor will not be entitled to unearned profits or any other compensation or damages as a result of the termination and hereby waives any claim therefor. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Without limitation, Contractor's indemnities and obligations as well as all warranties relative to Work provided through the date of termination survive a termination hereunder.

20. **Termination by Owner for Cause.** Should Contractor fail to timely provide Owner with the certificates of insurance, make a general assignment for the benefit of its creditors, fail to apply enough properly skilled workmen or specified materials to properly prosecute the Work in accordance with Contractor's schedule, or otherwise materially breach any provision of the Contract Documents, then Owner may, without any prejudice to any other right or remedy, give Contractor Written Notice thereof. If Contractor fails to cure its default within ten (10) days, Owner may terminate this Agreement by giving Written Notice to Contractor. In such case, Owner may, in Owner's sole discretion, take legal assignment of subcontracts and other contractual rights of Contractor and/or take possession of the premises and all materials, tools, equipment, and appliances thereon, and finish the Work by whatever method Owner deems expedient. Contractor will not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Sum exceeds the expense of finishing the Work, including compensation for additional administrative, architectural, consultant, and legal services (including without limitation attorney fees, expert fees, copy costs, and other expenses), such excess will be paid to Contractor, less any offsets. If such expense exceeds the unpaid balance, Contractor will pay the difference to Owner. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Without limitation, Contractor's indemnities and obligations as well as all warranties relative to Work provided through the date of termination survive a termination hereunder.
21. **Termination by Owner for Convenience.** Notwithstanding any other provision contained in the Contract Documents, Owner may, without cause and in its absolute discretion, terminate this Agreement at any time. In the event of such termination, Contractor will be entitled to recover from Owner the percentage of the Contract Sum equal to the percentage of the Work which Owner and/or its architect determines has been completed on the Project site as of the date of termination, together with any out of pocket loss Contractor has sustained with respect to materials and equipment as a result of the termination prior to completion of the Work, less any offsets. Contractor will not be entitled to unearned profit or any other compensation as a result of the termination and hereby waives any claim therefor. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Owner may, in Owner's sole discretion, take legal assignment of subcontracts and other contractual rights of Contractor. Without limitation, Contractor's indemnities and obligations as well as all warranties relative to Work provided through the date of termination survive a termination hereunder.
22. **Enforcement.** In the event either party commences legal action to enforce or rescind any term of this Agreement, the prevailing party will be entitled to recover its attorney fees, costs and legal expenses, including without limitation all copy costs and expert and consultant fees and expenses, incurred in that action and on all appeals from the other party.
23. **Ownership of Materials, Patents, and Intellectual Property Rights.** Owner will retain ownership and intellectual property rights in all plans, designs, drawings, documents, concepts, and materials provided by or on behalf of Owner to Contractor and to all work products of Contractor and its subcontractors for products, services, and Work provided under this Agreement, such products, services, and Work of Contractor and its subcontractors constituting Works made for hire. Neither Contractor nor its subcontractors will reuse any portion of such items provided by Owner or work products developed by Contractor or its subcontractors for Owner pursuant to this Agreement or disclose any such items to any third party without the prior written consent of Owner. Owner may withhold its consent in its absolute discretion. Contractor shall obtain the written agreement of each of its subcontractors to the terms of this section prior to permitting the subcontractor to perform any services contemplated by this Agreement.
24. **Comply with Intellectual Property Rights of Others.** Contractor represents and warrants that no Work or services (with its means, methods, goods, and services attendant thereto), provided to Owner will infringe or violate any right of any third party and that Owner may use and exploit such Work, means, methods, goods, and services without liability or obligation to any person or entity (specifically and without limitation, such Work, means, methods, goods, and services will not violate rights under any patent, copyright, trademark, or other intellectual property right or application for the same).

25. **Ownership and Use of Renderings and Photographs.** Renderings, photographs, and/or other images of or representing the services, Work, or any improvement on or relative to the Project Site, whether created before, during, or at completion of construction (and whether created by Owner, Contractor, or Contractor's subcontractors), are the property of the Owner. Contractor hereby transfers and assigns to Owner all ownership and intellectual property rights that Contractor and/or its subcontractors may have in and to all such renderings, photographs, and other images. The Owner reserves all rights including copyrights and other intellectual property rights to such renderings, photographs, and other images. No such renderings, photographs, or other images shall be used or distributed without written consent of the Owner.
26. **Public Statements.** Contractor will not make any statements or provide any information to the media about the Project or Work without the prior written consent of Owner. If Contractor receives any requests for information from media, Contractor will refer such requests to Owner.
27. **Confidentiality.** Contractor shall ensure that Contractor and its subcontractors, and the employees, agents and representatives of Contractor and its subcontractors, maintain in strict confidence, and shall use and disclose only as authorized by Owner all Confidential Information of Owner that Contractor receives in connection with the performance of this Agreement. Notwithstanding the foregoing, Contractor may use and disclose any information to the extent required by an order of any court or governmental authority, but only after it has notified Owner and Owner has had a reasonable opportunity to obtain reasonable protection for such information in connection with such disclosure. For purposes of this Agreement, "Confidential Information" means:
- a. The name or address of any affiliate, customer or subcontractor of Owner or any information concerning the transactions of any such person with Owner;
 - b. Any contracts, agreements, business plans, budgets or other financial information, renderings, photographs, and materials provided by Owner relating to the Work or any improvement on the Project Site to the extent such has not been made available to the public by the Owner;
 - c. Any other information that is marked or noted as confidential at the time of its disclosure.
28. **No Commercial Use of Transactions or Relationships.** Without the prior written consent of Owner, which Owner may grant or withhold in its sole discretion, neither Contractor nor Contractor's affiliates, officers, directors, agents, representatives, shareholders, members, Subcontractors, or employees shall make any private commercial use of their relationship to Owner or the Project, including, without limitation:
- a. By referring to the Owner or Project verbally or in any sales, marketing or other literature, letters, client lists, press releases, brochures or other written materials except as may be necessary for Contractor to perform Contractor's obligations under the terms of this Agreement;
 - b. By using or allowing the use of any photographs of the Work or Project or any part thereof, or of any service marks, trademarks or trade names or other intellectual property now or which may hereafter be associated with, owned by or licensed by Owner, in connection with any work, service or product; or
 - c. By contracting with or receiving money or anything of value from any person or commercial entity to facilitate such person or entity obtaining any type of commercial identification, advertising or visibility in connection with the Owner or Project.
- Notwithstanding the foregoing, Contractor may include a reference to Owner or the Project in a professional résumé or other similar listing of Contractor's references without seeking Owner's written consent in each instance, provided that such reference to Owner or the Project is included with at least several other similar references to projects of different owners and is given no more prominence than such other references.
29. **Entire Agreement.** This Agreement contains the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral, relating to the Project. This Agreement may be amended only by a writing signed by both parties. This Agreement will not be construed to create a contractual relationship of any kind between any persons or entities other than Owner and Contractor.

30. **Assignment.** Contractor will not assign any right or obligation hereunder without the prior written consent of the Owner, which consent may be granted or withheld in Owner's absolute discretion.

31. **Governing Law.** The parties acknowledge that the Contract Documents have substantial connections to the State of Utah. The Contract Documents will be deemed to have been made, executed, and delivered in Salt Lake City, Utah. To the maximum extent permitted by law, (i) the Contract Documents and all matters related to their creation and performance will be governed by and enforced in accordance with the laws of the State of Utah, excluding conflicts of law rules, and (ii) all disputes arising from or related to the Contract Documents will be decided only in a state or federal court located in Salt Lake City, Utah and not in any other court or state. Toward that end, the parties hereby consent to the jurisdiction of the state and federal courts located in Salt Lake City, Utah and waive any other *venue* to which they might be entitled by virtue of domicile, habitual residence, place of business, or otherwise.

32. **Effective Date.** The effective date of this Agreement is the date indicated by Owner's signature.

OWNER:

The Church of Jesus Christ of Latter-day Saints,
a Utah corporation sole

CONTRACTOR:

Signature: _____

Signature: _____

Print Name: _____

Print Name: _____

Title: _____

Address: _____

Address: _____

Telephone No: _____

Telephone No: _____

Facsimile No: _____

Facsimile No: _____

Email: _____

Email: _____

Effective Date: _____

Fed. I.D. or SSN: _____

License No: _____

Reviewed By: _____

Date Signed: _____

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SUPPLEMENTARY CONDITIONS

FOR SMALL PROJECT AGREEMENT BETWEEN OWNER AND CONTRACTOR (U.S.)

ITEM 1 - GENERAL

1. Conditions of the Small Project Agreement Between Owner and Contractor (U.S.) apply to each Division of the Specifications.
2. Provisions contained in Division 01 apply to all Divisions of the Specifications.

ITEM 2 - LIQUIDATED DAMAGES PAYABLE TO OWNER

This section may be included as a separate additional paragraph to the Small Project Agreement Between Owner and Contractor (U.S.), at Owner's discretion:

Delay in Completion of the Work. For each day after the expiration of the designated Time of Completion that Contractor has not completed the Work, Contractor will pay Owner the amount of One Hundred Fifty dollars (\$150.00) per day as liquidated damages for Owner's loss of use and the added administrative expense to Owner to administer the Project during the period of delay. In addition, Contractor will reimburse Owner for any additional Architect's fees, attorneys' fees, expert fees, consultant fees, copy costs, and other expenses incurred by Owner as a result of the delay. Owner may deduct any liquidated damages or reimbursable expenses from any money due or to become due to Contractor. If the amount of liquidated damages and reimbursable expenses exceeds any amounts due to Contractor, Contractor will pay the difference to Owner within ten (10) days after receipt of a written request from Owner for payment.

ITEM 3 - PERMITS

1. Owner will pay the costs of permits, fees, impact fees and improvement bonds required by local agencies necessary for the proper execution and completion of the work. Contractor shall obtain all permits and pay all fees, which will be reimbursed by the Owner without markup. These costs shall not be included in the bid amount. Contractor will conform to all ordinances and covenants governing the Project Site and/or Work.

ITEM 4 - STATE SPECIFIC SUPPLEMENTARY CONDITIONS

UTAH STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. Contractors should be exempt on purchases of material installed or converted into real property to be used by the Owner. The Contractor will furnish each vendor with a completed Exemption Certificate Form TC-721. The certificate will be prepared by the Contractor for each vendor in order to obtain the exemption.
2. The Owner's tax exempt number is 11871701-002-STC.

UTAH NOTICE OF INTENT TO OBTAIN FINAL COMPLETION:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

- A. Contractor shall file with the State Construction Registry, on its own behalf and/or on behalf of Owner, a notice of intent to obtain final completion at least 45 days before the day on which the Owner or Contractor files or could file a notice of completion under Utah Code Ann. Section 38-1a-506 if:
 1. The completion of performance time under the original contract for construction work is greater than 120 days;
 2. The total original construction contract price exceeds \$500,000; and
 3. The original contractor or owner has not obtained a payment bond in accordance

UTAH NOTICE OF COMPLETION:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

- A. Within five (5) calendar days of final completion of the Project and in compliance with Section 38-1a-507 Utah Code Annotated, Contractor shall file with the State Construction Registry, and copy to Owner, a notice of completion which shall include, without limitation, the following:
 - 1. The name, address, telephone number, and email address of the person filing the notice of completion;
 - 2. The name of the county in which the Project and/or Project site is located;
 - 3. The date on which final completion is alleged to have occurred;
 - 4. The method used to determine final completion; and
 - 5. One of the following:
 - a. The tax parcel identification number of each parcel included in the Project and/or Project site;
 - b. The entry number of a preliminary notice on the same project that includes the tax parcel identification number of each parcel included in the Project and/or Project site; or
 - c. The entry number of the building permit issued for the Project.
- B. Notwithstanding any other provision of the Contract Documents to the contrary, Contractor and Owner agree that any breach or failure to comply with this Section by the Contractor will constitute a breach of contract and the Contractor will be liable for any direct, indirect, or consequential damages to the Owner flowing from this breach.

UTAH STATE PROGRESS PAYMENTS AND FINAL PAYMENT:

Replace paragraph 5 of the Small Project Agreement Between Owner and Contractor (U.S.) with the following:

5. Payment

- a. If the Contractor's Bid Proposal Amount is over \$100,000, Contractor will submit to Owner a schedule of values which allocates the Contractor's Bid Proposal Amount to various portions of the Work. This schedule, when accepted by Owner, will be used as a basis for reviewing Contractor's payment requests.
- b. Progress Payments: Not more than once each month, Contractor will submit a payment request to Owner. Owner will pay Contractor progress payments for work completed within fifteen (15) days after Owner receives:
 - 1. Contractor's progress payment request for work to date;
 - 2. A certification by Contractor that Contractor has paid for all labor, materials, and equipment relating to the Work covered by prior payment requests and that Contractor will pay for all labor, materials, and equipment relating to the Work covered by the current payment request; and
 - 3. Conditional Waiver and Release Upon Progress Payment documents submitted by Contractor (in content complying with Utah Code § 38-1a-802) executed by each of the subcontractors performing work and/or providing materials covered by the Contractor's progress payment request.
- c. Final Payment: Owner will make full and final payment of the Contract Sum due within thirty (30) days of the completion of all of the following requirements:
 - 1. Contractor has submitted its final payment request;
 - 2. Contractor has submitted a certification that Contractor has paid for all labor, materials, and equipment relating to the Work covered by prior payment requests and that Contractor will pay for all labor, materials, and equipment relating to the Work covered by the final payment request; and
 - 3. Contractor has submitted Waiver and Release Upon Final Payment documents (in content complying with Utah Code § 38-1a-802) executed by each of the subcontractors performing work and/or providing materials covered by the Contractor's final payment request.

Acceptance of final payment by Contractor or any Subcontractor will constitute a waiver of claims by the payee except for those claims previously made to Owner in writing and identified by Contractor in its affidavit as still pending.

If the aggregate of previous payments made by Owner exceeds the amount due Contractor, Contractor will reimburse the difference to Owner.

- d. Owner may modify or reject any payment request if, in Owner's opinion, the Work for which payment is requested is not acceptable or is less complete than represented on the payment request.
- e. Upon receipt of any payment from Owner, Contractor will pay to each Subcontractor the amount paid to Contractor on account of such Subcontractor's portion of the Work.
- f. Contractor will maintain a copy of each payment request at the Project site for review by the Subcontractors.
- g. No payment made, either in whole or in part, by Owner will be construed to be an acceptance of defective or improper materials or workmanship.

END OF DOCUMENT

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DIVISION 01**SECTION 01 0000****GENERAL REQUIREMENTS: R&I PROJECT**

- 01 1000 SUMMARY**
- 01 1200 MULTIPLE CONTRACT SUMMARY**
- 01 1400 WORK RESTRICTIONS**
- 01 3000 ADMINISTRATIVE REQUIREMENTS**
- 01 3100 PROJECT MANAGEMENT AND COORDINATION**
- 01 3300 SUBMITTAL PROCEDURES**
- 01 3500 SPECIAL PROCEDURES**
- 01 4000 QUALITY REQUIREMENTS**
- 01 4301 QUALITY ASSURANCE – QUALIFICATIONS**
- 01 4523 TESTING AND INSPECTING SERVICES**
- 01 5000 TEMPORARY FACILITIES AND CONTROLS**
- 01 6100 COMMON PRODUCT REQUIREMENTS**
- 01 6200 PRODUCT OPTIONS**
- 01 6400 OWNER-FURNISHED PRODUCTS**
- 01 6600 DELIVERY, STORAGE, AND HANDLING REQUIREMENTS**
- 01 7000 EXECUTION REQUIREMENTS**
- 01 7400 CLEANING AND WASTE MANAGEMENT**
- 01 7700 CLOSEOUT PROCEDURES**
- 01 7800 CLOSEOUT SUBMITTALS**

SECTION 01 1000 SUMMARY

- A. Work Covered By Contract Documents:
 - 1. Provisions contained in Division 01 apply to all other sections and divisions of Specifications. All instructions contained in Specifications are directed to Contractor. Unless specifically provided otherwise, all obligations set forth in Specifications are obligations of Contractor.
 - 2. Comply with applicable laws and regulations.
- B. Work By Owner:
 - 1. Owner will furnish and install some portions of the Work with its own forces. Complete the Work necessary to accommodate the Work to be performed by Owner before scheduled date for performance of such Work.
 - 2. Owner may provide furnishings and/or equipment for Project. Contractor will receive, store, and protect such items on site until the date Owner accepts Project.

SECTION 01 1200 MULTIPLE CONTRACT SUMMARY

- A. Separate Contracts:
 - 1. Contracts may be issued by Owner for performance of certain construction operations at Project site.
 - 2. Contractor will afford other contractors reasonable opportunity to place and store their materials and equipment on site and to perform their work and will properly connect and coordinate its work with theirs where applicable:

SECTION 01 1400 WORK RESTRICTIONS

- A. Project Conditions:
 - 1. During construction period, Contractor will have use of premises for construction operations. Contractor will ensure that Contractor, its employees, subcontractors, and employees comply with following requirements:
 - a. Confine operations to areas within Contract limits shown on Drawings. Do not disturb portions of site beyond Contract limits.
 - b. Do not allow alcoholic beverages, illegal drugs, or persons under their influence on Project Site.
 - c. Do not allow use of tobacco in any form on Project Site.
 - d. Do not allow pornographic or other indecent materials on site.

- e. Do not allow work on Project Site on Sundays except for emergency work.
 - f. Refrain from using profanity or being discourteous or uncivil to others on Project Site or while performing The Work.
 - g. Wear shirts with sleeves, wear shoes, and refrain from wearing immodest, offensive, or obnoxious clothing, while on Project Site.
 - h. Do not allow playing of obnoxious and loud music on Project Site. Do not allow playing of any music within existing facilities.
 - i. Do not build fires on Project Site.
 - j. Do not allow weapons on Project Site, except those carried by law enforcement officers and/or other uniformed security personnel who have been retained by Owner or Contractor to provide security services.
2. Existing Facilities:
- a. If Owner will occupy existing building, reasonably accommodate use of existing facilities by Owner.

SECTION 01 3000 ADMINISTRATIVE REQUIREMENTS

A. Administrative Requirements:

1. Coordination:
 - a. Coordinate construction activities to ensure efficient and orderly installation of each part of the Work.
 - b. Coordinate construction operations that are dependent upon each other for proper installation, connection, and operation.
 - c. Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

SECTION 01 3100 PROJECT MANAGEMENT AND COORDINATION

A. Multiple Contract Coordination:

1. Contractor shall be responsible for coordination of Temporary Facilities and Controls, Construction Waste Management and Disposal services, and Final Cleaning for entire Project unless directed otherwise by Owner's Representative for those who perform work on Project from Notice to Proceed to date of Substantial Completion.

B. Project Meetings And Conferences:

1. Attend preconstruction conference and organizational meeting scheduled by Architect or Owner Representative at Project site or other convenient location.
2. Be prepared to discuss items of significance that could affect progress, including such topics as:
 - a. Construction schedule, equipment deliveries, general inspection of tests, preparation of record documents and O&M manuals, project cleanup, security, shop drawings, samples, use of premises, work restrictions, and working hours.
2. Pre-Installation Conferences.
 - a. Attend pre-installation conferences specified in Contract Document.

SECTION 01 3300 SUBMITTAL PROCEDURES

A. Submittal Procedure:

1. Coordination: Coordination preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently before performance of related construction activities to avoid delay.
2. Process Time: Allow sufficient review time so installation will not be delayed by time required to process submittals.
3. Identification: Place permanent label or title block on each submittal for identification. Include name of entity that prepared each submittal on label or title block.
4. Transmittal: Package each submittal appropriately for transmittal and handling.

General:

- a. Transmit each submittal from Contractor to Architect using transmittal letter. Transmittal letter shall provide sufficient space for Architect review stamp and comments (5" wide x 3" high minimum space).

- b. All submittals shall include Contractor's certification that information complies with Contract Document requirements, or, on form or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations.
- c. Submittals received from sources (both electronic and physical sources) other than Contractor or not marked with Contractor's approval will be returned without action.

Electronic Submittals:

- d. Preferred method of transmittal for most submittals previously in paper format is via email attachment to Architect in .pdf format.
- e. Maintain original size of .pdf files submitted from subcontractors (24"x36" drawings shall remain original size in electronic format, for example).
- f. Electronic submittals shall be submitted as a single file (.pdf) per submittal item / discipline.
- g. Do not submit multiple files, cut sheets, product information, etc.
- h. Contractor shall compile each submittal including transmittal letter as first page of each submittal.
- i. Contractor shall submit each submittal item / discipline in a separate email, not multiple submittals in a single email.
- j. Subject line of submittal email shall include project name and submittal title / category.

Physical Submittals:

- k. Submittals requiring hard copies or including physical product samples shall be delivered or shipped to Architect's office. Deliveries are accommodated from 8:30am to 4:30pm Monday through Friday on regular business days.
- l. Package each submittal appropriately for transmittal and handling. On transmittal, record relevant information and requests for data.

B. Action Submittals:

1. Product Data: Submit product data, as required by individual Sections of Specifications.
2. Shop Drawings: Submit shop drawings for review and designate (stamp) approval of shop drawings.
3. Samples: Samples used for comparison with actual component to be installed. Samples when accepted will be used for quality comparisons throughout course of construction.

C. Informational Submittals:

1. Informational submittals are design data, test reports, certificates, manufacturer's instructions, manufacturer's field reports, and other documentary data affirming quality of products and installations.
 - a. Return copies or PDF files marked with action taken and with corrections or modifications required.

D. Closeout Submittals:

1. Submittals that occur during project closeout.

SECTION 01 3500 SPECIAL PROCEDURES

A. Quality Assurance:

1. Hot Work Permit (Available from Owner's Representative):
 - a. Required for doing hot work involving open flames or producing heat or sparks such as:
 - 1) Brazing.
 - 2) Cutting.
 - 3) Grinding.
 - 4) Soldering.
 - 5) Thawing pipe.
 - 6) Torch applied roofing.
 - 7) Welding.

SECTION 01 4000 QUALITY REQUIREMENTS

A. Administrative Requirements:

1. Conflicting Requirements:
 - a. If compliance with two or more standards is specified and standards establish different or conflicting requirements for minimum quantities or quality levels, comply with most stringent requirement.
2. Minimum Quantity or Quality Levels:

- a. Quantity or quality level shown or specified shall be the minimum provided or performed. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits.
 3. Submit to Owner permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records establishing compliance with standards and regulations bearing upon performance of the Work.
- B. Quality Assurance:
1. Testing and inspecting services are used to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
 2. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to verify compliance and guard against defects and deficiencies and substantiate that proposed construction will comply with requirements. Owner or Owner's designated representative(s) will perform quality assurance to verify compliance with Contract Documents.
 3. Notify Owner immediately if asbestos-containing materials or other hazardous materials are encountered while performing the Work.
- C. Quality Control:
1. Quality Control Services:
 - a. Quality Control will be sole responsibility of Contractor.
 - 1) Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements performed by Contractor.
 - a) They do not include inspections, tests or related actions performed by Architect or Owner Representative, governing authorities or independent agencies hired by Owner or Architect.
 - b) Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
 - 2) Where services are indicated as Contractor's responsibility, engage qualified Testing Agency to perform these quality control services:
 - a) Contractor will not employ same testing entity engaged by Owner, without Owner's written approval.
- D. Repair And Protection:
1. On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 2. Protect construction exposed by or for Quality Assurance and Quality Control activities.
 3. Repair and protection are Contractor's responsibility, regardless of assignment of responsibility for Quality Assurance and Quality Control Services.

SECTION 01 4301 QUALITY ASSURANCE - QUALIFICATIONS

- A. Qualifications: Qualifications in this Section establish minimum qualification levels required; individual Specification Sections specify additional requirements:
1. Fabricator / Supplier / Installer Qualifications:
 - a. Firm experienced in producing products similar to those indicated for this Project and with record of successful in-service performance, as well as sufficient production capacity to produce required units:
 - 1) Where heading '*VMR (Value Managed Relationship) Suppliers / Installers*' is used to identify list of specified suppliers or installers, Owner has established relationships that extend beyond requirements of this Project. No other suppliers / installers will be acceptable. Follow specified procedures to preserve relationships between Owner and specified suppliers / installers and advantages that accrue to Owner from those relationships.
 - 2) Where heading '*Acceptable or Approved Suppliers / Installers / Fabricators*' is used to identify list of specified suppliers / installers / fabricators, use only one of listed suppliers / installers / fabricators. No others will be acceptable.
 2. Factory-Authorized Service Representative Qualifications:

- a. Authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
3. Installer Qualifications:
 - a. Firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with record of successful in-service performance.
4. Manufacturer Qualifications:
 - a. Firm experienced in manufacturing products or systems similar to those indicated for this Project and with record of successful in-service performance, as well as sufficient production capacity to produce required units.
5. Manufacturer's Field Services Qualifications:
 - a. Experienced authorized representative of manufacturer to inspect field-assembled components and equipment installation, including service connections.
6. Professional Engineer Qualifications:
 - a. Professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of kind indicated:
 - 1) Engineering services are defined as those performed for installations of system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
7. Specialists:
 - a. Certain sections of Specifications require that specific construction activities will be performed by entities who are recognized experts in those operations:
 - 1) Specialists will satisfy qualification requirements indicated and will be engaged for activities indicated.
 - 2) Requirement for special will not supersede building codes and regulations governing the Work.
8. Testing Agency Qualifications:
 - a. Independent Testing Agency with experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
 - b. Testing Laboratory:
 - 1) AASHTO Materials Reference Laboratory (AMRL) Accreditation Program.
 - 2) Cement and Concrete Reference Laboratory (CCRL).
 - 3) Nationally Recognized Testing Laboratory (NRTL): Nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 4) National Voluntary Laboratory (NVLAP): Testing Agency accredited according to National Institute of Standards and Technology (NIST) Technology Administration, U. S. Department of Commerce Accreditation Program.

SECTION 01 4523 TESTING AND INSPECTION SERVICES

- A. Submittals:
 1. Certificates: Testing Agency will submit certified written report of each inspection, test, or similar service.
 2. Tests and Evaluation Reports:
 - a. Testing Agency or Agencies will prepare logs, test reports, and certificates applicable to specific tests and inspections and deliver copies to Owner's Representative and to each of following if involved on project: Architect, Consulting Engineers (Engineer of Record), General Contractor, Authorities Having Jurisdiction (if required).
 3. Testing Agency:
 - a. Qualifications of Testing Agency management, personnel, inspector and technicians designated to project.
 - b. Provide procedures for non-destructive testing, equipment calibration records, personnel training records, welding inspection, bolting inspection, shear connector stud inspection, and seismic connection inspections.
- B. Quality Assurance:
 1. Owner or Owner's designated representative(s) will perform quality assurance. Owner's quality assurance procedures may include observations, inspections, testing, verification, monitoring and any other procedures deemed necessary by Owner to verify compliance with Contract Documents.

2. Owner will employ independent Testing Agencies to perform certain specified testing, as Owner deems necessary.
 3. Certification:
 - a. Product producers and associations, which have instituted approved systems of quality control and which have been approved by document approval agencies, are not required to have further testing.
 - b. Concrete mixing plants, plants producing fabricated concrete and wood or plywood products certified by agency, lumber, plywood grade marked by approved associates, and materials or equipment bearing underwriters' laboratory labels require no further testing and inspection.
 4. Written Practice for Quality Assurance:
 - a. Testing Agency will maintain written practice for selection and administration of inspection personnel, describing training, experience, and examination requirements for qualification and certification of inspection personnel.
 - b. Written practice will describe testing agency procedures for determining acceptability of structure in accordance with applicable codes, standards, and specifications.
 - c. Written practice will describe Testing Agency inspection procedures, including general inspection, material controls, visual welding inspection, and bolting inspection.
- C. Quality Control:
1. Quality Control will be sole responsibility of Contractor. Contractor will be responsible for testing, coordination, start-up, operational checkout, and commissioning of all items of the Work included in Project. All costs for these services will be included in Contractor's cost of the Work.
 2. Notify results of all Testing and Inspection performed by Contractor's independent Testing Agencies to Architect and/or Owner's Representative within 24 hours of test or inspection having been performed:
 - a. Testing and Inspection Reports will be distributed as follows:
 - 1) 1 copy to Owner's Representative.
 - 2) 1 copy to Architect.
 - 3) 1 copy to Consulting Engineer(s) (Engineer of Record).
 - 4) 1 copy to Authorities Having Jurisdiction (if required).
 3. Contractor's Responsibility:
 - a. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents.
 - b. Tests and inspections that are not explicitly assigned to Owner are responsibility of Contractor.
 - c. Cooperate with Testing Agency(s) performing required inspections, tests, and similar services and provide reasonable auxiliary services as requested. Notify Testing Agency before operations to allow assignment of personnel. Auxiliary services required include but are not limited to:
 - 1) Providing access to the Work and furnishing incidental labor, equipment, and facilities deemed necessary by Testing Agency to facilitate inspections and tests at no additional cost to Owner.
 - 2) Taking adequate quantities of representative samples of materials that require testing or helping Testing Agency in taking samples.
 - 3) Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
 - 4) Providing Testing Agency with preliminary design mix proposed for use for materials mixes that require control by Testing Agency.
 - d. For any requested inspection, Contractor will complete prior inspections to ensure that items are ready for inspection.
 - e. All Work is subject to testing and inspection and verification of correct operation.
 - f. Comply:
 - 1) Upon completion of Testing Agency's inspection, testing, sample-taking, and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
 - 2) Comply with Contract Documents in making such repairs.
 - g. Data:
 - 1) Furnish records, drawings, certificates, and similar data as may be required by testing and inspection personnel to assure compliance with Contract Documents.
 - h. Defective Work (Non-Conforming Work): Non-conforming Work as covered in General Conditions applies, but is not limited to following requirements Protection:
 - 1) Where results of inspections, tests, or similar services show that the Work does not comply with Contract Document requirements, correct deficiencies in the Work promptly to avoid work delays.
 - 2) Where testing personnel take cores or cut-outs to verify compliance, repair prior to acceptance.

- 3) Contractor will be responsible for any and all costs incurred resulting from inspection that was scheduled prematurely or retesting due to failed tests.
 - 4) Remove and replace any Work found defective or not complying with contract document requirements at no additional cost to Owner.
 - 5) Should test return unacceptable results, Contractor will bear all costs of retesting and re-inspection as well as cost of all material consumed by testing, and replacement of unsatisfactory material and/or workmanship.
- i. Protection:
 - 1) Protect construction exposed by or for quality assurance and quality control service activities, and protect repaired construction.
 - j. Scheduling: Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities:
 - 1) Schedule testing and inspections in advance so as not to delay the Work and to eliminate any need to uncover the Work for testing or inspection.
 - 2) Notify Testing Agency and Architect or Owner as noted in Sections in Division 01 thru Division 50 prior to any time required for such services.
 - 3) Incorporate adequate time for performance of all inspections and correction of noted deficiencies.
 - 4) Schedule sequence of activities to accommodate required services with minimum of delay.
 - 5) Schedule sequence of activities to avoid necessity of removing and replacing construction to accommodate testing and inspections.
 - k. Test and Inspection Log:
 - 1) Provide system of tracking all field reports, describing items noted, and resolution of each item. Prepare record of tests and inspections. Include following requirements:
 - (a) Date test or inspection was conducted.
 - (b) Description of the Work tested or inspected.
 - (c) Date test or inspection results were transmitted to Architect or Owner Representative.
 - (d) Identification of Testing Agency or inspector conducting test or inspection.
 - 2) Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's or Owner's reference during normal working hours.
- D. Tests And Inspections - General:
1. Testing specifically identified to be conducted by Owner, will be performed by an independent entity and will be arranged and paid for by Owner.
 2. Individual Sections in Division 01 through Division 50 indicate if Owner will provide testing and inspection of the Work of that Section.
 3. Owner may engage additional consultants for testing, air balancing, commissioning, or other special services:
 - a. Activities of any such Owner consultants are in addition to Contractor testing of materials or systems necessary to prove that performance is in compliance with Contract requirements.
 - b. Contractor must cooperate with persons and firms engaged in these activities.
 4. Tests include but not limited to those described in detail in 'Field Quality Control' in Part 3 of Individual Sections in Divisions 01 through Division 50.
 5. Taking Specimens:
 - a. Only testing laboratory shall secure, handle, transport, or store any samples and specimens for testing.
 6. Scheduling Testing Agency:
 - a. Contractor will coordinate the Work and facilitate timeliness of such testing and inspecting services so as not to delay the Work.
 - b. Contractor will notify Testing Agency and Architect or Owner Representative to schedule tests and / or inspections.
- E. Testing Agency Services And Responsibility:
1. Testing Agency, including independent testing laboratories, will be licensed and authorized to operate in jurisdiction in which Project is located:
 - a. Approved Testing Agency Qualifications: Requirements of Section 01 4301 apply.
 2. Testing and Inspection Services:
 - a. Testing Agency will not release, revoke, alter, or increase Contract Document requirements or approve or accept any portion of the Work.
 - b. Testing Agency will not give direction or instruction to Contractor.

- c. Testing Agency will have full authority to see that the Work is performed in strict accordance with requirements of Contract Documents and directions of Owner's Representative and/or Architect.
 - d. Testing Agency will not provide additional testing and inspection services beyond scope of the Work without prior approval of Owner's Representative and/or Architect.
3. Testing Agency Duties:
- a. Independent Testing Agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual specification Sections will cooperate with Architect or Owner Representative and Contractor in performance of its duties and will provide qualified personnel to perform required inspections and tests.
 - b. Testing Agency will test or obtain certificates of tests of materials and methods of construction, as described herein or elsewhere in technical specification.
 - c. Testing Agency will provide management, personnel, equipment, and services necessary to perform testing functions as outlined in this section.
 - d. Testing Agency must have experience and capability to conduct testing and inspecting indicated by ASTM standards and that specializes in types of tests and inspections to be performed.
 - e. Testing Agency will comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, ASTM D3666, ASTM D3740, and other relevant ASTM standards.
 - f. Testing Agency must calibrate all testing equipment at reasonable intervals (minimum yearly) with accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.
 - g. Welding Procedure Review: Testing Agency will provide review and approval or rejection of all welding procedures to be used and verify compliance with all reference standard requirements.
4. Testing and Inspection Reports:
- a. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
 - b. Laboratory Reports: Testing Agency will furnish reports of materials and construction as required, including:
 - 1) Description of method of test.
 - 2) Identification of sample and portion of the Work tested:
 - (a) Description of location in the Work of sample.
 - (b) Time and date when sample was obtained.
 - (c) Weather and climatic conditions at time when sample was obtained.
 - 3) Evaluation of results of tests including recommendations for action.
 - c. Inspection Reports:
 - 1) Testing Agency will furnish "Inspection at Site" reports for each site visit documenting activities, observations, and inspections.
 - 2) Include notation of weather and climatic conditions, time and date conditions and status of the Work, actions taken, and recommendations or evaluation of the Work.
 - d. Reporting Testing and Inspection (Conforming Work):
 - 1) Submit testing and inspection reports as required within twenty four (24) hours of test or inspection having been performed.
 - e. Reporting Testing and Inspection Defective Work (Non-Conforming Work):
 - 1) Testing Agency, upon determination of irregularities, deficiencies observed or test failure(s) observed in the Work during performance of its services of test or inspection having been performed, will:
 - (a) Verbally notify results to Architect, Contractor, and Owner's Representative within one hour of test or inspection having been performed (if Defective Work (Non-Conforming Work) is incorporated into project).
 - (b) Submit written inspection report and test results as required within twenty four (24) hours of test or inspection having been performed.
 - f. Final Report:
 - 1) Submit final report of tests and inspections at Substantial Completion, which identify unresolved deficiencies.
- F. Architect's Responsibility:
- 1. Architect Duties:
 - a. Notify Owner's Representative before each test and/or inspection:
- G. Field Quality Control:
- 1. Field Tests And Inspections:

- a. Field Test and Inspection requirements are described in detail in 'Field Quality Control' in Part 3 Execution' of individual Sections in Division 01 thru Division 49.

SECTION 01 5000 TEMPORARY FACILITIES AND CONTROLS

A. Administrative Requirements:

1. Contractor is responsible for security of materials, tools, and equipment. Do not permit others to use building keys provided by Owner. Safeguard building and contents while the Work is being performed and secure building when the Work is finished for day.
2. Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and reduce possibility that air, waterways, and subsoil might be contaminated or polluted, or that other undesirable effects might result:
 - a. Avoid use of tools and equipment that produce harmful noise.
 - b. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near site.
 - c. Protect the Work, materials, apparatus, and fixtures from injury due to weather, theft, and vandalism.
3. Existing restroom facilities may be used by Contractor. Clean restrooms and portions of existing building used in accessing restrooms daily. If existing facilities are not usable, provide and maintain temporary sanitary toilet.

B. Temporary Barriers And Enclosures:

1. Protect existing trees and plants. Remove and replace vegetation that dies or is damaged beyond repair due to construction activities.
2. Erect adequate barricades, warning signs, and lights necessary to protect persons from injury or harm.
3. Provide temporary enclosures at exterior building openings for security and protection from weather, theft, and vandalism. Erect and maintain dust-proof partitions and enclosures as required to prevent spread of dust and fumes to occupied portions of building.
4. Proprietary Camera Services: In its absolute discretion, and with or without notice to Contractor, Owner may provide from time to time, but is not obligated to provide, one or more cameras on or about Project site and/or signage or notices of the same:
 - a. If provided by Owner, such camera(s) and/or signage and notices are solely for Owner's benefit and convenience and shall not be for benefit of Contractor, Subcontractor(s) or for any third person.
 - b. Owner shall have no liability, obligation, or responsibility to Contractor, Subcontractors, or any third person relative to such camera(s), signage, or notices, or absence of camera(s), signage, or notices, including without limitation, installation, maintenance, operation, repair, testing, functionality, capacity, recording, monitoring, posting, etc., of the same (hereafter 'Proprietary Camera Services').
 - c. Contractor, with Owner's prior consent (which shall not be unreasonably withheld), may relocate such camera(s), signage, or notices as necessary to not unreasonably, materially and physically interfere with work at Project Site.
 - d. Contractor's obligations under Contract Documents, including but not limited to, Contractor's obligation for security of Project Site, are not modified by Owner's opportunity to provide, actually providing, or not providing Proprietary Camera Services and/or signage or notices regarding the same.
 - e. This Specification Section does not preclude Contractor from providing its own camera(s), signage, or notices pursuant to terms and conditions of this Agreement. Neither does this Section reduce, expand or modify any other right or obligation of Owner pursuant to terms of this Agreement.

C. Utilities:

1. Electrical Power: Owner will provide electric power for construction activities within limits available at existing facility.
2. Fire Protection: Exercise caution to avoid fire damage: Do not build fires on site.
3. Heating, Cooling, And Ventilation:
 - a. Permanent mechanical system may be operated upon following conditions:
 - 1) Do not interfere with normal set-back temperature patterns except as approved by Project Manager.
 - 2) Do not operate system when the Work causing airborne dust is occurring or when dust caused by such Work is present without first installing temporary filtering system.
4. Lighting: Existing lighting system may be used by Contractor.
5. Water Service: Contractor will use existing water supply for construction purposes to extent of existing facilities.

SECTION 01 6100 COMMON PRODUCT REQUIREMENTS

A. Administrative Requirements:

1. Provide products that comply with Contract Documents, are undamaged, and, unless otherwise indicated, are new and unused at time of installation. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and for intended use and effect.

SECTION 01 6200 PRODUCT OPTIONS

A. Product selection is governed by Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include:

1. Substitutions And Equal Products:
 - a. Generally speaking, substitutions for specified products and systems, as defined in Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.
 - b. Approved Products / Manufacturers / Suppliers / Installers:
 - 1) Category One:
 - (a) Owner has established 'Value Managed Relationships' that extend beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
 - (b) Follow specified procedures to preserve relationships between Owner and specified manufacturers / suppliers and advantages that accrue to Owner from those relationships.
 - 2) Category Two:
 - (a) Owner has established National Contracts that contain provisions extending beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
 - (b) Follow specified procedures to preserve relationships between Owner and specified manufacturers / suppliers and advantages that accrue to Owner from those relationships.
 - 3) Category Three:
 - (a) Specified products are provided to Church Projects under a National Account Program. Use these products to preserve advantages that accrue to Owner from those programs. No substitutions or equal products will be allowed on this Project.
 - 4) Category Four:
 - (a) Provide only specified products available from manufacturers listed. No substitutions, private-labeled, or equal products, or mixing of manufacturers' products is allowed on this Project.
 - (b) In Sections where lists recapitulating Manufacturers previously mentioned in Section are included under heading '*Manufacturers*' or '*Approved Manufacturers*', this is intended as convenience to Contractor as listing of contact information only. It is not intended that all manufacturers in list may provide products where specific products and manufacturers are listed elsewhere in Section.
 - c. Acceptable Products / Manufacturers / Suppliers / Installers:
 - 1) Type One: Use specified products / manufacturers unless approval to use other products / manufacturers has been obtained from Architect or Owner Representative by Addendum.
 - 2) Type Two: Use specified products / manufacturers unless approval to use other products and manufacturers has been obtained from Architect or Owner Representative in writing before installing or applying unlisted or private-labeled products.
 - 3) Use 'Equal Product Approval Request Form' to request approval of equal products, manufacturers, or suppliers before bidding or before installation, as noted in individual Sections.
 - d. Quality / Performance Standard Products / Manufacturers:
 - 1) Class One: Use specified product / manufacturer or equal product from specified manufacturers only.
 - 2) Class Two: Use specified product / manufacturer or equal product from any manufacturer.
 - 3) Products / manufacturers used will conform to Contract Document requirements.

SECTION 01 6400 OWNER-FURNISHED PRODUCTS

A. Administrative Requirements:

1. Install items furnished by Owner or receive and store in safe condition items purchased directly by Owner according to requirements of Contract Documents.

SECTION 01 6600 DELIVERY, STORAGE, AND HANDLING REQUIREMENTS

- A. Administrative Requirements:
1. Deliver, store, and handle products according to manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
- B. Delivery, Storage, and Handling:
1. Delivery and Acceptable Requirements:
 - a. Deliver, store, and handle products according to manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
 - b. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - c. Deliver products to site in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - d. Inspect products upon delivery to ensure compliance with Contract Documents, and to ensure that products are undamaged and properly protected.
 2. Storage and Handling Requirements:
 - a. Store products at site in manner that will simplify inspection and measurement of quantity or counting of units.
 - b. Store heavy materials away from Project structure so supporting construction will not be endangered.
 - c. Store products subject to damage by elements above ground, under cover in weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

SECTION 01 7000 EXECUTION REQUIREMENTS

- A. Administrative Requirements:
1. Require installer of each major component to inspect both substrate and conditions under which the Work is to be done:
 - a. Notify Owner in writing of unsatisfactory conditions.
 - b. Do not proceed until unsatisfactory conditions have been corrected.
- B. Common Installation Provisions:
1. Provide attachment and connection devices and methods necessary for securing the Work:
 - a. Secure the Work true to line and level.
 - b. Allow for expansion and building movement.
 2. Recheck measurements and dimensions before starting each installation.
 3. Design, furnish, and install all shoring, bracing, and sheathing as required for safety and for proper execution of the Work and, unless otherwise required, remove same when the Work is completed.
 4. Where mounting heights are not shown, install individual components at standard mounting heights recognized within industry or local codes for that application. Refer questionable mounting height decisions to Owner for final decision.
- C. Protection:
1. Cover and protect furniture, equipment, and fixtures from soiling and damage when demolition the Work is performed in rooms and areas from which such items have not been removed.
- D. Completion Inspection:
1. Upon 100 percent completion of Project, Contractor will request Substantial Completion Inspection.
 2. Owner will conduct Substantial Completion Inspection in presence of Contractor and furnish list of items to be corrected.
 3. Contractor will notify Owner in writing when items have been corrected.

SECTION 01 7400 CLEANING AND WASTE MANAGEMENT

- A. Disposal Of Waste:

1. Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in landfill or incinerator acceptable to authorities having jurisdiction:
 - a. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - b. Remove and transport debris in manner that will prevent spillage on adjacent surfaces and areas.
 2. Burning: Do not burn waste materials.
 3. Disposal: Transport waste materials off Owner's property and legally dispose of them.
- B. Progress Cleaning:
1. Keep premises broom-clean during progress of the Work.
 2. During handling and installation, protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from soiling, damage, or deterioration until Substantial Completion.
 3. Clean and maintain completed construction as frequently as necessary throughout construction period.
 4. Remove waste materials and rubbish caused by employees, subcontractors, and contractors under separate contract with Owner and dispose of legally.
- C. Final Cleaning:
1. Clean each surface or unit to condition expected in normal, commercial-building cleaning and maintenance program. Comply with manufacturer's instructions. Remove all rubbish from under and about building and leave building clean and habitable.
 2. In addition to general cleaning noted above, perform cleaning for all trades at completion of the Work in areas where construction activities have occurred.
 3. If Contractor fails to clean up, Owner may do so and charge cost to Contractor.

SECTION 01 7700 CLOSEOUT PROCEDURES

- A. General:
1. Closeout process consists of three specific project closeout inspections. Contractor shall plan sufficient time in construction schedule to allow for required inspections before expiration of Contract Time.
 2. Contractor shall conduct his own inspections of The Work and shall not request closeout inspections until The Work of the contract is reasonably complete and correction of obvious defects or omissions are complete or imminent.
 3. Date of Substantial Completion shall not occur until completion of construction work, unless agreed to by Architect / Owner's Representative and included on Certificate of Substantial Completion.
- B. Preliminary Closeout Review:
1. When Architect, Owner and Contractor agree that project is ready for closeout, Pre-Substantial Inspection shall be scheduled. Preparation of floor substrate to receive carpeting and any work which could conceivably damage or stain carpet must be completed, as carpet installation will be scheduled immediately following this inspection.
 2. Prior to this inspection, completed test and evaluation reports for HVAC system and font, where one occurs, are to be provided to Project Manager, Architect, and applicable consultants.
 3. Architect, Owner and Contractor review completion of punch list items. When Owner and Architect confirm that Contractor has achieved Substantial Completion of The Work, Owner, Architect and Contractor will execute Certificate of Substantial Completion that contains:
 - a. Punch list of items requiring completion and correction will be created.
 - b. Time frame for completion of punch list items will be established, and date for Substantial Completion Inspection shall be set.
- C. Substantial Completion Inspection:
1. When Architect, Owner and Contractor agree that project is ready for Substantial Completion, an inspection is held. Punch list created at Pre-Substantial Inspection is to be substantially complete.
 2. Prior to this inspection, Contractor shall discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups and similar elements.
 3. Architect, Owner and Contractor review completion of punch list items. When Owner and Architect confirm that Contractor has achieved Substantial Completion of The Work, Owner, Architect and Contractor will execute Certificate of Substantial Completion that contains:
 - a. Date of Substantial Completion.

- b. Punch List Work not yet completed, including seasonal and long lead items.
 - c. Amount to be withheld for completion of Punch List Work.
 - d. Time period for completion of Punch List Work.
 - e. Amount of liquidated damages set forth in Supplementary Conditions to be assessed if Contractor fails to complete Punch List Work within time set forth in Certificate.
4. Contractor shall present Closeout Submittals to Architect and place tools, spare parts, extra stock, and similar items required by Contract Documents in locations as directed by Facilities Manager.
- D. Final Acceptance Meeting:
1. When punch list items except for any seasonal items or long lead items which will not prohibit occupancy are completed, Final Acceptance Meeting is held.
 2. Owner, Architect and Contractor execute Owner's Project Closeout - Final Acceptance form, and verify:
 - a. All seasonal and long lead items not prohibiting occupancy, if any, are identified, with committed to completion date and amount to be withheld until completion.
 - b. Owner's maintenance personnel have been instructed on all system operation and maintenance as required by the Contract Documents.
 - c. Final cleaning requirements have been completed.
 3. If applicable, once any seasonal and long lead items are completed, Closeout Inspection is held where Owner and Architect verify that The Work has been satisfactorily completed, and Owner, Architect and Contractor execute Closeout portion of the Project Closeout - Final Acceptance form.
 4. When Owner and Architect confirm that The Work is satisfactorily completed, Architect will authorize final payment.

SECTION 01 7800 CLOSEOUT SUBMITTALS

- A. Administrative Requirements:
1. Project Record Documents:
 - a. Do not use record documents for construction purposes:
 - 1) Protect from deterioration and loss in secure, fire-resistive location.
 - 2) Provide access to record documents for reference during normal Working hours.
 - b. Maintain clean, undamaged set of Drawings. Mark set to show actual installation where installation varies from the Work as originally shown. Give particular attention to concealed elements that would be difficult to measure and record at later date:
 - 1) Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
 - 2) Mark new information that is important to Owner, but was not shown on Contract Drawings.
 - 3) Note related Change Order numbers where applicable.
 2. As Built Record Drawings:
 - a. Provide two full-size sets of prints and PDF file of As Built Record Drawings to Facilities Management Office, printed from the updated AutoCAD drawing files or updated Revit model files, as specified by Owner, that have been modified to show actual dimensions and location of equipment, material, utility lines, and other work as actually constructed, based upon information provided by Contractor. Architect will submit updated As Built Record Drawings in PDF (ISO32000 format) to Owner. In addition, Architect will submit to Owner updated AutoCAD as built record drawing files with associated plot style tables or the Revit as built record model files, as specified by Owner.
- B. Operations And Maintenance Manual:
1. General:
 - a. Include closeout submittal documentation as required by Contract Documentation. Include only closeout submittals as defined in individual specification section.
 - b. Submittal Format: Digital copies unless otherwise noted, required for each individual specification section that include 'Closeout Submittals'.
 2. Project Manual:
 - c. Copy of complete Project Manual including Addenda, Modifications as defined in General Conditions, and other interpretations issued during construction:
 - (1) Mark these documents to show variations in actual Work performed in comparison with text of specifications and Modifications.
 - (2) Show substitutions, selection of options, and similar information, particularly on elements that are concealed or cannot otherwise be readily discerned later by direct observation.

3. Maintenance Contracts: (digital format only).
 4. Operations and Maintenance Data (digital format only):
 - a. Operations and maintenance submittals includes cleaning instructions, maintenance instructions, operations instructions, equipment list, and parts lists.
 5. Warranty Documentation: Digital format of final, executed warranties.
 6. Record Documentation:
 - a. Documentation includes Certifications, color and pattern selections, Design Date, Geotechnical Evaluation Reports (soils reports), Manufacture Reports, Literature or cut sheets, Shop Drawings, Source Quality Control, Special Procedures, and Testing and Inspection Reports.
 7. Software: Audio and Video System software, programming and set-files.
 8. Irrigation Plan: Laminated and un-laminated reduced sized hard copies.
 9. Landscape Management Plan (LMP):
 - a. Irrigation Section:
 - (1) Documentation required by Sections under 32 8000 Heading: Irrigation.
 - b. Landscaping Section:
 - (1) Documentation required by Sections under 32 8000 Heading: Irrigation.
- C. Warranties:
1. When written guarantees beyond one (1) year after substantial completion are required by Contract Documents, secure such guarantees and warranties properly addressed and signed in favor of Owner. Include these documents in Operations & Maintenance Manual(s) specified above.
 2. Delivery of guarantees and warranties will not relieve Contractor from obligations assumed under other provisions of Contract Documents.

END OF SECTION

DIVISION 05: METALS

05 0500 COMMON WORK RESULTS OF METALS

05 0503 SHOP-APPLIED METAL COATINGS
05 0523 METAL FASTENING

05 1000 STRUCTURAL METAL FRAMING

05 1223 STRUCTURAL STEEL FOR BUILDINGS

05 5000 METAL FABRICATIONS

05 5215 STAINLESS STEEL HANDRAILS

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SECTION 05 0503**SHOP-APPLIED METAL COATINGS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Quality of factory or shop-applied priming applied to steel supplied to Project without finish coat.
 - 2. Quality of and procedures for field touch-up and repair of factory-applied priming and galvanizing.
- B. Related Requirements:
 - 1. Sections under 09 9000 heading: Finish painting.

1.2 REFERENCES

- A. Reference Standards:
 - 1. ASTM International:
 - a. ASTM A780/A780M-09, 'Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings'.
 - b. ASTM B695-04(2009), 'Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 - 1. Participate in pre-installation conference.
 - 2. In addition to requirements of Section 01 3100, review following:
 - a. Meet with Architect before commencing repair of galvanized surfaces to establish extent of repairs required and, if applicable, choice of methods to be used.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Product data and samples, if requested by Architect.

PART 2 - PRODUCTS**2.1 FINISHES**

- A. Factory And Shop-Applied Primer:
 - 1. Compatible with and of equal or better quality than finish paint system to be applied by Sections under 09 9000 heading.
 - 2. Primer on unexposed, unfinished surfaces may be fabricator's standard shop coat.
- B. Repairs To Primed Surface:
- C. Unless otherwise specified, use primer which matches characteristics of original primer and is compatible with and of equal or better quality than finish paint system to be applied by Sections under 09 9000 heading.

- D. Material For Repairs Of Galvanized Surfaces:
1. Non-Structural, Non-Load-Bearing Items Not Exposed To Weather:
 - a. Zinc-Rich Paints:
 - 1) Zinc-Dust Content: Dried film shall contain 94 percent minimum of zinc-dust by weight.
 - 2) Type One Acceptable Manufacturers:
 - a) Galvax by Alvin Products Inc, Everett, MA www.alvinproducts.com.
 - b) ZRC Galvilite by ZRC Worldwide, Marshfield, MA www.zrcworldwide.com.
 - c) Equal as approved by Architect before bidding. See Section 01 6200.
 2. Structural, Load-Bearing Items And Items Exposed To Weather:
 - a. Zinc-Based Solders, Powder, Or Rod:
 - 1) Zinc-Cadmium solder with liquidus temperature range from 518 to 527 deg F (270 to 275 deg C), or
 - 2) Zinc-Tin-Lead alloy with liquidus temperature range from 446 to 500 deg F (230 to 260 deg C).
 - b. Sprayed Zinc: Wire, ribbon, or powdered zinc suitable for process.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Preparation:
1. General:
 - a. Clean, grind, or otherwise prepare welds in steel that is to be coated within limits acceptable to welder responsible for structural integrity.
 - b. Surfaces to be coated shall be clean, dry and free of oil, grease, and corrosion products.
 2. Preparation Of Primed, Ungalvanized Surfaces:
 - a. Clean welds and grind serious abrasions.
 3. Preparation Of Galvanized Surfaces:
 - a. Follow requirements of ASTM A780/A780M and following:
 - b. For Repair Using Zinc-Rich Paints:
 - 1) Blast clean surfaces to near-white metal, in accordance with SSPC-SP10 (1 to 2 mil anchor pattern), as minimum.
 - 2) Where circumstances do not allow blast cleaning, power disk sand to bright metal finish.
 - 3) Extend surface preparation into undamaged galvanized area.
 - 4) Remove flux residue and weld spatter from welded areas.
 - c. For Repair Using Zinc-Based Alloys:
 - 1) Clean surface to be reconditioned using wire brush, light grinding action, or mild blasting.
 - 2) Extend surface preparation into surrounding, undamaged galvanized areas.
 - 3) Remove flux residue and weld spatter from welded areas.
 - 4) Preheat cleaned area to at least 600 deg F (316 deg C).
 - a) Do not overheat surface beyond 750 deg F (400 deg C) or allow surrounding galvanized coatings to be burned.
 - b) Wire brush surface during preheating.
 - d. For Repair Using Sprayed Zinc (Metallizing):
 - 1) Blast clean surfaces to near-white metal, in accordance with SSPC-SP5 as minimum.
 - 2) Extend surface preparation into undamaged galvanized area.
 - 3) Remove flux residue and weld spatter from welded areas.

3.2 REPAIR / RESTORATION

- A. Repairs To Primed, Ungalvanized Surfaces:
1. Thoroughly clean metal and give one (1) prime coat of specified material, well-worked into metal joints and open spaces. Match existing primed finish as required.
 - a. Do not apply primer at temperatures below 45 deg F (7 deg C).

- b. Protect un-primed machine-finished surfaces against corrosion by priming.
- B. Repairs To Galvanized Surfaces:
- 1. Non-Structural, Non-Load-Bearing Items Not Exposed To Weather:
 - a. Repair Using Zinc-Rich Paints: Spray- or brush-apply zinc-rich paint to prepared area. Apply paint in single application employing multiple spray passes to achieve dry film thickness of 2 mils.
 - 2. Structural, Load-Bearing Items And Items Exposed To Weather:
 - a. Repair Using Zinc-Based Alloys:
 - 1) Rub cleaned, pre-heated areas with repair stick to deposit evenly distributed layer of zinc alloy. If powdered zinc alloys are used, sprinkle powder on surface and spread out with spatula or similar tool.
 - 2) Remove flux residue by rinsing with water or wiping with damp cloth.
 - b. Repair Using Sprayed Zinc (Metallizing): Apply 2 mil minimum coating by means of metal-spraying pistols fed with either zinc wire or zinc powder in accordance with requirements of ASTM B695, Type I.
 - 3. All Items:
 - a. Apply repair materials immediately after surface preparation is complete.
 - b. Take thickness measurements, with either magnetic or electromagnetic gauge, to ensure applied coating is as specified or agreed to.

END OF SECTION

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SECTION 05 0523**METAL FASTENING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Quality of structural metal-to-metal, wood-to-metal, and wood-to-wood bolts used on Project.
 - 2. Requirements and standards for site welded metal-to-metal connections.
- B. Related Requirements:
 - 1. Section 03 1511: Cast-in-place and drilled-in anchor bolts.
 - 2. Furnishing and installing of structural bolts specified under Section concerned.
 - 3. Performance of welding specified under Section concerned.

1.2 REFERENCES

- A. Reference Standards:
 - 1. American National Standards Institute / American Welding Society:
 - a. ANSI/AWS D1.1/D1.1M:2010, 'Structural Welding Code - Steel'.
 - b. ANSI/AWS D1.3/D1.3M:2010, 'Structural Welding Code - Sheet Steel'.
 - 2. ASTM International:
 - a. ASTM A36/A36M-08, 'Standard Specification for Carbon Structural Steel'.
 - b. ASTM A307-10, 'Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength'.
 - c. ASTM A325-10, 'Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength'.

1.3 QUALITY ASSURANCE

- A. Qualifications: Requirements of Section 01 4301 applies, but not limited to the following:
 - 1. Welders shall be certified 30 days minimum before beginning work on Project. If there is doubt as to proficiency of welder, Architect may require welder to take another test, at no expense to Owner. Certification shall be by Pittsburgh Laboratories or other authority approved by Architect.
- B. Certifications:
 - 1. Maintain welder's certifications on job-site.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Materials:
 - 1. Bolts And Threaded Fasteners:
 - a. Bolts: Conform to requirements of ASTM A307, Grade A.

2.2 ACCESSORIES

- A. Arc-Welding Electrodes: Type E70XX AWS Iron and Steel Arc-welding electrodes and meeting current AISC Specifications.

PART 3 - EXECUTION

3.1 PERFORMANCE

- A. Welding shall meet requirements of ANSI / AWS D1.1 and D1.3.
- B. Minimum weld sizes, unless detailed otherwise.
 - 1. Weld pipe columns to base plates and top plates with 1/4 inch (6 mm) fillet weld all around.
 - 2. Weld glu-lam connection side plates to base plates with 1/4 inch (6 mm) fillet weld all along outside edges.
 - 3. Weld stiffeners to pipe columns with 1/4 inch (6 mm) fillet weld all around.

END OF SECTION

SECTION 05 1223**STRUCTURAL STEEL FOR BUILDINGS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Miscellaneous structural steel.
- B. Related Requirements:
 - 1. Section 06 1100: Installation of miscellaneous structural steel.

1.2 REFERENCES

- A. Reference Standards:
 - 1. American Society For Testing And Materials:
 - a. ASTM A36/A36M-08, 'Standard Specification for Carbon Structural Steel'.
 - b. ASTM A53/A53M-12, 'Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless'.
 - c. ASTM A500/A500M-10a, 'Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes'.

PART 2 - PRODUCTS**2.1 COMPONENTS**

- A. Materials:
 - 1. Miscellaneous Steel:
 - a. Meet requirements of ASTM A36/A36M for the following:
 - 1) Miscellaneous structural steel.
- B. Fabrication:
 - 1. Shop prime steel provided under this Section.
- C. Finishes:
 - 1. Shop Primer:
 - a. Concealed Steel: Fabricator's standard shop coat.
 - b. Exposed Steel To Receive Finish: Primer shall be acceptable to Finish Manufacturer.

PART 3 - EXECUTION: Not Used**END OF SECTION**

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SECTION 05 5215**STAINLESS STEEL HANDRAILS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install stainless steel handrails as described in Contract Documents:
 - a. Rostrum Riser Handrail.
- B. Products Furnished But Not Installed Under This Section:
 - 1. Anchoring sleeves in concrete for stainless steel pipe handrails.
- C. Related Requirements:
 - 1. Section 05 0523: 'Metal Fastening' for quality of welding.
 - 2. Section 06 1100: 'Wood Framing' for blocking for pipe handrail brackets.
 - 3. Section 06 4115: 'Rostrum Casework' for wood handrail attached to Rostrum Riser Handrail.
- D. Products Not Furnished And Not Installed Under This Section:
 - 1. Rostrum Riser Handrail pipe sleeves, base plates and anchor bolts.
- E. Related Requirements:
 - 1. Section 03 1511: 'Concrete Anchors And Bolts' for Rostrum Riser Handrail base plate expansion bolts as shown on Contract Drawings.
 - 2. Section 05 1200: 'Structural Steel Framing' for Rostrum Riser Handrail stainless posts to be set into metal pipe sleeves as shown on Contract Drawings.

1.2 REFERENCES

- A. Definitions:
 - 1. Non-magnetic Stainless Steel: Austenitic grade of stainless steel with low magnetic permeabilities and shows almost no response to a magnet when in annealed condition.
 - 2. Non-shrink Grout: Structural grout used for filling voids between elements that is formulated with cement, fine aggregates and admixtures. Admixtures are used to provide expansive properties of the material during curing. This expansion counteracts the natural tendency of cement grouts to shrink during curing.
 - 3. Peened: Nonslip textured gripping surface that is much easier to hold on to.
 - 4. Stainless Steel: Stainless steels are alloys of iron to which at least 10 percent chromium has been added to increase corrosion resistance and will not rust when exposed to weather. To obtain greater corrosion resistance, more nickel and chromium are added to the alloy. Along with iron and chromium, all stainless steels contain some carbon to make it stronger.
 - a. Austenitic Stainless Steel: Most popular of the stainless steels because of their ductility, ease of working and good corrosion resistance.
 - b. Stainless Steel Alloys:
 - 1) Type 304 (UNS S30400): Austenitic stainless steel with non-magnetic properties in annealed condition that provide good corrosion resistance to both chemical and atmospheric exposures, with high resistance to oxidations. Most common and widely used stainless steel.
- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM C1107/C1107M-13, 'Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)'.

1.3 SUBMITTALS

- A. Action Submittals:
1. Shop Drawings: Show fabrication and installation of handrails and railings including floor plans, elevations, sections, details of components, and attachments to other elements of The Work.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

- A. Materials:
1. Pipe Sleeves: 2 inch (50 mm) diameter by 6 to 9 inch (150 to 225 mm) long non-magnetic stainless steel.
 2. Rostrum Riser Handrail (floor mounted).
 - a. Stainless steel bar.
 - b. Stainless steel mounting plate for hardwood handrail.
 - c. Sizes and configurations as indicated on Contract Drawings.
- B. Fabrication:
1. Preassemble railing systems in shop to greatest extent possible to minimize field splicing and assembly.
 2. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
 3. Grind smooth welded joints and buff welds to same appearance as remainder of railing.
 4. Form curves by bending pipe in jigs to produce uniform curvature for each configuration required. Maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.
 5. Return pipe ends of wall mounted handrails into wall.
 6. Welded Connections:
 - a. Fabricate railing system and handrail connections by welding.
 - b. Weld corners and seams continuously to comply with following:
 - 1) Use materials and methods that minimize distortion and develop of metals.
 - 2) At tee and cross intersections, notch ends of intersecting members to fit contour of pipe to which end is joined and weld all around.
 - 3) At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and so contours of welded surfaces match adjacent surfaces.

2.2 ACCESSORIES

- A. Rail Setting Grout:
1. Commercial non-shrink grout conforming to requirements of ASTM C1107, Type B or Type C.
 2. Type Two Acceptable Manufacturers:
 - a. Normal Construction Grout A by Bonsal American, Charlotte, NC www.bonsal.com.
 - b. Advantage 1107 Grout by Dayton Superior Specialty Chemicals, Kansas City, KS www.daytonsuperiorchemical.com.
 - c. NS Grout by Euclid Chemical Co, Cleveland, OH www.euclidchemical.com
 - d. 5 Star Special Grout 110 by Five Star Products Inc, Fairfield, CT www.fivestarprouducts.com.
 - e. Duragrout by L&M Construction Chemicals Inc, Omaha, NE www.lmcc.com.
 - f. Sonneborn / BASF Building Systems, Shakopee, MN www.chemrex.com.
 - g. Tamms Grout 621 by TAMMS Industries, Mentor, OH www.tamms.com.
 - h. U S Spec MP Grout by U S Mix Products Co, Denver, CO www.usspec.com.
 - i. CG-86 Grout by W R Meadows, Hampshire, IL www.wrmeadows.com.
 - j. Equal as approved by Architect before use. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Touch up field welds to match finished material.

END OF SECTION

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DIVISION 06: WOOD, PLASTICS, AND COMPOSITES

06 1000 ROUGH CARPENTRY

06 1011 WOOD FASTENINGS
06 1100 WOOD FRAMING
06 1636 WOOD PANEL PRODUCT SHEATHING

06 2000 FINISH CARPENTRY

06 2001 COMMON FINISH CARPENTRY REQUIREMENTS
06 2210 MISCELLANEOUS WOOD TRIM
06 2710 SHELVING

06 4000 ARCHITECTURAL WOODWORK

06 4001 COMMON ARCHITECTURAL WOODWORK REQUIREMENTS
06 4005 PLASTIC LAMINATE
06 4114 WOOD-VENEER-FACED ARCHITECTURAL CABINETS
06 4115 ROSTRUM CASEWORK
06 4512 ARCHITECTURAL WOODWORK WOOD TRIM

END OF TABLE OF CONTENTS

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SECTION 06 1011**WOOD FASTENINGS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Quality of wood fastening methods and materials used for Rough Carpentry unless specified otherwise.
- B. Related Requirements:
 - 1. Section 03 1511: Quality of Anchors and Inserts.
 - 2. Section 05 0523: Quality of bolts used for Rough Carpentry.
 - 3. Furnishing and installing of other fasteners are specified in individual Sections where installed.

1.2 REFERENCES

- A. Reference Standards;
 - 1. APA-The Engineered Wood Association:
 - a. APA AFG-01: Adhesives for Field-Gluing Plywood to Wood Framing (September 1974).
 - 2. ASTM International:
 - a. ASTM A153/A153M-09, 'Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware'.
 - b. ASTM D3498-03(2011), 'Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems'.
 - c. ASTM F1667-11a, 'Standard Specification for Driven Fasteners: Nails, Spikes, and Staples'.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's literature on framing anchors and powder actuated fasteners.
 - 2. Shop Drawings:
 - a. Submit diameter and lengths of fasteners proposed for use on Project. If length or diameter of proposed fasteners differ from specified fasteners, also include technical and engineering data for proposed fasteners including, but not limited to:
 - 1) Adjusted fastener spacing where using proposed fasteners and,
 - 2) Adjusted number of fasteners necessary to provide connection capacity equivalent to specified fasteners.
 - b. Submit on powder-actuated fasteners other than those specified in Contract Documents showing design criteria equivalents at each application.
 - c. Show type, quantity, and installation location of framing anchors. Where necessary, reference Drawing details, etc, for installation locations.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Description:
 - 1. Nail Terminology:

- a. When following nail terms are used in relation to this Project, following lengths and diameters will be understood. Refer to nails of other dimensions by actual length and diameter, not by one of listed terms:

Nail Term	Length	Diameter
8d Box	2-1/2 inches	0.113 inch
8d Common	2-1/2 inches	0.131 inch
10d Box	3 inches	0.128 inch
10d Common	3 inches	0.148 inch
16d Box	3-1/2 inches	0.135 inch
16d Sinker	3-1/4 inches	0.148 inch
16d Common	3-1/2 inches	0.162 inch

B. Materials:

1. Fasteners:

a. General:

- 1) Fasteners for preservative treated and fire-retardant-treated wood shall be of hot dipped zinc-coated galvanized steel, stainless steel, silicon bronzed, or copper. Coating weights for zinc-coated fasteners shall be in accordance with ASTM A153/A153M.

b. Nails:

- 1) Meet requirements of ASTM F1667.
 2) Unless noted otherwise, nails listed on Drawings or in Specifications shall be common nail diameter, except 16d nails, which shall be box diameter.

c. Wood Screws:

1) SDS Screws:

- a) Category Four Approved Products. See Section 01 6200 for definitions of categories.

(1) SDS Screws by Simpson Strong Tie Co, Dublin, CA www.strongtie.com.

- 2) All Other: Standard type and make for job requirements.

d. Powder-Actuated Fasteners:

- 1) Type One Quality Standard: Hilti X-DNI 62P8.

2) Manufacturers:

- a) Hilti, Tulsa, OK www.us.hilti.com.

- b) Redhead Division of ITW, Wood Dale, IL www.itw-redhead.com and Markham, ON www.itwconstruction.ca.

- c) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6200.

2. Adhesives:

a. Construction Mastics:

- 1) Meet requirements of 'APA-The Engineered Wood Association' Specification AFG-01 or ASTM D3498.

- 2) Use phenol-resorcinol type for use on pressure treated wood products.

3. Framing Anchors:

- a. Framing anchors and associated fasteners in contact with preservative hot dipped zinc-coated galvanized steel or stainless steel. Do not use stainless steel items with galvanized items.

b. Type Two Acceptable Products:

- 1) KC Metals Inc, San Jose, CA www.kcmetals.com.

- 2) Simpson Strong Tie Co, Dublin, CA www.strongtie.com.

- 3) United Steel Products Co Inc (USP), Montgomery, MN www.uspconnectors.com.

- 4) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 ERECTION

- A. Secure one Manufacturer approved fastener in each hole of framing anchor that bears on framing member unless approved otherwise in writing by Architect.
- B. Provide washers with bolt heads and with nuts bearing on wood.

END OF SECTION

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SECTION 06 1100**WOOD FRAMING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install wood framing and blocking as described in Contract Documents.
- B. Products Installed But Not Furnished Under This Section:
 - 1. Miscellaneous structural steel elements.
- C. Related Requirements:
 - 1. Section 05 1223: Furnishing of miscellaneous structural steel.
 - 2. Sections under 06 4000 Heading: 'Architectural Woodwork' for wall blocking requirements.

1.2 REFERENCES

- A. Reference Standards:
 - 1. National Institute of Standards and Technology (NIST), Technology Administration, U. S. Department of Commerce:
 - a. Voluntary Product Standard DOC PS 20-05, 'American Softwood Lumber Standard'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 - 1. Participate in pre-installation conference held jointly with Section 06 1636.
 - a. Schedule pre-installation conference immediately before beginning framing work.
 - b. In addition to agenda items specified in Section 01 3100, review following:
 - 1) Rough opening.
 - 2) Nails and nailing requirements.
 - 3) Connections.
 - 2. Participate in pre-installation conference held jointly with Section 08 4113.
 - a. Schedule pre-installation conference for one (1) week before scheduled installation of storefront system.
 - b. In addition to agenda items specified in Section 01 3100, review following:
 - 1) Rough opening requirements.

1.4 SUBMITTALS

- A. Informational Submittals:
 - 1. Test And Evaluation Reports:
 - a. Technical and engineering data on nails to be set by nailing guns for Architect's approval of types proposed to be used as equivalents to specified hand set nails and adjusted number and spacing of pneumatically-driven nails to provide equivalent connection capacity.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Protect lumber and sheathing and keep under cover in transit and at job site.
 - 2. Do not deliver material unduly long before it is required.

- B. Storage And Handling Requirements:
 - 1. Store lumber and sheathing on level racks and keep free of ground to avoid warping.
 - 2. Stack to insure proper ventilation and drainage.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Dimension Lumber:
 - 1. Design Criteria:
 - a. Meet requirements of PS 20 and National Grading Rules for softwood dimension lumber.
 - b. Bear grade stamp of WWPA, SPIB, or other association recognized by American Lumber Standards Committee identifying species of lumber by grade mark or by Certificate of Inspection.
 - c. Lumber **2 inches (50 mm)** or less in nominal thickness shall not exceed 19 percent in moisture content at time of fabrication and installation and be stamped 'S-DRY', 'K-D', or 'MC15'.
 - d. Lumber shall be S4S.
 - e. Preservative Treated Plates / Sills:
 - 1) **2x4 (38 mm by 64 mm)**: Standard and better Douglas Fir, Southern Pine, or HemFir, or StrandGuard by iLevel by Weyerhaeuser Boise, ID www.ilevel.com. (LSL 1.3 E)
 - 2) **2x6 (38 mm by 140 mm)** And Wider: No. 2 or or MSR 1650f - 1.5e Douglas Fir, Southern Pine, HemFir, or StrandGuard by iLevel by Weyerhaeuser, Boise, ID www.ilevel.com. (LSL 1.3 E).
- B. Lumber Ledgers:
 - 1. Design Criteria:
 - a. No. 2 Douglas Fir-Larch, or Southern Pine.
- C. See drawings for additional requirements.

2.2 ACCESSORIES

- A. Blocking:
 - 1. Sound lumber without splits, warps, wane, loose knots, or knots larger than **1/2 inch (13 mm)**.
- B. Furring Strips:
 - 1. Utility or better.
- C. Sill Sealer:
 - 1. Closed-cell polyethylene foam, **1/4 inch (6 mm)** thick by width of plate.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Use preservative treated wood for wood members in contact with concrete or masonry, including wall, sill, and ledger plates, door and window subframes and bucks, etc.
- B. Interface With Other Work:
 - 1. Coordinate with other Sections for location of blocking required for installation of equipment and building specialties. Do not allow installation of gypsum board until required blocking is in place.

2. Where manufactured items are to be installed in framing, provide rough openings of dimensions within tolerances required by manufacturers of such items. Confirm dimensions where not shown on Contract Drawings.
- C. Tolerances:
1. Walls:
 - a. 1/4 inch (6 mm) in 20 feet (6 meters), non-cumulative in length of wall.
 - b. 1/8 inch (3 mm) in 10 feet (3 meters) with 1/4 inch (6 mm) maximum in height of wall.
 - c. Distances between parallel walls shall be 1/4 inch (6 mm) maximum along length and height of wall.
- D. Floors:
1. Place with crown side up.
 2. Provide accurately fitted header and trimmer joists of same size as regular joists around floor openings, unless detailed otherwise, and support by steel joist hangers.
 3. Double joists under partitions that parallel run of joists.
- E. Walls:
1. Openings: Single, bearing stud supporting header and one adjacent (king) stud continuous between top and bottom plates, unless shown otherwise.
 2. Corners And Partition Intersections: Triple studs.
 3. Top Plates In Bearing Partitions: Doubled or tripled and lapped. Stagger joints at least 48 inches (1 200 mm).
 4. Firestops:
 - a. Horizontal or vertical concealed spaces in walls, light coves, soffits, drop ceilings, and other features over 10 feet (3 000 mm) in length or height, and at stairs, ceiling levels, floor levels, and other junctures of horizontal to vertical concealed spaces.
 - b. Within concealed spaces of exterior wall finishes and exterior architectural elements, such as trims, cornices or projections, at maximum intervals of 20 feet (6 000 mm), length or height.
 5. Sill Plates:
 - a. Shear Walls And Bearing Walls:
 - 1) Provide specified anchor 12 inches (300 mm) maximum and 4 inches (100 mm) minimum from each end of each plate.
 - 2) Shear Walls: Fasten with anchor bolts embedded in concrete or with screw anchors.
 - 3) Bearing Walls: Fasten with anchor bolts embedded in concrete, or with screw anchors or expansion bolts in drilled holes.
 - b. Non-Structural Walls: Fasten with powder actuated fasteners.
 - c. In addition to requirements of paragraphs 'a' and 'b' above, set sill plates of interior walls measuring less than 36 inches (900 mm) in length in solid bed of specified construction adhesive, except where sill sealer is used.
 - d. Install specified seal sealer under sill plates of exterior walls of main building and of acoustically insulated interior walls.
 6. Nailing:
 - a. Stud to plate:

2 by 4 inch nominal	End nail, two 16d OR toe nail, four 8d
2 by 6 inch nominal	End nail, three 16d OR toe nail, four 8d
 - b. Top plates: Spiked together, 16d, 16 inches (400 mm) on center.
 - c. Top plates: Laps, lap members 48 inches (1200 mm) minimum and nail with 16d nails 4 inches (100 mm) on center
 - d. Top plates: Intersections, three 16d.
 - e. Backing And Blocking: Three 8d, each end.
 - f. Corner studs and angles: 16d, 16 inches (400 mm) on center.
- F. Accessory / Equipment Mounting And Gypsum Board Back Blocking (nailers):
1. Furnish and install blocking in wood framing required for hardware, specialties, equipment, accessories, and mechanical and electrical items, etc.
- G. Furring Strips

1. On Wood or Steel: Nail or screw as required to secure firmly.
2. On Concrete or Masonry:
 - a. Back up furring strips on exterior walls or walls in contact with earth with 15 lb (6.8 kg) felt strip.
 - b. Nail at 12 inches (300 mm) on center maximum.

END OF SECTION

SECTION 06 1636**WOOD PANEL PRODUCT SHEATHING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install wood panel product sheathing required for floors as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
 - 2. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
 - 3. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
 - 4. Section 01 6200: Administrative and procedural requirements for product options.
 - 5. Section 06 1100: 'Wood Framing':
 - a. Pre-installation conference held jointly with Section 06 1636.

1.2 REFERENCES

- A. Association Publications:
 - 1. Council of American Structural Engineers. CASE Form 101: *Statement of Special Inspections*. Washington, DC: CASE, 2001. (c/o American Council of Engineering Companies, 1015 15th St., NW, Washington, DC 20005; 202-347-7474; www.acec.org).
- B. Definitions:
 - 1. Field Quality Control: Testing, Inspections, Special Testing and Special Inspections to assure compliance to Contract Documents.
 - 2. Inspection/Special Inspection: Inspection of materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and referenced standards:
 - a. Inspection: Not required by code provisions but may be required by Contract Documents.
 - b. Special Inspection: Required by code provisions and by Contract Documents.
 - c. Inspection-Continuous: Full-time observation of the Work requiring inspection by approved inspector who is present in area where the Work is being performed.
 - d. Inspection-Periodic: Part-time or intermittent observation of the Work requiring inspection by approved inspector who is present in area where the Work has been or is being performed and at completion of the Work.
 - 3. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform particular construction operation, including installation, erection, application, and similar operations.
 - 4. Observation: Visual observation of building / site elements or structural system by registered design professional for general conformance to approved construction documents at significant construction stages and at completion. Observation does not include or waive responsibility for performing inspections or special inspections.
 - 5. Owner's Representative: Owner's Designated Representative (Project Manager or Facilities Manager) who will have express authority to bind Owner with respect to all matters requiring Owner's approval or authorization.
 - 6. Product Testing: Tests and inspections that are performed by testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.

7. Quality Assurance: Testing, Inspections, Special Testing and Special Inspections provided for by Owner.
 8. Quality Control: Testing, Inspections, Special Testing and Special Inspections provided for by Contractor.
 9. Special Inspection: See Inspection.
 10. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
 11. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.
- C. Reference Standards:
1. National Institute of Standards and Technology (NIST), Technology Administration, U. S. Department of Commerce:
 - a. Voluntary Product Standard DOC PS 1-07. 'Structural Plywood'.
 - b. Voluntary Product Standard DOC PS 2-04, 'Performance Standard for Wood-based Structural-Use Panels'.
 2. International Code Council (IBC) (2012):
 - a. IBC Chapter 17, 'Special Inspections And Tests'.
 - 1) Section 1704, 'Special Inspections, Contractor Responsibility And Structural Observations'.
 - 2) Section 1705, 'Required Verification And Inspection'.
 - a) Section 1705.5, 'Wood Construction'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
1. Participate in pre-installation conference as specified in Section 06 1100.
 2. In addition to agenda items specified in Section 01 3100 and Section 06 1100, review following:

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
1. Do not deliver material unduly long before it is required.
 2. Protect sheathing and keep under cover in transit and at job site.
- B. Storage And Handling Requirements:
1. Store sheathing on level racks and keep free of ground.
 2. Stack to insure proper ventilation and drainage.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Performance:
1. Design Criteria:
 - a. Meet requirements of PS 1, PS 2, PRP-108 (APA), or PRP-133 (TECO). Except where plywood is specifically indicated on Drawings, oriented strand board (OSB) is acceptable.
- B. Materials:
1. Sheathing:
 - a. Sheathing shall bear grade stamp from American Plywood Association (APA) or equal grading organization.
 - b. Sheathing shall not exceed 18 percent moisture content when fabricated or more than 19 percent when installed in Project.
 - c. Sheathing **23/32 inch (18.3 mm)** thick and thicker used for single-layer subflooring shall be tongue and groove.

- d. Sheathing used for same purpose shall be of same thickness. In all cases, thickness specified is minimum required regardless of span rating.
- e. Minimum span ratings for given thicknesses shall be as follows:

Thickness		Span Rating
3/8 inch	9.5 mm	24 / 0
7/16 inch nominal	11 mm nominal	24 / 16
15/32 inch actual	11.9 mm actual	32 / 16
1/2 inch nominal	12.5 mm nominal	32 / 16
19/32 inch actual	15.1 mm actual	40 / 20
5/8 inch nominal	15.9 mm nominal	40 / 20
23/32 inch actual	18.3 mm actual	48 / 24
3/4 inch nominal	19 mm nominal	48 / 24

2.2 ACCESSORIES

- A. Nails:
 - 1. As indicated on Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Top of nail heads shall be flush with sheathing surface.
 - 2. Use of edge clips to provide spacing between sheathing panels is acceptable.
- B. Floor Sheathing:
 - 1. Floor Sheathing: 1 Layer Subflooring.
 - a. Apply bead of glue to structural supports. Lay face grain / strength axis across supports and with panel continuous over two supports minimum.
 - b. Allow expansion gap of at least 1/2 inch (12.5 mm) at walls.
 - c. Tongue and Groove.
 - d. Nail Spacing.
 - 1) As indicated on Drawings.
 - e. Thickness:
 - 1) As indicated on Drawings.
 - f. Do not install any piece of bottom layer floor sheathing with shortest dimension of less than 24 inches (600 mm).
 - 2. Subflooring: 2 Layers Subflooring.
 - a. Bottom layer:
 - 1) Glue subflooring layers together along lines of structural supports.
 - 2) Leave 1/32 inch (1 mm) gap at side and end joints.
 - 3) Nail as per floor sheathing nailing requirements.
 - 4) Thickness:
 - a) 19/32 inch actual (15 mm) minimum thickness, except where specifically noted otherwise.
 - 5) Do not install any piece of single layer floor sheathing with shortest dimension of less than 24 inches (600 mm).
 - b. Top layer:
 - 1) Stagger joints of second layer subflooring so they do not line up with joints of first layer subflooring, but do align with intermediate structural member (for example, align with field nailing of bottom subflooring layer).
 - 2) Glue subflooring layers together along lines of structural supports.
 - 3) Leave 1/32 inch (1 mm) gap at side and end joints.
 - 4) Nail at 6 inch (150 mm) centers on ends and 12 inch (300 mm) centers on intermediate structural members.

- 5) Thickness:
 - a) 19/32 inch actual (15 mm) minimum thickness, except where specifically noted otherwise.
- 6) Do not install any piece of single layer floor sheathing with shortest dimension of less than 24 inches (600 mm).

3.2 PROTECTION

- A. Protect roof sheathing from moisture until roofing is installed.

END OF SECTION

SECTION 06 2001**COMMON FINISH CARPENTRY REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install sealants required for items installed under this Section, as described in Contract Documents.
 - 2. Furnish and install following items as described in Contract Documents:
- B. Products Installed But Not Furnished Under This Section:
 - 1. Architectural Woodwork.
 - 2. Rostrum Casework
 - 3. Hardwood Base.
 - 4. Miscellaneous Wood Trim.
 - 5. Wood Handrails.
- C. Related Requirements:
 - 1. Section 06 1100: 'Wood Framing' for furring and blocking.
 - 2. Section 06 2210: 'Miscellaneous Wood Trim'.
 - a. Wood Trim.
 - 3. Sections under 06 4000 Heading: Furnishing of Architectural Woodwork.
 - a. Section 06 4001: 'Common Architectural Woodwork Requirements':
 - 1) Quality of wood materials to be used in Finish Carpentry.
 - b. Section 06 4115: 'Rostrum Casework'.
 - c. Section 06 4512: 'Architectural Woodwork Wood Trim'.
 - 4. Section 07 9213: 'Elastomeric Joint Sealants' for quality of sealants, submittal and installation requirements.
 - 5. Sections under 09 9000 heading: Back priming of work to be installed against concrete or masonry or subjected to moisture, and finishing of finish carpentry and architectural woodwork.

1.2 REFERENCES

- A. Association Publications:
 - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
 - a. Architectural Woodwork Standards (AWS), 1st Edition, 2009'.
- B. Definitions:
 - 1. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
 - a. Economy Grade: The lowest acceptable grade in both material and workmanship requirements, and is for work where price outweighs quality considerations.
 - b. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
 - c. Premium Grade: The highest Grade available in both material and workmanship where the highest level of quality, materials, workmanship, and installation is required.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturers:

1. Manufacturer Contact List:
 - a. Blum Inc, Stanley, NC www.blum.com.
 - b. Bommer Industries, Landrum, SC www.bommer.com.
 - c. CompX National, Mauldin, SC www.nclnet.com.
 - d. Dow Chemical, Midland, MI www.dow.com.
 - e. Flynn & Enslow, San Francisco, CA www.flynnenslow.com.
 - f. Grass America Inc, Kernersville, NC www.grassusa.com.
 - g. Hafele America Co., Archdale, NC hafele.com.
 - h. Hillside Wire Cloth Co., Inc., Bloomfield, NJ www.hillsidewirecloth.com.
 - i. Ives, Indianapolis, IN www.iveshardware.com.
 - j. Knap & Vogt, Grand Rapids, MI www.knapandvogt.com or Knap & Vogt Canada, Mississauga, ON (905) 676-8972.
 - k. Olympus Lock Co, Seattle, WA www.olympus-lock.com.
 - l. Owens Corning, Toledo, OH www.owens-corning.com.
 - m. Salice America Inc, Charlotte, NC www.saliceamerica.com.
 - n. SOSS Door Hardware (Division of Universal Industrial Products Company) Pioneer OH www.soss.com.
 - o. Stanley, New Britain, CT www.stanleyhardware.com or Oakville, ON (800) 441-1759.
 - p. TWP Inc., Berkley, CA www.twpinc.com.
 - q. Wire Cloth Manufacturers Inc., Mine Hill, NJ www.wireclothman.com.

- B. Glue: Waterproof and of best quality.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:

1. Verify walls, ceilings, floors, and openings are plumb, straight, in-line, and square before installing Architectural Woodwork.
2. Report conditions that are not in compliance to Architect before starting installation.

3.2 PREPARATION

A. Surface Preparation:

1. Install Architectural Woodwork after wall and ceiling painting is completed in areas where Architectural Woodwork is to be installed.

B. Items Installed But Not Furnished Under This Section: Install in accordance with requirements specified in Section furnishing item.

1. Vertical Wheelchair Lift.

3.3 INSTALLATION

A. Special Techniques:

1. AWS Custom Grade is minimum acceptable standard, except where explicitly specified otherwise, for installation of architectural woodwork.

B. General Architectural Woodwork Installation:

1. Fabricate work in accordance with measurements taken on Project site.
 2. Scribe, miter, and join accurately and neatly to conform to details.
 3. Exposed surfaces shall be machine sanded, ready for finishing.
 4. Allow for free movement of panels.
 5. Countersink nails. Countersink screws and plug those exposed to view.
 6. Attach custom casework as specified in Sections under 06 4000 Heading: 'Furnishing of Architectural Woodwork' to wall blocking with #10 x 3 inch (76 mm) minimum Cabinet Screws. Attach wall cabinets with screws equally spaced horizontally not to exceed 12 inches (305 mm) O.C. with 3 inch (76 mm) maximum spacing at cabinet edges.
- C. Items Installed But Not Furnished Under This Section: Install in accordance with requirements specified in Section furnishing item.
1. Vertical Wheelchair Lift.

END OF SECTION

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SECTION 06 2210**MISCELLANEOUS WOOD TRIM****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install wood trim not specified elsewhere as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 06 1100: 'Wood Framing' for wall blocking required for Wood Trim.
 - 2. Section 06 2001: 'Common Finish Carpentry Requirements':
 - a. Installation of Wood Trim.
 - 3. Section 06 4001: 'Common Architectural Woodwork Requirements':
 - a. Approved Fabricators.
 - b. General standards for materials and fabrication of Architectural Woodwork.
 - 4. Section 06 4512: 'Architectural Woodwork Wood Trim'.
 - 5. Section 09 9324: 'Interior Clear-Finished Hardwood'.

1.2 REFERENCES

- A. Association Publications:
 - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
 - a. Architectural Woodwork Standards (AWS), 1st Edition, 2009.
- B. Definitions:
 - 1. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
 - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
 - 2. Plain-Sawn: A hardwood figure developed by sawing a log lengthwise at a tangent to the annual growth rings. It appears as U-shaped or straight markings in the board's face.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Samples:
 - a. Interior Hardwood for Transparent Finish:
 - 1) Before performing work of this Section, prepare Control Sample, to match sample available from Owner, to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.
 - 2) Design Criteria:
 - a) Provide **8 inch by 10 inch (200 mm by 255 mm)** sample of Red Oak to match Owner provided stain color selected for Project.
 - b) Control Sample will be used as performance standard for evaluating finish provided.
- B. Informational Submittals:
 - 1. Source Quality Control Submittals:
 - a. Samples:
 - 1) Interior Hardwood for Transparent Finish:

- a) Owner will provide Control Sample for finish.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Design Criteria:
 - 1. General:
 - a. Meet requirements of Section 06 4001 for general standards for materials and fabrication of Architectural Woodwork.
 - 2. Clear Finished Hardwood:
 - a. Match materials specified in Section 06 4512.
 - b. Match finish specified in Section 06 4512
 - 3. Opaque Finished Hardwood: Hardwood allowed by AWS Custom Grade.
 - 4. Opaque Finished Softwood: Solid stock Pine, C or better, S4S.
 - 5. Opaque Finished Paneling: Paneling allowed by AWS Custom Grade.

2.2 SOURCE QUALITY CONTROL

- A. Inspections:
 - 1. Clear Finished Hardwood:
 - a. Color matches Owner provided sample specified in Section 09 9324.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 06 2710**SHELVING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install adjustable shelving not part of casework, including mounting hardware, as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 06 4001: 'Common Architectural Woodwork Requirements'.

1.2 REFERENCES

- A. Association Publications:
 - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
 - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.

PART 2 - PRODUCTS**2.1 MATERIALS**

- A. Shelves:
 - 1. Design Criteria:
 - a. Conform to applicable requirements of Sections 06 4001.
 - b. Fabricate the work of this section to AWS 'Custom Grade'.
 - c. Species as acceptable for AWS 'Custom Grade'.
 - 2. Material:
 - a. Panel Product:
 - 1) Glues (adhesives) used in manufacture and fabrication of panel products shall be Type I or II.
 - 2) Moisture content shall be same as specified for lumber.
 - 3) Cores:
 - a) All Other: Industrial grade particle board with minimum density of **45 lbs per cu ft (721 kg per cu meter)**.
 - 4) Facings:
 - a) All facings shall be Melamine or Kortron.
 - 5) Thickness:
 - a) **30 Inch (750 mm) Span And Less: 3/4 inch (19 mm) thick.**
 - b) **Spans Over 30 Inches (750 mm) To 42 Inches (1 050 mm): One inch (25 mm) thick.**
 - c) **Spans Over 42 inches (1 050 mm): One inch (25 mm) thick and provide equal center supports.**
 - b. Edgings:
 - 1) Use **3/4 inch (19 mm) Kortron or Melamine faced Panel Product with hot glued 3 mm thick PVC with eased edges.** Apply banding on all four edges of adjustable shelving and on exposed edges of fixed shelving, with one-inch return onto unexposed edges. Edge banding color to match Panel Product.

- B. Shelf Supports In Storage Building: 1x4 solid stock Pine, C or better, S4S.

2.2 ACCESSORIES

- A. Manufacturer:
 - 1. Manufacturer Contact Information:
 - a. Knape & Vogt, Grand Rapids, MI www.knapeandvogt.com or Knape & Vogt Canada Inc, Mississauga, ON (905) 676-8166.
- B. Shelf Brackets And Standards In Main Building:
 - 1. Brackets:
 - a. Size according to shelf width, end of bracket to be within 2 inches (50 mm) of front edge of shelf.
 - b. Category Four Approved Product. See Section 01 6200 for definitions of Categories.
 - 1) 187WH extra heavy duty brackets by Knape & Vogt.
 - 2. Standards:
 - a. Category Four Approved Product. See Section 01 6200 for definitions of Categories.
 - 1) 87WH extra heavy duty standard by Knape & Vogt.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Attach metal standards by screws into framing members or special blocking. Utilize all available pre-drilled screw holes in standards.
- B. Attach wood shelf supports with 16d finish nails through sheathing into framing members or special blocking, two nails minimum into each framing member. Attach shelves to supports with 1-1/2 inch (38 mm) long minimum flathead screws with heads countersunk to be flush or slightly below shelf surface, one screw at each shelf corner minimum.

END OF SECTION

SECTION 06 4001**COMMON ARCHITECTURAL WOODWORK REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. General standards for materials and fabrication of Architectural Woodwork and for hardware associated with Architectural Woodwork.
- B. Related Requirements:
 - 1. Section 06 1100: Furring and blocking.
 - 2. Section 06 2001: Installation.
 - 3. Section 06 2210: 'Miscellaneous Wood Trim'.
 - 4. Section 06 4115: 'Rostrum Casework'.
 - 5. Section 06 4512: 'Architectural Woodwork Wood Trim'.
 - 6. Section 09 9324: 'Interior Clear-Finished Hardwood' for filling of nail holes and finishing.

1.2 REFERENCES

- A. Association Publications:
 - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
 - a. Architectural Woodwork Standards (AWS), 1st Edition, 2009.
- B. Definitions:
 - 1. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
 - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's literature for specialty items and hardware not manufactured by Architectural Woodwork fabricator.
 - 2. Shop Drawings:
 - a. Fabricator:
 - 1) Provide shop drawings for cabinet and casework that are included for project showing details, casework locations and layout in compliance with Contract Drawings.
- B. Informational Submittals:
 - 1. Qualification Statement:
 - a. Fabricator:
 - 1) Provide Qualification documentations as requested.

1.4 QUALITY ASSURANCE

- A. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
 - 1. Fabricator:

- a. Fabricator Firm specializing in performing work of this section.
 - 1) Firm experience in supplying products indicated for this Project.
 - 2) Firm with sufficient production capacity to produce required units.
 - 3) Firm will comply with specifications and Contract Documents for this Project.
 - 4) Minimum five (5) years experience in Woodwork installations.
 - 5) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and installation procedures required for this project before bidding.
- b. Upon request by Architect or Owner, submit documentation.

1.5 DELIVERY, HANDLING, AND STORAGE

- A. Delivery And Acceptance Requirements:
 1. Assemble architectural woodwork at Architectural Woodwork Fabricator's plant and deliver ready for erection insofar as possible.
 2. Protect architectural woodwork from moisture and damage while in transit to job site.
 3. Report damaged materials received within two (2) days from delivery at project site.
- B. Storage And Handling Requirements:
 1. Unload and store in place where it will be protected from moisture and damage and convenient to use.

PART 2 - PRODUCTS

2.1 FABRICATORS

- A. Approved Fabricators. See Section 01 4301:
 1. Meet Quality Assurance Fabricator Qualifications as specified in Part 1 of this specification.

2.2 ASSEMBLIES

- A. Design Criteria:
 1. General:
 - a. AWS Custom Grade is minimum acceptable standard, except where explicitly specified otherwise, for materials, construction, and installation of architectural woodwork.
 2. Materials:
 - a. Lumber:
 - 1) Grade:
 - a) No defects in boards smaller than 600 sq in (3 871 sq cm).
 - b) One defect per additional 150 sq inches (968 sq cm) in larger boards.
 - c) Select pieces for uniformity of grain and color on exposed faces and edges.
 - d) No mineral grains accepted.
 - 2) Allowable Defects:
 - a) Tight knots not exceeding 1/8 inch (3 mm) in diameter. No loose knots permitted.
 - b) Patches (dutchmen) not apparent after finishing when viewed beyond 18 inches (450 mm).
 - c) Checks or splits not exceeding 1/32 inch by 3 inches (1 mm by 75 mm) and not visible after finishing when viewed beyond 18 inches (450 mm).
 - d) Stains, pitch pockets, streaks, worm holes, and other defects not mentioned are not permitted.
 - e) Normal grain variations, such as cats eye, bird's eye, burl, curl, and cross grain are not considered defects.
 - 3) Use maximum lengths possible, but not required to exceed 10 feet (3 meters) without joints. No joints shall occur closer than 72 inches (1 800 mm) in straight runs exceeding 18 feet (3 600 mm). Runs between 18 feet (3 600 mm) and 10 feet (3

- meters) may have no more than one joint. No joints shall occur within 72 inches (1 800 mm) of outside corners nor within 18 inches (450 mm) of inside corners.
- 4) Moisture content shall be six (6) percent maximum at fabrication. No opening of joints due to shrinkage is acceptable.

B. Fabrication:

1. Follow Architectural Woodwork Standards (AWS) for fabrication of Architectural Woodwork.
2. Tolerances:
 - a. No planer marks (KCPI) allowed. Sand wood members and surfaces with 100 grit or finer.
 - b. Maximum Gap: None allowed.
 - c. Flushness Variation: 0.015 inch (0.4 mm) maximum.
 - d. Sanding Cross Scratches: 1/4 inch (6 mm) maximum.
 - e. Plug screw holes. Screw locations not to be visible beyond 18 inches (450 mm).
3. Fabricate work in accordance with measurements taken on job site.
4. 'Ease' sharp corners and edges of exposed members to promote finishing and protect users from splinters. Radius of 'easing' shall be uniform throughout Project and between 1/32 and 1/16 of an inch (0.8 and 1.6 of a millimeter).
5. Fabricate so veneer grain is vertical.
6. Joints:
 - a. Use lumber pieces with similar grain pattern when joining end to end.
 - b. Compatibility of grain and color from lumber to panel products is required.
7. Install hardware in accordance with Manufacturer's directions. Leave operating hardware operating smoothly and quietly.
8. Remove or repair damaged surface of or defects in exposed finished surfaces of architectural woodwork to match adjacent similar undamaged surface.

PART 3 - EXECUTION: Not Used

END OF SECTION

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SECTION 06 4005**PLASTIC LAMINATE****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Wall-hung counters.
 - 2. Countertops for custom casework.

- B. Related Requirements:
 - 1. Section 06 2001: 'Common Finish Carpentry Requirements':
 - a. Installation of wall-hung counters.
 - b. Installation of countertops for custom casework.
 - 2. Section 06 4001: 'Common Architectural Woodwork Requirements':
 - a. Approved Fabricators.
 - b. General standards for materials and fabrication of Architectural Woodwork.
 - 3. Sections Under 22 4200 Heading: Plumbing Fixtures.

1.2 REFERENCES

- A. Association Publications:
 - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
 - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.

- B. Definitions:
 - 1. Flame Spread: The propagation of flame over a surface.
 - a. Flame Spread Index: The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723.
 - 2. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade.
 - a. Premium Grade: Highest Grade available in both material and workmanship where highest level of quality, materials, workmanship, and installation is required.
 - 3. High-Pressure Decorative Laminate (HPDL): Laminated thermosetting decorative sheets intended for decorative purposes. Also known as Plastic Laminate.
 - 4. Smoke-Developed Index: The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723.

- C. Reference Standards:
 - 1. ASTM International:
 - a. ASTM E84-18, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - b. ASTM E162-15a, 'Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source'.
 - 2. Kitchen Cabinet Manufacturers Association:
 - a. ASTM/KCMA A161.1-2012, 'Performance And Construction Standards For Kitchen And Vanity Cabinets'.
 - 3. National Electrical Manufacturer's Association / American National Standards Institute:
 - a. ANSI/NEMA LD-3-2005, 'High Pressure Decorative Laminates'.
 - 4. Underwriters Laboratories, Inc.:
 - a. UL 723: 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'; (10th Edition).

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Color selections.
 - b. Manufacturer's technical data sheet.
- B. Informational Submittals:
 - 1. Certificates:
 - a. Provide Manufacturer's certification of compliance to ANSI/NEMA LD 3.
 - 2. Test And Evaluation Reports:
 - a. Test reports: Certified test reports showing compliance with specified performance characteristics and physical properties for Quality Assurance if requested by Owner or Architect.
- C. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Manufacturer's literature for plastic laminate.
 - b) Color selections.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Fire-Test-Response Characteristics: Provide plastic laminate with surface burning characteristics as determined by testing identical products by qualified testing agency.
 - a. Surface-Burning Characteristics:
 - 1) Plastic Laminate shall have Class A flame spread rating in accordance with ASTM E84 or UL 723 Type 1.
 - a) Class A (Flame spread index 0-25; Smoke-developed index 0-450).
 - b) Flash point: None.

1.5 WARRANTY

- A. Manufacturer Extended Warranty:
 - 1. Approved Fabricator's written guarantee that all Goods and Services will be free from defects in materials and workmanship for a period of five (5) years from date of substantial completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Fabricators:
 - 1. Approved Fabricators. See Section 06 4001 for Category Three Approved Fabricators.
- B. Manufacturers:
 - 1. Type Two Acceptable Manufacturers:
 - a. Formica, Cincinnati, OH www.formica.com or Formica Canada Inc, St Jean sur Richelieu, PQ (450) 347-7541, all matte finish.
 - b. Nevamar, Odenton, MD www.nevamar.com.
 - c. Pionite Decorative Surfaces, Auburn, ME www.pionite.com.
 - d. WilsonArt, Temple, TX www.wilsonart.com or WilsonArt International Inc, Mississauga, ON (905) 565-1255.
 - e. Equal as approved by Architect before bidding. See Section 01 6200.

- C. Plastic Laminates:
 - 1. Design Criteria:
 - a. Countertops:
 - 1) Post-formed front edge and backsplash, except where detailed otherwise, with plastic laminate meeting requirements of ANSI/NEMA LD 3: PF 42.
 - a) Vertical Applications: GP 28.
 - b) Horizontal (other than countertops): GP 38.
 - 2) No raised lip on front edge.
 - b. Balancing Material: BK 20.
 - c. AWS Quality Grade: Premium.
 - 2. Assemblies:
 - a. Countertops shall meet requirements of KCMA A161.1.
 - b. Adhesives for other than post-formed types shall be spray grade, high heat resistant, neoprene contact adhesive.
 - 3. Category Four Approved Colors. See Section 01 6200 for definition of Categories:
 - a. Nevamar MR7002.

PART 3 - EXECUTION: Not Used

END OF SECTION

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SECTION 06 4114**WOOD-VENEER-FACED ARCHITECTURAL CABINETS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Custom casework.

- B. Related Requirements:
 - 1. Section 06 1100: 'Wood Framing' for wall blocking required for Custom Casework.
 - 2. Section 06 2001: 'Common Finish Carpentry Requirements' for installation of Custom casework.
 - 3. Section 06 4001: 'Common Architectural Woodwork Requirements' for:
 - a. Approved Fabricators.
 - b. General standards for materials and fabrication of Architectural Woodwork and for hardware associated with Architectural Woodwork.
 - 4. Section 09 9324: 'Interior Clear-Finished Hardwood' for wood finishes.
 - 5. Sections Under 22 4200 Heading: Plumbing Fixtures.

1.2 REFERENCES

- A. Association Publications:
 - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
 - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
 - b. HPVA, NWWDA, or APA.
 - 2. Hardwood Plywood & Veneer Association (HPVA), Reston, VA www.hpva@hpva.org.
 - 3. The Engineered Wood Association (APA), Tacoma, WA www.apawood.org.
 - 4. Window & Door Manufacturers Association (WDMA) Chicago, IL www.wdma@wdma.com.

- B. Definitions:
 - 1. Book-Match: Matching between adjacent veneer leaves on one panel face. Every other piece of veneer is turned over so that the adjacent leaves are "opened" as two pages in a book. The fibers of the wood, slanting in opposite directions in the adjacent leaves, create a characteristic light and dark effect when the surface is seen from an angle.
 - 2. Face Veneer: The outermost exposed wood veneer surface of a veneered wood door, panel, or other component exposed to view when the project is completed.
 - 3. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
 - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
 - 4. High-Pressure Decorative Laminate (HPDL): Laminated thermosetting decorative sheets intended for decorative purposes. Also known as Plastic Laminate.
 - 5. Medium Density Fiberboard (MDF): Generic name for a panel or core manufactured from lignocellulosic fibers combined with synthetic resin or other suitable binder and bonded together under heat and pressure in hot press by process in which added binder creates entire bond.
 - 6. Panel Product: Panels manufactured with differences in core materials, adhesives or binders which affect characteristics of the panels. These include wood veneers and many prefinished wood panels and decorative overlays with aesthetic and performance characteristics.
 - 7. Plain-Sawn: A hardwood figure developed by sawing a log lengthwise at a tangent to the annual growth rings. It appears as U-shaped or straight markings in the board's face.
 - 8. Running Match: Each panel face is assembled from as many veneer leaves as necessary. Any portion left over from one panel may be used to start the next.

9. Veneer: A thin sheet or layer of wood, usually rotary cut, sliced or sawn from a log or flitch. Thickness may vary from 1/100 inch (0.3 mm) to 1/4 inch (6.4 mm).

C. Reference Standards:

1. American National Standards Institute / Builders Hardware Manufacturers Association:
 - a. ANSI/BHMA A156.11-2014, 'Cabinet Locks'.
2. American National Standards Institute / Hardwood Plywood & Veneer Association:
 - a. ANSI/HPVA HP-1-2009, 'Standard for Hardwood and Decorative Plywood'.
3. American National Standards Institute / Window & Door Manufacturers Association (WDMA):
 - a. ANSI/WDMA I.S. 6A-13, 'Industry Standard for Architectural Stile and Rails Doors'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the efforts of the various trades affected by the Work of this Section.
2. Coordinate completion of 2x6 (50mm x 100mm) wall blocking for custom casework.
3. Coordinate completion of custom casework.

1.4 SUBMITTALS

A. Action Submittals:

1. Product Data:
 - a. Manufacturer's literature or cut sheets for hardware.
2. Shop Drawings:
 - a. Confirm compliance with Contract Document requirements as to configuration and dimensions of custom casework.
 - b. Include plan and elevation views, materials used, standing and running trim profiles, assembly methods, joint details, fastening methods, accessories, and hardware.
3. Samples:
 - a. Interior Hardwood for Transparent Finish:
 - 1) Before performing work of this Section, prepare Control Sample, to match sample available from Owner, to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.
 - 2) Design Criteria:
 - a) Provide 8 inch by 10 inch (200 mm by 255 mm) sample(s) of Red Oak to match Owner provided stain color selected for Project.
 - b) Control Sample will be used as performance standard for evaluating finish provided.

B. Informational Submittals:

1. Source Quality Control Submittals:
 - a. Samples:
 - 1) Interior Hardwood for Transparent Finish:
 - a) Owner will provide Control Sample for finish.

1.5 WARRANTY

A. Manufacturer Extended Warranty:

1. Approved Fabricator's written guarantee that all Goods and Services will be free from defects in materials and workmanship for period of five (5) years from date of substantial completion.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Components:

1. Design Criteria:

a. General:

- 1) Except as noted otherwise, fabricate the work of this section according to AWS 'Custom Grade'.
 - a) Cabinet door wood grain direction shall run vertically and all doors shall be set matched.
 - b) Cabinet drawer front wood grain direction may run vertically or horizontally, with same direction maintained on all cabinet or elevation of cabinets.
- 2) Casework Construction Type:
 - a) Type B: Face-frame construction where front edge of cabinet body components are overlaid with frame.
- 3) Door interface style:
 - a) Type B Construction: Flush Overlay.

b. Solid Stock:

- 1) Exposed: Plain sawn Red Oak.
- 2) Semi-exposed And Concealed: Species as acceptable for AWS 'Custom Grade'.

c. Panel Product:

- 1) Glues (adhesives) used in manufacture and fabrication of panel products shall be Type I or II.
- 2) Moisture content shall be same as specified for lumber.
- 3) Cores:
 - a) Cabinet Doors: Medium density fiberboard (MDF) with minimum density of **48 lbs per cu ft (769 kg per cu meter)**.
 - b) All Other: Industrial grade particle board with minimum density of **45 lbs per cu ft (721 kg per cu meter)**.
- 4) Facings:
 - a) Hardwood veneer facings shall be plain sliced Red Oak AWS Grade A, or equal by HPVA, WDMA, or APA.
 - b) All other facings shall be Melamine or Kortron.
- 5) Edgings:
 - a) Cabinet Doors And Drawer Fronts Higher Than **8 Inches (200 mm)**:
 - (1) **3/4 inch by 1/8 to 1/4 inch (19 mm by 3 to 6 mm)** edge-banding of wood species matching hardwood face veneer.
 - b) Wood Veneer Faced Shelves (Use only in CES Module cabinetry):
 - (1) **3/4 inch by 1/4 inch (19 mm by 6 mm)** edge-band of wood species matching hardwood face veneer on front edge with hot-glued, 2 mm thick minimum, wood-grained PVC edge-banding on other three sides.
 - c) Shelves And Exposed Panel Product Edges:
 - (1) Hot-glued, 3 mm thick, PVC edge-banding. Wood-grain, except color matching Melamine or Kortron surface at shelf edges.
 - d) Semi-Exposed Panel Product Edges:
 - (1) Hot-glued, 3 mm thick, wood grained PVC edge-banding.
- d. Casework Doors:
 - 1) Face Veneer:
 - a) Design Criteria:
 - (1) Plain sliced Red Oak meeting requirements of AWS Grade A, **1/50 inch (0.5 mm)** thick minimum immediately before finishing.
 - (2) Face veneers shall be running book matched.
 - 2) Doors under **1-3/8 inch (35 mm)** thick: Panel Product.

B. Fabrication:

1. Fabricators:

- a. Approved Fabricators. See Section 06 4001 for Category Three Approved Fabricators.

2. Cabinet Body:

- a. Use AWS Flush Overlay construction on cabinet bodies.
- b. If used, install Rail System adjustable shelf supports recessed.
3. Drawers:
 - a. Fabricate with separate, screw-attached drawer front.
 - b. Joints shall be dowel and pressure-glued, or lock shoulder, glued, and pin nailed.
 - c. Set bottoms into sides, backs, and subfront with **1/4 inch (6 mm)** deep groove with **3/8 inch (9.5 mm)** minimum standing shoulder.
 - d. Every drawer shall have specified drawer guides and pull installed. Install drawer guides with 'Euroscrows', and pulls with through-bolts passing through both front and sub-front.
4. Cabinet Doors:
 - a. Full height, panel product cabinet doors may be fabricated in two pieces and joined on back with metal backplate. Backplate shall match interior door surface color.
 - b. Hinges: Install hinges using plastic insertion dowels for hinges and 'Euroscrows' for baseplates.
 - c. Every cabinet door shall have specified pull installed.
5. Cabinet Component Thickness And Material:
 - a. Use hardwood veneer facing on panel product, except on following surfaces:
 - 1) Where Kortron or Melamine shall be used.
 - 2) Cabinet exposed interiors surfaces (not including cabinet doors) and shelving faces behind cabinet doors in all rooms.
 - 3) Cabinet semi-exposed surfaces.
 - 4) Cabinet concealed surfaces.
 - 5) Cabinet exposed exteriors permanently concealed (not exposed to view).
 - 6) Drawer sides, backs, bottoms, and subfronts.
 - b. Ends, Divisions, Bottoms, Tops: **3/4 inch (19 mm)** thick panel product.
 - c. Rails: **3/4 inch (19 mm)** thick panel product.
 - d. Shelves:
 - 1) Panel product.
 - 2) Thickness:
 - a) **30 Inch (750 mm)** Span And Less: **3/4 inch (19 mm)** thick.
 - b) Spans Over **30 Inches (750 mm)** To **42 Inches (1 050 mm)**: **One inch (25 mm)** thick.
 - c) Spans Over **42 inches (1 050 mm)**: **One inch (25 mm)** thick and provide Hafele or equal center supports.
 - e. Backs: **1/4 inch (6 mm)** thick panel product.
 - f. Doors: **3/4 inch (19 mm)** thick panel product.
 - g. Drawer Sides, Backs, And Subfronts: **1/2 inch (12.7 mm)** thick minimum panel product.
 - h. Drawer Bottoms: **1/4 inch (6 mm)** thick panel product.
 - i. Separate Drawer Front:
 - 1) **8 Inches (200 mm)** High And Less: **3/4 inch (19 mm)** thick solid hardwood.
 - 2) More Than **8 Inches (200 mm)** High: **3/4 inch (19 mm)** panel product.
 - j. Hardboard Dividers: **1/4 inch (6 mm)** thick panel product.
 - k. Hardboard Shelves: **1/8 inch (3 mm)** thick hardboard, smooth both sides.
6. Cabinet and Drawer Locks:
 - a. Install only on cabinets and drawers as shown on Contract Documents.
7. Install plastic grommets in cable access holes in countertops located as located on Contract Documents.

C. Finishes:

1. Factory Finishing:
 - a. Design Criteria:
 - 1) Applied before leaving factory.
 - 2) Factory-finish to match Owner selected sample as specified in Section 09 9324.
 - b. Match existing Project Color Scheme:
 - 1) Control Sample provided by Owner:
 - a) Control Sample will be existing wood item from Project.

2.2 ASSESSORIES

A. Manufacturers:

1. Manufacturer Contact List for Assessories:
 - a. Accuride, Santa Fe Springs, CA www accuride.com.
 - b. Anybumper, Amite, LA www Anybumper.com.
 - c. Blum Inc, Stanley, NC www blum.com.
 - d. CompX National, Mauldin, SC www nclnet.com.
 - e. Glynn Johnson, Chicago, IL www glynn-johnson.com.
 - f. Grass America Inc, Kernerville, NC www grassusa.com.
 - g. Hafele America Co., Archdale, NC hafele.com.
 - h. Hager Companies, St Louis, MO www hagerhinge.com or Hager Hinge (Canada) Ltd, Kitchener, ON (519) 893-7580.
 - i. Ives, Indianapolis, IN www iveshardware.com.
 - j. Knappe & Vogt, Grand Rapids, MI www knapeandvogt.com or Knappe & Vogt Canada, Mississauga, ON (905) 676-8972.
 - k. Mark Eaton LLC, American Fork, UT www markeatonllc.com.
 - 1) Contact Information: Mark Eaton (801) 756-5639.
 - l. Mckinney, Scranton, PA www mckinneyhinge.com or Markham, ON (905) 940-2040.
 - m. Olympus Lock Co, Seattle, WA www olympus-lock.com.
 - n. Salice America Inc, Charlotte, NC www saliceamerica.com.
 - o. Stanley, New Britain, CT www stanleyhardware.com.
 - p. Techna-Base Inc, Pleasant Grove, UT (801) 361-2289 or dlundahl@earthlink.net.
 - 1) Contact Information: Dewey Lundahl (801) 785-6477 or (801) 361-2289 (cell).
 - q. Trimco, Los Angeles, CA www trimcobbw.com.
 - r. Wire Cloth Manufacturers, Inc., Mine Hill, NJ www wireclothman.com.

B. Cabinet Hardware:

1. Cabinet And Drawer Pulls:
 - a. Satin Chromium Plated brass / bronze core bow handles, 4 inches (100 mm) long minimum.
 - b. Type Two Acceptable Products:
 - 1) 4484 by Stanley.
 - 2) Equal as approved by Architect before installation. See Section 01 6200.
2. Cabinet And Drawer Locks:
 - a. General:
 - 1) Pin tumbler type suitable for location.
 - 2) Keying: Key each cabinet and drawer individually as shown on Contract Documents except as follows:
 - a) Key each cabinet and drawer within each Office alike.
 - b) Crosskey knife drawer in Serving Area so all other cabinet and drawer keys will open drawer.
 - 3) Stamp keys with Room number and cabinet designation as shown on Signage Plan of Contract Drawings.
 - 4) Provide six (6) keys per cabinet.
 - b. Design Criteria:
 - 1) Barrel diameter: 7/8 inch (22 mm).
 - 2) Cylinder length: 7/8 inch (22 mm).
 - 3) Key removable in locked or unlocked position.
 - 4) Meet ANSI/BHMA A156.11 Grade 2 requirements.
 - c. Type Two Acceptable Manufacturers:
 - 1) Advantage Plus cam lock by CompX National Lock.
 - 2) 100DR/200DW N Series door and drawer lock by Olympus Lock Inc.
 - 3) Equal as approved by Architect before installation. See Section 01 6200.
3. Cabinet Adjustable Shelf Supports:
 - a. Either of following systems are acceptable, at Fabricator's option:
 - 1) 32mm System: Casework Fabricator's standard.
 - 2) Traditional System:
 - a) Class Two Quality Standards: 255 and 256 by Knappe & Vogt.
4. Cabinet Hinges:
 - a. Description:

- 1) Cup Hinge (Concealed Hinge or European style).
 - 2) Steel, nickel-plated, full overlay, self closing with dowel, Mod 17.
 - b. Design Criteria:
 - 1) Doors **48 inches (1 200 mm)** High or Less:
 - a) Two (2) hinges.
 - b) Hinge Opening: 165 degree minimum.
 - 2) Doors over **48 inches (1 200 mm)** High:
 - a) Four (4) hinges.
 - b) Hinge Opening: 165 degree minimum.
 - c. Basis of Design: Model 329.03.558 with Model 329.73.510 mounting plate by Hafele.
 - 1) Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
 - a) Blum.
 - b) Grass America.
 - c) Hafele.
 - d) Knape & Vogt.
 - e) Salice.
5. Cabinet Inactive Leaf Catches:
- a. Class Two Quality Standards:
 - 1) Full-Height Doors: Two Surface Bolts No 043 - **2 inch (50 mm)** by Ives.
 - 2) All Other Doors: Elbow Catch No 2 by Ives.
6. Drawer Guides:
- a. Keyboard / Pencil Drawers:
 - 1) Steel ball bearings, **45 lb (20 kg)** load rating minimum.
 - 2) 3/4 extension, top mounting.
 - 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Series 2006 by Accuride.
 - b) Article 422.14.345 by Hafele.
 - c) Series KV8200 by Knape & Vogt.
 - b. Standard Drawers:
 - 1) Full extension, steel ball bearings, **100 lb (45 kg)** load rating.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Series 3832-Classic by Accuride.
 - b) Article 422.04.552 by Hafele.
 - c) Series KV8400 by Knape & Vogt.
 - c. Lateral Files / Serving Area Drawers:
 - 1) Files/Drawers **30 inches (762 mm)** wide and under:
 - a) Full extension, steel ball bearings, **150 lb (68 kg)** load rating.
 - b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Series 4034 by Accuride.
 - (2) Article 422.17.550 by Hafele.
 - (3) Series KV8505 by Knape & Vogt.
 - 2) Files/Drawers over **30 inches (762 mm)** wide:
 - a) Duty, full extension, steel ball bearings, **200 lbs (90 kg)** load rating.
 - b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Series 3640-A by Accuride.
 - (2) Article 422.07.554 by Hafele.
 - (3) Series KV8800 by Knape & Vogt.
- C. Cabinet Door Bumpers:
1. Description:
 - a. Polyurethane bumper to protect gypsum board from cabinet handle damage where cabinet handles hit gypsum wallboard surface.
 2. Design Criteria:
 - a. Clear.
 - b. Peel adhesion.
 - c. Size: **3/8 inch (9.5 mm)** diameter x **1/8 inch (3 mm)** thick.
 3. Type Two Acceptable Products:

- a. WS-34 Cylindrical Soft Durometer Cabinet Bumper by Anybumper.
- b. Equal as approved by Architect before installation. See Section 01 6200.

2.3 SOURCE QUALITY CONTROL

- A. Inspections:
 1. Clear Finished Hardwood:
 - a. Color matches Owner provided sample specified in Section 09 9324.

PART 3 - EXECUTION: Not Used

END OF SECTION

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SECTION 06 4115**ROSTRUM CASEWORK****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
1. Rostrum casework as described in Contract Documents consisting of the following:
 - a. Chapel Pulpit (with adjustable lift mechanism and projector lift).
 - b. Control Pedestal (modifications and relocation).
 - c. Modesty Rail.
 - d. Ramp Landing Sidewall.
 - e. Riser Steps Sidewall.
 - f. Rostrum Riser Handrail (floor mounted).
 - g. Sacrament Table.
 - h. Wood Handrails and Handrail Brackets.
- B. Related Requirements:
1. Section 05 5215: 'Stainless Steel Handrails' for floor mounted Rostrum Riser Handrail and Rostrum Ramp Handrail.
 2. Section 06 1100: 'Wood Framing' for wall blocking required for Rostrum Casework.
 3. Section 06 2001: 'Common Finish Carpentry Requirements':
 - a. Installation of Rostrum Casework.
 4. Section 06 4001: 'Common Architectural Woodwork Requirements':
 - a. Approved Fabricators.
 - b. General standards for materials and fabrication of Architectural Woodwork.
 - c. Action Submittals for shop drawings from Fabricator.
 - d. Field Quality Control Submittals for field dimensions provided to Fabricator from Contractor.
 5. Section 09 9324: 'Interior Clear-Finished Hardwood'.

1.2 REFERENCES

- A. Association Publications:
1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
 - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
- B. Definitions:
1. Face Veneer: The outermost exposed wood veneer surface of a veneered wood door, panel, or other component exposed to view when the project is completed.
 2. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade:
 - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
 3. Plain-Sawn: A hardwood figure developed by sawing a log lengthwise at a tangent to the annual growth rings. It appears as U-shaped or straight markings in the board's face.
 4. Running Match: Each panel face is assembled from as many veneer leaves as necessary. Any portion left over from one panel may be used to start the next.
- C. Reference Standards:
1. International Electrotechnical Commission (IEC):
 - a. IEC 60529 (ed. 2.1 b:2001), 'Degrees of protection provided by enclosures (IP Code).
 2. International Organization for Standards (ISO):

- a. ISO 3746:2010, 'Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Survey method using an enveloping measurement surface over a reflecting plane'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 1. Coordinate the efforts of the various trades affected by the Work of this Section.
 2. Coordinate completion of 2x6 (50mm x 100mm) wall blocking for rostrum casework.
 3. Coordinate completion of electrical and audio video wiring with rostrum casework.
 4. Coordinate completion of rostrum casework.
- B. Sequencing:
 1. Install rostrum casework after following as been completed:
 - a. Adjacent millwork.
 - b. Adjacent walls and ceilings are finished.

1.4 SUBMITTALS

- A. Action Submittals:
 1. Shop Drawings:
 - a. As specified in as specified in Action Submittals in Section 06 4001 'Common Architectural Woodwork Requirements'.
 2. Samples:
 - a. Interior Hardwood for Transparent Finish:
 - 1) Before performing work of this Section, prepare Control Sample, to match sample available from Owner, to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.
 - 2) Design Criteria:
 - a) Provide 8 inch by 10 inch (200 mm by 255 mm) sample of Red Oak to match Owner provided stain color selected for Project.
 - b) Control Sample will be used as performance standard for evaluating finish provided.
- B. Informational Submittals:
 1. Source Quality Control Submittals:
 - a. Samples:
 - 1) Interior Hardwood for Transparent Finish:
 - a) Owner will provide Control Sample from project for finish.
 2. Field Quality Control Submittals:
 - a. Field dimensions:
 - 1) Contractor Responsibility:
 - a) Provide field dimensions of Rostrum area to Approved Fabricator as specified in Field Quality Control Submittal in Section 06 4001 'Common Architectural Woodwork Requirements'.
- C. Closeout Submittals:
 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Final, executed copy of Warranty.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 1. Assemble Rostrum Casework at Architectural Woodwork Fabricator's plant and deliver ready for erection insofar as possible.

2. Protect Rostrum Casework from moisture and damage while in transit to job site.
3. Report damaged materials received.

B. Storage And Handling Requirements:

1. Unload and store in secure place where it will be protected from moisture and damage and convenient to use.

1.6 WARRANTY

A. Adjustable Lift Mechanism:

1. Lift Manufacturer's warranty against defects in materials and workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Description:

1. Rostrum casework consists:
 - a. Chapel Pulpit (with adjustable lift mechanism).
 - b. Control Pedestal.
 - c. Modesty Rail.
 - d. Ramp Landing Sidewall.
 - e. Riser Steps Sidewall.
 - f. Rostrum Riser Handrail (floor mounted).
 - g. Sacrament Table.
 - h. Wood Handrails and Handrail Brackets.

B. Design Criteria:

1. AWS Custom Grade is minimum acceptable standard for materials, construction, and installation of architectural woodwork.
2. Interior Hardwood for Transparent Finish. Furnish factory-finish matching Owner selected sample for Rostrum Casework:
 - a. Design Criteria:
 - 1) Factory-finish to match Owner selected sample as specified in Section 09 9324.
 - b. Match existing Project Color Scheme:
 - 1) Control Sample provided by Owner:
 - a) Control Sample will be existing wood item from Project.

C. Materials:

1. Rostrum Casework as described in Contract Documents.
 - a. Material:
 - 1) Solid Wood: Plain sawn Red Oak.
 - 2) Paneling: Panel Product with plain sliced Red Oak veneer.
 - b. Rostrum Rail:
 - 1) Running match construction.
 - 2) Fabricator Option:
 - a) Option A: One (1) **3/4 inch (19 mm)** 'A' face veneer panel product both sides.
 - b) Option B: Two (2) **1/2 inch (12.7 mm)** 'A' face veneer one side panel product laminated together.
 - c. End (Wing) Supports:
 - 1) No butcher block (edge grain construction) permitted.
2. Wood handrails and brackets.

D. Fabrications:

1. Following Architectural Woodwork Standards (AWS) for fabrication of Rostrum casework.

2.2 ACCESSORIES

A. Adjustable Pulpit Mechanism:

1. Description:
 - a. Lift Mechanism for raising and lowering pulpit / podium lecterns including but not limited to following components:
 - 1) Column assembly.
 - 2) Control box.
 - 3) Control cable.
 - 4) Control relay assembly.
 - 5) Lift Actuator.
2. Design Criteria:
 - a. General:
 - 1) Identification:
 - a) Each unit shall have tag permanently attached giving Model Number and Manufacturer's name, phone number, and address.
 - 2) Service Life:
 - a) Estimated service life of Lift Mechanism shall be one (1) million cycles plus/minus ten (10) percent.
 - 3) Sound:
 - a) Lift mechanism must operate at not more than 48db(A) measured per ISO 3746.
 - b. Dimension Requirements:
 - 1) Provide Lift Mechanism within lectern neck and engage not more than **18 inches (450 mm)** and not less than **17 inches (430 mm)**.
 - 2) Provide Lift Mechanism to fit inside lectern (size is based which Manufacturer provided original pulpit mechanism):
 - a) **8-3/4 to 9 inch (222 to 230 mm)** square by **18 inch (450 mm)**.
 - 3) Do not exceed **3 inches (75 mm)** minimum or **6 inches (150 mm)** maximum space from bottom of lectern to top of pulpit base.
 - c. Safety switch assembly.
 - d. Switches, condensers, etc, shall be only those supplied by Manufacturer.
 - e. Surge Protector.
3. Column Assembly:
 - a. General:
 - 1) Construct Lift Mechanism with inner and outer column.
 - 2) Inner column must be fixed to base plate of Lift Mechanism.
 - 3) Connect outer column to inner column with system of roller bearings to provide vertical motion but limit lateral motion.
 - b. Material:
 - 1) Construct inner and outer column dimensionally stable material for presence of variable humidity levels (typically aluminum).
 - 2) Protect inner and outer column from oxidation with an electrolytic coating such as powder coat paint or anodize.
4. Control Box:
 - a. General:
 - 1) Electrical components of unit shall be UL/ULC, CSA, and/or TUV listed or recognized where such listing or recognition is available.
 - 2) Actuator and power supply must meet requirements of IEC 60529 for IP51 protection.
 - 3) Cut-off mechanism must automatically reset after operation.
 - b. Power Supply:
 - 1) Power supply for operating motor of actuator must be separate from actuator and Lift Mechanism.
 - 2) Power supply mains cable must be available with molded plug end for interface with standard outlets without use of adapters.
 - 3) Power supply must meet worldwide voltage and frequency requirements.
5. Control Cable:
 - a. Separate interconnection cables used to connect screw actuator, control switch and power to power supply unit.
 - b. Interconnection cables must be uniquely sized, keyed, and pinned so that incorrect connection to power supply unit cannot be completed.

- c. Locking mechanism must be supplied to prevent interconnection cables from being removed from the power supply without disabling lock mechanism.
 - 6. Lifting Actuator:
 - a. Provide movable outer column with screw type actuator.
 - 1) Outer column must not be physically connected to screw type actuator.
 - b. Screw Type Actuator:
 - 1) Provide sealed and lubricated for life of actuator.
 - 2) Provide end of stroke limit switches contained with actuator.
 - 3) Provide brake mechanism to prevent screw from back driving under load.
 - 4) Actuator must extend and/or retract at minimum speed of **1/2 inch (12.7 mm)** per second.
 - 7. Safety Switch Assembly:
 - a. Provide adjustable cut-off mechanism to limit weight that Lift Mechanism can carry during extension:
 - 1) Lift Mechanism to carry total weight of **55 lb (24.9 kg) to 65 lb (29.5 kg)** including weight of pulpit lectern and neck assembly.
 - b. Provide adjustable cut-off mechanism to limit force that may be transmitted to an obstruction object during retraction:
 - 1) Force should not exceed **3 lbs (1.36 kg)** when measured between top of pulpit cabinet and front left corner of lectern.
 - 8. Category Four Approved Product. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements:
 - a. Manufacturer Contact List:
 - 1) Mark Eaton LLC, American Fork, UT www.markeatonllc.com.
 - a) Contact Information: Mark Eaton (801) 756-5639.
 - 2) Techna-Base , Inc., Pleasant Grove, UT.
 - a) Contact Information: Dewey Lundahl (801) 785-6477 or (801) 361-2289 (cell).
 - b. Approved Product:
 - 1) Mark Eaton:
 - a) Model LDS2005A by Mark Eaton.
 - 2) Techna-Base.
 - a) Model PL-120 (120 VAC) or Model PL-220 (220 VAC).
- B. Projector Appliance Lift Hardware
- 1. Approved Product:
 - a. HAL-20 Appliance Lift by Knape & Vogt, www.knapeandvogt.com

2.3 SOURCE QUALITY CONTROL

- A. Inspections:
- 1. Clear Finished Hardwood:
 - a. Color matches Owner provided sample specified in Section 09 9324.

PART 3 - EXECUTION: Not Used

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SECTION 06 4512**ARCHITECTURAL WOODWORK WOOD TRIM****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Hardwood base.
 - 2. Hardwood handrail at Rostrum Riser and/or Rostrum Ramp.
 - 3. Hardwood trim

- C. Related Requirements:
 - 1. Section 06 1100: 'Wood Framing' for wall blocking required for Wood Trim.
 - 2. Section 06 2001: 'Common Finish Carpentry Requirements':
 - a. Installation of Wood Trim.
 - 3. Section 06 2210: Remaining Wood Trim.
 - 4. Section 06 4001: 'Common Architectural Woodwork Requirements':
 - a. General standards for materials and fabrication of Architectural Woodwork.
 - 5. Section 09 9324: 'Interior Clear-Finished Hardwood'.

1.2 REFERENCES

- A. Association Publications:
 - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada / Woodwork Institute, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
 - a. Architectural Woodwork Standards (AWS), 1st Edition, 2009.

- B. Definitions:
 - 1. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade.
 - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
 - 2. Plain Slicing: Most commonly used for hardwood plywood. The log is cut in half, and one half is placed onto a carriage and moved up and down past a fixed knife to produce the veneers. Veneer is sliced parallel to the pith of the log and approximately tangent to the growth rings to achieve flat-cut veneer. Each piece is generally placed in a stack and kept in order. One half log, sliced this way, is called a "flitch".
 - 3. Plain-Sawn: A hardwood figure developed by sawing a log lengthwise at a tangent to the annual growth rings. It appears as U-shaped or straight markings in the board's face.
 - 4. Running Trim: Generally combined in the term "standing and running trim" and refers to random, longer length trims delivered to the jobsite (e.g., baseboard, chair rail, crown molding).

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings:
 - a. Include materials used, standing and running trim profiles, joint details, and hardware.
 - 2. Samples:
 - a. Interior Hardwood for Transparent Finish:
 - 1) Before performing work of this Section, prepare Control Sample, to match sample available from Owner, to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.

- 2) Design Criteria:
 - a) Provide 8 inch by 10 inch (200 mm by 255 mm) sample of Red Oak to match Owner provided stain color selected for Project.
 - b) Control Sample will be used as performance standard for evaluating finish provided.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Manufacturers:
 1. Approved Fabricators. See Section 06 4001 for Approved Fabricators.
- B. Performance / Design Criteria: Conform to requirements of Section 06 4001 'Common Architectural Woodwork Requirements'.
 1. Glue: Waterproof and of best quality.
 2. Factory-finish to match Owner selected sample as specified in Section 09 9324.
- C. Architectural Woodwork Wood Trim:
 1. Interior Hardwood For Transparent Finish:
 - a. Design Criteria:
 - 1) Solid wood shall be plain sawn Red Oak.
 - 2) Paneling shall be panel product with plain sliced Red Oak veneer.
 - 3) Finish to match Owner selected sample as specified in Section 09 9324.
 - b. Match existing Project Color Scheme:
 - 1) Control Sample provided by Owner:
 - a) Control Sample will be existing wood item from Project.
 2. Interior Wood For Opaque, Painted Finish:
 - a. Applies to ceiling trim only.
 - b. Solid wood shall be any species allowed by AWS Custom grade.
- D. Shelves:
 1. Conform to applicable requirements of Sections 06 4001 and 06 4114.
 2. Use 3/4 inch (19 mm) Kortron or Melamine faced Panel Product with hot glued 3 mm thick PVC edge banding with eased edges. Apply banding on exposed edges with one inch (25 mm) return onto unexposed edges. Edge banding color to match Panel Product.

2.2 SOURCE QUALITY CONTROL

- A. Inspections:
 1. Clear Finished Hardwood:
 - a. Color matches Owner provided sample specified in Section 09 9324.

PART 3 - EXECUTION Not Used

END OF SECTION

DIVISION 07: THERMAL AND MOISTURE PROTECTION

07 9000 JOINT PROTECTION

07 9213 ELASTOMERIC JOINT SEALANTS

END OF TABLE OF CONTENTS

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SECTION 07 9213**ELASTOMERIC JOINT SEALANTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install sealants not specified to be furnished and installed under other Sections.
 - 2. Quality of sealants to be used on Project not specified elsewhere, including submittal, material, and installation requirements.
- B. Related Requirements:
 - 1. Removing existing sealants specified in Sections where work required.
 - 2. Furnishing and installing of sealants is specified in Sections specifying work to receive new sealants.

1.2 REFERENCES

- A. Definitions:
 - 1. Sealant Types and Classifications:
 - a. ASTM Specifications:
 - 1) Type:
 - a) Type S: Single-component sealant.
 - b) Type M: Multi-component sealant.
 - 2) Grade:
 - a) Grade P: Pourable or self-leveling sealant used for horizontal traffic joints.
 - b) Grade NS: Non-sag or gunnable sealant used for vertical and non-traffic joints.
 - 3) Classes: Represent movement capability in percent of joint width.
 - a) Class 100/50: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand of at least 100 percent increase and decrease of at least 50 percent of joint width as measured at time of application.
 - b) Class 50: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 50 percent of joint width as measured at time of application.
 - c) Class 25: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 25 percent of joint width as measured at time of application.
 - d) Class 12: Sealant that, when tested for adhesion and cohesion under cyclic movement shall withstand increase and decrease of at least 12 percent of joint width as measured at time of application.
 - 4) Use:
 - a) T (Traffic): Sealant designed for use in joints in pedestrian and vehicular traffic areas such as walkways, plazas, decks and parking garages.
 - b) NT (Non-Traffic): Sealant designed for use in joints in non-traffic areas.
 - c) I (Immersion): Sealant that meets bond requirements when tested by immersion (Immersion rated sealant applications require primer).
 - d) M (Mortar): Sealant that meets bond requirements when tested on mortar specimens.
 - e) G (Glass): Sealant that meets bond requirements when tested on glass specimens.
 - f) A (Aluminum): Sealant that meets bond requirements when tested on aluminum specimens.
 - g) O (Other): Sealant that meets bond requirements when tested on substrates other than standard substrates, being glass, aluminum, mortar.

- b. Federal Specifications:
 - 1) Type:
 - a) Type I: Self-leveling, pour grade.
 - (1) Compound which has sufficient flow to give smooth level surface when applied in horizontal joint at **40 deg F (4.4 deg C)**.
 - b) Type II: Non-sag, gun grade
 - (1) Compound which permits application in joints on vertical surfaces without sagging (slumping) at temperatures **40 deg F (4.4 deg C)** and **122 deg. F (50 deg. C)**.
 - c) Type NS: Non-sag, gun grade.
 - (1) Non-sag shall be a compound which permits application in joints on vertical surfaces without sagging (slumping) at temperatures between **-20 deg F** and **122 deg. F (- 29 and 50 deg. C)**.
 - 2) Class:
 - a) Class A: Compounds resistant to 50 percent total joint movement (includes Type I and Type II).
 - (1) Capable of resisting compression-extension cycling of plus and minus 25 percent of nominal half inch width.
 - b) Class B: Compounds resistant to 25 percent total joint movement (includes Type I and Type II).
 - (1) Capable of resisting compression-extension cycling of plus and minus 12 1/2 percent of nominal half inch width.
- 2. Silicone: Any member of family of polymeric products whose molecular backbone is made up of alternating silicon and oxygen atoms and which has pendant hydrocarbon groups attached to silicon atoms. Used primarily as a sealant. Offers excellent resistance to water and large variations in temperature (**minus 100 deg F to + 600 deg F**) (**minus 73.3 deg C to + 316 deg C**).

B. Reference Standards:

- 1. American Association of State and Highway Transportation Officials:
 - a. AASHTO T 132-87(2013), 'Standard Method of Test for Tensile Strength of Hydraulic Cement Mortars'.
- 2. ASTM International:
 - a. ASTM C639-15, 'Standard Test Method for Rheological (Flow) Properties of Elastomeric Sealants'.
 - b. ASTM C661-15, 'Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer'.
 - c. ASTM C679-15, 'Standard Test Method for Tack-Free Time of Elastomeric Sealants'.
 - d. ASTM C719-14, 'Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)'.
 - e. ASTM C793-05(2010), 'Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants'.
 - f. ASTM C794-15a, 'Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants'.
 - g. ASTM C920-14a, 'Standard Specification for Elastomeric Joint Sealants'.
 - h. ASTM C1135-15, 'Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants'.
 - i. ASTM C1184-14, 'Standard Specification for Structural Silicone Sealants'.
 - j. ASTM C1193-16, 'Standard Guide for Use of Joint Sealants'.
 - k. ASTM C1248-08(2012), 'Standard Test Method for Staining of Porous Substrate by Joint Sealants'.
 - l. ASTM C1330-02(2013), 'Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants'.
 - m. ASTM C1481-12 'Standard Guide for Use of Joint Sealants with Exterior Insulation & Finish Systems (EIFS)'.
 - n. ASTM D412-15a, 'Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension'.
 - o. ASTM D2202-00(2014), 'Standard Test Method for Slump of Sealants'.
 - p. ASTM D2240-15, 'Standard Test Method for Rubber Property-Durometer Hardness'.
 - q. ASTM D5893-10, 'Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements'.

- r. ASTM E119-16a, 'Standard Test Methods for Fire Tests of Building Construction and Materials'.
- 3. Federal Specifications:
 - a. Federal Specification TT-S-001543A (CON-NBS), 'Sealing Compound: Silicone Rubber Base (for Calking, Sealing & Glazing in Buildings and Other Structures)' (9 Jun 1971).
 - b. TT-S-00230C (CON-NBS), 'Sealing compound: Elastomeric Type, Single Component (For Calking, Sealing, And Glazing In Buildings And Other Structures.' (2 Feb 1970).
- 4. Government Services Administration (GSA), Commercial Item Descriptions (CID):
 - a. GSA CID A-A-272A, 'Sealing Compound: Silicone Rubber Base (For Caulking, Sealing, and Glazing in Buildings and Other Structures)'.
 - b. GSA CID A-A-1556, 'Sealing Compound Elastomeric Type, Single Component (For Caulking, Sealing, and Glazing in Buildings and Other Structures)'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Scheduling:
 - 1. Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.
 - 2. Ensure sealants are cured before covering with other materials.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - b. Manufacturer's literature for each Product.
 - c. Schedule showing joints requiring sealants. Show also backing and primer to be used.
- B. Informational Submittals:
 - 1. Certificates:
 - a. Manufacturer's Certificate:
 - 1) Certify products are suitable for intended use and products meet or exceed specified requirements.
 - 2) Certificate from Manufacturer indicating date of manufacture.
 - 2. Manufacturers' Instructions:
 - a. Manufacturer's installation recommendations for each Product.
 - b. Manufacturer's installation for completing sealant intersections when different materials are joined.
 - c. Manufacturer's installation for removing existing sealants and preparing joints for new sealant.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten (10) years documented experience.
 - 2. Applicator Qualifications:
 - a. Company specializing in performing work of this section.
 - b. Provide if requested, reference of projects with minimum three (3) years documented experience, minimum three (3) successfully completed projects of similar scope and complexity, and approved by manufacturer.
 - c. Designate one (1) individual as project foreman who shall be on site at all times during installation.
- B. Preconstruction Testing:

1. Pre-construction testing is not required when sealant manufacturer can furnish data acceptable to Architect based on previous testing for materials matching those of the Work.

C. Mockups:

1. Provide mockups including sealant and joint accessories to illustrate installation quality and color if requested by Architect or Project Manager.
 - a. Incorporate accepted mockup as part of Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:

1. Deliver and keep in original containers until ready for use.
2. Inspect for damage or deteriorated materials.

B. Storage and Handling Requirements:

1. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).
2. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
3. Store in a cool dry location, but never under 40 deg F (4 deg C) or subjected to sustained temperatures exceeding 90 deg F (32 deg C) or as per Manufacturer's written recommendations.
4. Do not use sealants that have exceeded shelf life of product.

1.7 FIELD CONDITIONS

A. Ambient Conditions:

1. Do not install sealant during inclement weather or when such conditions are expected. Allow wet surfaces to dry.
2. Follow Manufacturer's temperature recommendations for installing sealants.

1.8 WARRANTY

A. Manufacturer Warranty:

1. Signed warranties against adhesive and cohesive failure of sealant and against infiltration of water and air through sealed joint for period of three (3) years from date of Substantial Completion.
 - a. Manufacturer's standard warranty covering sealant materials.
 - b. Applicator's standard warranty covering workmanship.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:

1. Manufacturer Contact List:
 - a. Dow Corning Corp., Midland, MI www.dowcorning.com.
 - b. Franklin International, Inc. Columbus, OH www.titebond.com.
 - c. GE Sealants & Adhesives (see Momentive Performance Materials Inc.).
 - d. Laticrete International Inc., Bethany, CT www.laticrete.com.
 - e. Momentive Performance Materials Inc. (formally GE Sealants & Adhesives), Huntersville, NC www.ge.com/silicones.
 - f. Sherwin-Williams, Cleveland, OH www.sherwin-williams.com.
 - g. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com or Sika Canada Inc, Pointe Claire, QC www.sika.ca.

- h. Tremco, Beachwood, OH www.tremcosealants.com or Tremco Ltd, Toronto, ON (800) 363-3213.
- B. Materials:
1. Design Criteria:
 - a. Compliance: Meet or exceed requirements of these standards:
 - 1) ASTM C920: Elastomeric joint sealant performance standard.
 - 2) ASTM C639 or ASTM D2202: Flow (sag or slump).
 - 3) ASTM C661 or ASTM D2240: Durometer hardness (shore A).
 - 4) ASTM C679 or ASTM C794: Tack free time (peel strength).
 - 5) ASTM C719: Joint movement capability.
 - 6) ASTM C793: Effects of accelerated weathering.
 - 7) ASTM C1135 or ASTM D412: Tensile adhesion strength.
 - 8) ASTM C1184: Structural silicone sealants.
 - 9) ASTM C1248: Staining.
 - 10) ASTM D412: Modulus.
 - 11) ASTM D5893: Silicone Joint Sealant for Concrete Pavements.
 - 12) Federal Specification TT-S-001543A.
 - 13) Federal Specification TT-S-00230C.
 - 14) GSA CID A-A-272A.
 - 15) GSA CID A-A-1556.
 - b. Comply with Manufacturer's ambient condition requirements.
 - c. Sealants must meet Manufacturer's shelf-life requirements.
 - d. Sealants must adhere to and be compatible with specified substrates.
 - e. Sealants shall be stable when exposed to UV, joint movements, and particular environment prevailing at project location.
 - f. Primers (Concrete, stone, masonry, and other nonporous surfaces typically do not require a primer. Aluminum and other nonporous surfaces except glass require use of a primer. Installer Option to use Adhesion Test to determine if primer is required or use primer called out in related sections):
 - 1) Adhesion Test:
 - a) Apply silicone sealant to small area and perform adhesion test to determine if primer is required to achieve adequate adhesion. If necessary, apply primer at rate and in accordance with Manufacturer's instructions. See 'Field Quality Control' in Part 3 of this specification for Adhesive Test.
 - 2) If Primer required, shall not stain and shall be compatible with substrates.
 - 3) Allow primer to dry before applying sealant.
 2. General Interior Sealants:
 - a. General:
 - 1) Inside jambs and heads of exterior door frames.
 - 2) Both sides of interior door frames.
 - 3) Inside perimeters of windows.
 - 4) Miscellaneous gaps between substrates.
 - b. Design Criteria:
 - 1) Meet ASTM C920, Type S, Grade NS, NT, and Class 25 test requirements.
 - 2) 100 percent silicone sealant.
 - c. Non-Paintable Sealant (Installer Option A):
 - 1) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
 - a) Dow Corning: Tub, Tile, And Ceramic Silicone Sealant.
 - b) Laticrete: Latacil Silicone Sealant.
 - c) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS2800 SilGlaze II Silicone Sealant.
 - d) Sherwin Williams: White Lightning Silicone Ultra Low Odor Window and Door Sealant.
 - e) Tremco: Tremsil 200 Silicone Sealant.
 - f) Franklin International: Titebond 2601 (White) 2611 (Clear) 100% Silicone Sealant.
 - d. Paintable Sealant (Installer Option B):
 - 1) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
 - a) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS7000 Paintable Silicone Sealant.

2.2 ACCESSORIES

- A. Bond Breaker Tape:
 - 1. Pressure sensitive tape as by Sealant Manufacturer to suit application.
 - 2. Provide tape to prevent adhesion to joint fillers or joint surfaces at back of joint and allow sealant movement.
- B. Joint Backing:
 - 1. Comply with ASTM C1330.
 - 2. Flexible closed cell, non-gassing polyurethane or polyolefin rod or bond breaker tape as recommended by Sealant Manufacturer for joints being sealed.
 - 3. Oversized 25 to 50 percent larger than joint width.
- C. Joint Cleaner:
 - 1. Non-corrosive and non-staining type as recommended by Sealant Manufacturer, compatible with joint forming materials.
- D. Masking Tape:
 - 1. Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 - 1. Examine substrate surfaces and joint openings are ready to receive Work.
 - a. Verify each sealant is compatible for use with joint substrates.
 - b. Verify joint surfaces are clean and dry.
 - c. Ensure concrete surfaces are fully cured.
 - 2. Sealants provided shall meet Manufacturer's shelf-life requirements.
 - 3. Notify Architect of unsuitable conditions in writing.
 - a. Do not proceed until unsatisfactory conditions are corrected.
 - 4. Commencement of Work by installer is considered acceptance of substrate.

3.2 PREPARATION

- A. Surface Preparation:
 - 1. Remove existing joint sealant materials where specified.
 - a. Clean joint surfaces of residual sealant and other contaminants capable of affecting sealant bond to joint surface using manufacturer's recommended joint preparation methods.
 - b. Repair deteriorated or damaged substrates as recommended by Sealant Manufacturer to provide suitable substrate. Allow patching materials to cure.
 - 2. Surfaces shall be clean, dry, free of dust, oil, grease, dew, frost or incompatible sealers, paints or coatings that may interfere with adhesion. Prepare substrates in accordance with Manufacturer's instructions:
 - a. Porous surfaces: Clean by mechanical methods to expose sound surface free of contamination and laitance followed by blasting with oil-free compressed air.
 - b. Nonporous surfaces: Use two-cloth solvent wipe in accordance with ASTM C1193. Allow solvent to evaporate prior to sealant application.
 - c. High-pressure water cleaning: Exercise care that water does not enter through failed joints.
 - d. Primers:
 - 1) Primers enhance adhesion ability.
 - 2) Use of primers is not a substitution for poor joint preparation.
 - 3) Primers should be used always in horizontal application where there is ponding water.
 - 3. Field test joints in inconspicuous location.

- a. Verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.
 - b. When test indicates sealant adhesion failure, modify joint preparation primer, or both and retest until joint passes sealant adhesion test.
4. Masking: Apply masking tape as required to protect adjacent surfaces and to ensure straight bead line and facilitate cleaning.

B. Joints:

1. Prepare joints in accordance with ASTM C1193.
 - a. Clean joint surfaces of contaminants capable of affecting sealant bond to joint surface using Manufacturer's recommended instructions for joint preparation methods.
 - b. Remove dirt, dust, oils, wax, paints, and contamination capable of affecting primer and sealant bond.
 - c. Clean concrete joint surfaces to remove curing agents and form release agents.

C. Protection:

1. Protect elements surrounding the Work of this section from damage or disfiguration.

3.3 APPLICATION

A. General:

1. Apply silicone sealant in accordance with Manufacturer's instructions.
2. Do not use damaged or deteriorated materials.
3. Install primer and sealants in accordance with ASTM C1193 and Manufacturer's instructions.
4. Apply primer where required for sealant adhesion.
5. Install sealants immediately after joint preparation.
6. Do not use silicone sealant as per the following:
 - a. Apply caulking/sealant at temperatures below 40 deg F (4 deg C).
 - b. Below-grade applications.
 - c. Brass and copper surfaces.
 - d. Materials bleeding oils, plasticizers, and solvents.
 - e. Structural glazing and adhesive.
 - f. Surfaces to be immersed in water for prolonged time.

B. Joint Backing:

1. Install joint backing to maintain sealant joint ratios recommended by Manufacturer.
2. Install without gaps, twisting, stretching, or puncturing backing material. Use gage to ensure uniform depth to achieve correct profile, coverage, and performance.
3. Rod for open joints shall be at least 1-1/2 times width of open joint and of thickness to give solid backing. Backing shall fill up joint so depth of sealant bite is no more than 3/8 inch (9.5 mm) deep.

C. Bond Breaker:

1. Install bond breaker where joint backing is not used or where backing is not feasible.
 - a. Apply bond-breaker tape in shallow joints as recommended by Sealant Manufacturer.

D. Sealant:

1. Apply sealant with hand-caulking gun with nozzle of proper size to fit joints. Use sufficient pressure to insure full contact to both sides of joint to full depth of joint. Apply sealants in vertical joints from bottom to top.
2. Fill joint opening to full and proper configuration.
3. Apply in continuous operation.
4. Tool joints immediately after application of sealant if required to achieve full bedding to substrate or to achieve smooth sealant surface. Tool joints in opposite direction from application direction, i.e., in vertical joints, from the top down. Do not 'wet tool' sealants.
5. Depth of sealant bite shall be 1/4 inch (6 mm) minimum and 1/2 inch (12.7 mm) maximum, but never more than one half or less than one fourth joint width.

- E. Caulk gaps between painted or coated substrates and unfinished or pre-finished substrates. Caulk gaps larger than **3/16 inch (5 mm)** between painted or coated substrates.

3.4 TOLERANCES

- A. Provide joint tolerances in accordance with Manufacturer's printed instructions.

3.5 FIELD QUALITY CONTROL

- A. Adhesion Test (Installer Option to use adhesion test to determine if primer is required).
 - 1. Perform adhesion tests in accordance with Manufacturer's instructions and ASTM C1193, Method A, Field-Applied Sealant joint Hand-Pull Tab:
 - a. Perform five (5) tests for first **1,000 linear feet (300 meters)** of applied silicone sealant and one (1) test for each **1,000 linear feet (300 meters)** seal thereafter or perform one (1) test per floor per building elevation minimum.
 - b. For sealants applied between dissimilar materials, test both sides of joints.
 - 2. Sealants failing adhesion test shall be removed, substrates cleaned, sealants re-installed, and re-testing performed.
 - 3. Maintain test log and submit report to Architect indicating tests, locations, dates, results, and remedial actions.

3.6 CLEANING

- A. Remove masking tape and excess sealant.
- B. Clean adjacent materials, which have been soiled, immediately (before setting) as recommended by Manufacturer.
- C. Waste Management: Dispose of products in accordance with manufacturer's recommendation.

END OF SECTION

DIVISION 08: OPENINGS

08 0100 OPERATION AND MAINTENANCE OF OPENINGS

08 0601 HARDWARE GROUP AND KEYING SCHEDULES

08 1000 DOORS AND FRAMES

08 1429 FLUSH WOOD DOORS: FACTORY-FINISHED, CLEAR

08 7000 HARDWARE

08 7101 COMMON FINISH HARDWARE REQUIREMENTS

08 7102 HANGING DEVICES

08 7103 SECURING DEVICES

08 7108 STOPS AND HOLDERS

08 7109 ACCESSORIES

END OF TABLE OF CONTENTS

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SECTION 08 0601**HARDWARE GROUP AND KEYING SCHEDULES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
1. Furnish and install door hardware and keying as described in Contract Documents.

1.2 REFERENCES

- A. Definitions:
1. Builders Hardware Manufacturer's Association (BHMA) Hardware Functions:
 - a. F75 Passage Latch: Latch bolt operated by lever from either side at all times.
 - b. F81 Office Door Lock: Dead locking latch bolt operated by lever from either side, except when outside lever is locked by turn button in inside lever. When outside lever is locked, latch bolt is operated by key in outside lever or by rotating inside lever. Turn button must be manually rotated to unlock outside lever.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
1. Materials shall be delivered in original, unopened packages with labels intact.

PART 2 - HARDWARE GROUPS**2.1 INTERIOR DOORS**

- A. Single Interior Doors:
1. **Group 20:**
 - a. 1 each: Latchset Function F75.
 - b. Replace existing latchset with new on existing door.
 2. **Group 24:**
 - a. 1 set: Smoke Gaskets.
 - b. 3 each: Hinges.
 - c. 1 each: Lockset Function F81. (Salvage and relocate existing latchset)
 - d. 1 each: Stop.

END OF SECTION

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SECTION 08 1429**FLUSH WOOD DOORS: Factory-Finished, Clear****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Factory-finished flush wood doors.
- B. Related Requirements:
 - 1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for installation.
 - 2. Section 06 4114: 'Wood-Veneer-Faced Architectural Cabinets' for cabinet doors.
 - 3. Section 09 9324: 'Interior Clear-Finished Hardwood'.

1.2 REFERENCES

- A. Abbreviations And Acronyms:
 - 1. AWS: Architectural Woodwork Standards (formerly AWI).
 - 2. FD: Fire-resistant core, fire-resistant materials assembled to stiles and rails according to methods prescribed by the testing agency to meet rigorous smoke, flame, and pressure tests.
 - 3. FD-5: Core with 2 layers on each side.
 - 4. ME: Matching edges, i.e., vertical edges same as decorative faces.
 - 5. PC: Particleboard core, solid core door with stiles and rails bonded to the core and abrasive planed flat prior to the application of the faces.
 - 6. PC-5: Core with 2 layers on each side.
- B. Association Publications:
 - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
 - a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.
- C. Definitions:
 - 1. Book-Match: Matching between adjacent veneer leaves on one panel face. Every other piece of veneer is turned over so that the adjacent leaves are "opened" as two pages in a book. The fibers of the wood, slanting in opposite directions in the adjacent leaves, create a characteristic light and dark effect when the surface is seen from an angle.
 - 2. Fire-rated: Fire-retardant particleboard with an Underwriters' Laboratory (UL) stamp for Class 1 fire rating (Flame Spread 20, Smoke Developed 25). Fire-rated doors are available with particleboard and mineral cores for ratings up to 1-1/2 hours.
 - 3. Fire-rated Door: A door made of fire-resistant material that can be closed to prevent the spread of fire and can be rated as resisting fire for 20 minutes (1/3 hour), 30 minutes (1/2 hour), 45 minutes (3/4 hour) (C), 1 hour (B), or 1-1/2 hours (B). The door must be tested and carry an identifying label from a qualified testing and inspection agency.
 - 4. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade.
 - a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project's quality of materials, workmanship, or installation.
 - b. Premium Grade: The highest Grade available in both material and workmanship where the highest level of quality, materials, workmanship, and installation is required.
 - 5. Running Match: Each panel face is assembled from as many veneer leaves as necessary. Any portion left over from one panel may be used to start the next.
- D. Reference Standards:

1. American Architectural Manufacturers Association / Window & Door Manufacturers Association / CSA Group:
 - a. AAMA/WDMA/CSA 101/I.S.2/A440-17, 'North American Fenestration Standard/Specification for windows, doors, and skylights'
2. ASTM International:
 - a. ASTM C1036-16, 'Standard Specification for Flat Glass'.
 - b. ASTM C1048-18, 'Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass'.
3. Hardwood, Plywood, and Veneer Association:
 - a. HPVA HP-1-2016 'Standard for Hardwood and Decorative Plywood'.
4. National Particleboard Association / Composite Panel Association:
 - a. NPA A208.1-2009, 'Particleboard'.

1.3 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
 - a. Schedule showing type of door at each location. Included shall be size, veneer, core type, fire rating, hardware prep, openings, blocking, etc.
 - b. Indicate factory finish color and type.
2. Samples:
 - a. Interior Hardwood for Transparent Finish:
 - 1) Before performing work of this Section, prepare Control Sample, to match sample available from Owner, to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.
 - 2) Design Criteria:
 - a) Provide **8 inch by 10 inch (200 mm by 255 mm)** sample of Red Oak to match Owner provided stain color selected for Project.
 - b) Control Sample will be used as performance standard for evaluating finish provided.

B. Informational Submittals:

1. Source Quality Control Submittals:
 - a. Samples:
 - 1) Interior Hardwood for Transparent Finish:
 - a) Owner will provide Control Sample for finish.

C. Closeout Submittals:

1. Include following information in Operations And Maintenance Manuals specified in Section 01 7800:
 - a. Record Documentation:
 - 1) Manufacturers Documentation:
 - a) Manufacturer's product literature on doors and factory finish.
 - b) Maintenance and repair instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:

1. Deliver in clean truck and, in wet weather, under cover.
2. Deliver to building site only after plaster, cement, and taping compound are completed and dry and after interior painting operations have been completed.
3. Individually wrap in polyethylene bags for shipment and storage.

B. Storage And Handling Requirements:

1. Store doors in a space having controlled temperature and humidity range between 25 and 55 percent.
2. Store flat on level surface in dry, well ventilated space.

3. Cover to keep clean but allow air circulation.
4. Do not subject doors to direct sunlight, abnormal heat, dryness, or humidity.
5. Handle with clean gloves and do not drag doors across one another or across other surfaces.
6. Leave shipping bag on door after installation until immediately before substantial completion inspection.
7. Doors have been acclimated to the field conditions for a minimum of 72 hours before installation is commenced.

1.5 WARRANTY

A. Manufacturer Warranty:

1. Manufacturer's standard full door warranty for lifetime of original installation.
 - a. Warranty shall include finishing, hanging, and installing hardware if manufacturing defect was discovered after door was finished and installed.
 - b. Warranty to include defects in materials including following:
 - 1) Delaminating in any degree.
 - 2) Warp or twist of **1/4 inch (6 mm)** or more in door panel at time of one-year warranty inspection.
 - 3) Telegraphing of core assembly: Variation of **1/100 inch (0.25 mm)** or more in **3 inch (75 mm)** span.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Suppliers:

1. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements:
 - a. Architectural Building Supply, Salt Lake City, UT www.cookandboardman.com:
 - 1) Contact Information: Russ Farley: phone (800) 574-4369, fax 801-484-6817, or e-mail russf@absdoors.com.
 - b. Beacon Metals Inc, Salt Lake City, UT www.beacon-metals.com:
 - 1) Contact Information: Jared Butler: phone (801) 486-4884, cell (435) 216-2297, FAX 801-485-7647, or e-mail Jared@beacon-metals.com.
 - c. Midwest D-Vision Solutions, Salt Lake City, UT www.mwdsutah.com.
 - 1) Contact Information: Dan Mercer, office (801) 377-4355, cell (801) 618-9456, e-mail danm@mwdsutah.com.

B. Manufacturers:

1. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
 - a. Graham Wood Doors, Mason City, IA.
 - b. Marshfield Door Systems Inc, Marshfield, WI.
 - c. VT Industries, Holstein, IA.

C. Wood Doors:

1. Type: AWS PC-5ME or FD-5ME.
2. Grade: AWS Premium, except face veneer.
3. Fully Type I Construction: Adhere all glue lines with Type I adhesive, including veneer lay-up.
4. Face Veneer:
 - a. Plain sliced Red Oak meeting requirements of AWS Grade A, **1/50 inch (0.5 mm)** thick minimum immediately before finishing.
 - b. Face veneers shall be running book matched.
5. Core:
 - a. Fully bonded to stiles and rails and sanded as a unit before applying veneers.
 - b. Non-Rated:

- 1) 32 lb density meeting requirements of ANSI A208.1 Mat Formed Wood Particle Board, Grade 1-L-1 minimum.
 - 2) Stiles:
 - a) 1-3/8 inches (35 mm) deep minimum before fitting.
 - b) Stile face to be hardwood matching face veneer material, thickness manufacturer's standard.
 - 3) Rails:
 - a) 1-1/8 inches (28 mm).
 - b) Manufacturer's option.
- c. Fire-rated, AWS FD 1/3:
- 1) 32 lb density meeting requirements of ANSI A208.1 Mat Formed Wood Particle Board, Grade 1-L-1 minimum.
 - 2) Stiles:
 - a) 1-3/8 inches (35 mm) deep minimum before fitting.
 - b) Stile face to be hardwood matching face veneer material, thickness manufacturer's standard.
 - 3) Rails:
 - a) 1-1/8 inches (28 mm).
 - b) Manufacturer's option.
- D. Fabrication:
1. Doors shall be factory-machined. Coordinate with Section 08 1213 and Sections under 08 7000.
- E. Finishes:
1. Factory Finishing:
 - a. Applied by Door Manufacturer before leaving factory.
 - b. Performance / Design Criteria:
 - 1) Finish factory-finish to match Owner selected sample as specified in Section 09 9324.
 - c. Match existing Project Color Scheme:
 - a) Control Sample will be existing wood item from Project.
 - d. Finish: AWS Finish System TR-6 Catalyzed Polyurethane Premium Grade for unfilled, open-grain woods.

2.2 SOURCE QUALITY CONTROL

- A. Inspections:
1. Verification of Performance:
 - a. Doors shall have following information permanently affixed on top of door:
 - 1) Manufacturer:
 - 2) Door designation or model.
 - 3) Veneer species.
 - 4) Factory finish.
 2. Clear Finished Hardwood:
 - a. Color matches Owner provided sample specified in Section 09 9324.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 08 7101**COMMON FINISH HARDWARE REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. General requirements for finish hardware related to architectural wood and hollow metal doors.
- B. Related Requirements:
 - 1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for installation of hardware.
 - 2. Section 06 4114: 'Wood-Veneer-Faced Architectural Cabinets' for architectural woodwork hardware.
 - 3. Section 08 0601: 'Hardware Group and Keying Schedules'.
 - 4. Section 08 4113: 'Aluminum-Framed Entrances and Storefronts' for storefront hardware.

1.2 REFERENCES

- A. Association Publications:
 - 1. Builders Hardware Manufacturers Association (BHMA), 355 Lexington Avenue, 15th Floor, New York, NY 10017-6603, Tel: 212-297-2122 Fax: 212-370-9047, www.buildershardware.com.
- B. Reference Standards:
 - 1. International Code Council / American National Standards Institute:
 - a. ICC / ANSI A117.1-2009, 'Accessible and Usable Buildings and Facilities'.
 - 2. Underwriters Laboratories (UL):
 - a. UL 10B, 'Fire Tests of Door Assemblies' (10th Edition).
 - b. UL 10C, 'Positive Pressure Fire Tests of Door Assemblies' (Third Edition).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Hardware Templates:
 - a. Provide hardware templates to Sections 08 1213, 08 1313, and 08 1429 within fourteen (14) days after Architect approves hardware schedule.
 - b. Supply necessary hardware installation templates to Section 06 2024 before pre-installation conference.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's cut sheets.
 - b. Two (2) copies of Manufacturer's installation, adjustment, and maintenance instructions for each piece of hardware. Include one (1) set in 'Operations And Maintenance Manual' and send one (1) set with hardware when delivered.
 - c. Copy of hardware schedule.
 - d. Written copy of keying system explanation.
 - 2. Shop Drawings:
 - a. Submit hardware schedule indicating hardware to be supplied.
 - b. Schedule shall indicate details such as proper type of strikeplates, spindle lengths, hand, backset, and bevel of locks, hand and degree opening of closer, length of kickplates, length

of rods and flushbolts, type of door stop, and other necessary information necessary to determine exact hardware requirements.

B. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Operations and Maintenance Data:
 - 1) Manufacturer's installation, adjustment, and maintenance instructions for each piece of hardware.
 - b. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Manufacturer's literature and/or cut sheets.
 - b) Include keying plan and bitting schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage And Handling Requirements:

1. Neatly and securely package hardware items by hardware group and identify for individual door with specified group number and set number used on Supplier's hardware schedule.
2. Include fasteners and accessories necessary for installation and operation of finish hardware in same package.

PART 2 - PRODUCTS

2.1 SUPPLIERS

A. Existing Projects (Doors and Door Hardware):

1. USA Projects:
 - a. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories:
 - 1) Architectural Building Supply, Salt Lake City, UT www.cookandboardman.com:
 - a) Contact Information: Russ Farley: phone (800) 574-4369, fax 801-484-6817, or e-mail russf@absdoors.com.
 - 2) Beacon Metals Inc, Salt Lake City, UT www.beacon-metals.com:
 - a) Contact Information: Jared Butler: phone (801) 486-4884, cell (435) 216-2297, FAX 801-485-7647, or e-mail Jared@beacon-metals.com.
 - 3) Midwest D-Vision Solutions, Salt Lake City, UT www.mwdsutah.com.
 - a) Contact Information: Dan Mercer, office (801) 377-4355, cell (801) 618-9456, e-mail danm@mwdsutah.com.

2.2 FINISHES

A. Hardware Finishes:

1. Finishes for brass or bronze hardware items shall be:
 - a. ANSI / BHMA Finish Code 626.
 - 1) Description: Satin Chromium Plated.
 - 2) Base Metal: Brass. Bronze.
2. Finishes for flat goods items may be:
 - a. ANSI / BHMA Finish Code 630.
 - 1) Description: Satin Stainless Steel.
 - 2) Base Metal: Stainless Steel (300 Series).
3. Materials other than steel, brass, or bronze shall be finished to match appearance satin chromium plated, except flat goods which shall be satin stainless steel.

2.3 FASTENERS

- A. Fasteners shall be of suitable types, sizes and quantities to properly secure hardware. Fasteners shall be of same material and finish as hardware unless otherwise specified. Fasteners exposed to weather shall be non-ferrous or corrosion resisting steel.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before ordering materials, examine Contract Documents to be assured that material to be ordered is appropriate for thickness and substrate to which it is to be secured and will function as intended.

END OF SECTION

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SECTION 08 7102**HANGING DEVICES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Hinges for flush wood and hollow metal doors.
- B. Related Requirements:
 - 1. Section 08 7101: 'Common Hardware Requirements'.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Hager Companies, St Louis, MO www.hagerhinge.com.
 - b. Ives, New Haven, CT www.iveshardware.com.
 - c. McKinney, Scranton, PA www.mckinneyhinge.com.
 - d. PBB, Ontario, CA www.pbbinc.com.
 - e. Stanley (dormakaba Americas), Indianapolis IN www.stanleyhardwarefordoors.com/products/.
- B. Hinges:
 - 1. Doors:
 - a. Sizes:
 - 1) Non-Fire-Rated Doors:
 - a) 1-3/4 inch 44.5 mm non-fire-rated wood doors in wood frames: 4 inches by 4 inches (100 mm by 100 mm).
 - 2) Fire-Rated Doors:
 - a) 1-3/4 inch (45 mm) fire-rated doors in metal frames:
 - (1) Standard: 4-1/2 inches by 4-1/2 inches (115 mm by 115 mm).
 - (2) Wide Throw: 4-1/2 inches (115 mm) by width required.
 - 2. Use non-removable pins on exterior opening doors.
 - 3. Hinges on exterior doors shall be solid brass, plated to achieve specified finish.
 - 4. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a. Interior:
 - 1) Hager: BB 1279.
 - 2) Ives: 5BBI.
 - 3) McKinney: TA 2714.
 - 4) MacPro / McKinney: MPB79.
 - 5) PBB: BB81.
 - 6) Stanley: FBB 179.

PART 3 - EXECUTION: Not Used**END OF SECTION**

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SECTION 08 7103**SECURING DEVICES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Items for architectural wood or hollow metal doors:
 - a. Locksets and latchsets.
 - b. Cylinders.
- B. Related Requirements:
 - 1. Section 08 7101: Common Hardware Requirements.

1.2 REFERENCES

- A. Definitions:
 - 1. Grade 2 Standard Duty Key-In Lever Cylindrical Lockset:
 - a. Performance Features:
 - 1) Exceeds 400,000 ANSI cycles.
 - 2) Single motion egress provides easy emergency exit.
 - 3) Full 1 inch (25 mm) throwbolt with saw resistant hardened steel roller pin.
 - 4) Anti-drill design deadbolt. Two (2) ball bearings inserted to prevent drill attacks.
 - 5) ADA-compliant thumbturn.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Standard Key Delivery:
 - a. Include change keys with hardware.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Manufacturers:
 - 1. Manufacturer List:
 - a. Best Locks by Stanley, Indianapolis IN www.stanleysecuritysolutions.com.
 - b. Glynn-Johnson, Indianapolis, IN www.glynn-johnson.com.
 - c. Hager, St Louis, MO www.hagerhinge.com.
 - d. Ives, New Haven, CT www.iveshardware.com.
 - e. Knape & Vogt, Grand Rapids, MI www.knapeandvogt.com.
 - f. Marks USA, Amityville, NY www.marksusa.com.
 - g. Precision Hardware, Romulus, MI www.precisionhardware.com.
 - h. Rockwood, Manufacturing Co, Rockwood, PA www.rockwoodmfg.com.
 - i. Sargent, New Haven, CT www.sargentlock.com.
 - j. Schlage, Colorado Springs, CO www.schlage.com.
 - k. Von Duprin, Indianapolis, IN www.vonduprin.com.
 - l. Yale Commercial Locks, Lenoir City, TN www.yalecommercial.com.
- B. General:

1. Backsets shall be **2-3/4 inches (70 mm)**.
 2. Provide metal dust box strikes for wood frames.
 3. Furnish lead shields where required.
- C. Locksets And Latchsets:
1. Design Criteria:
 - a. Grade 2 Standard Duty Key-In Lever Cylindrical Lockset:
 - 1) ANSI/BHMA A156.02 Series 4000 Grade 2.
 - 2) Meet UL 3 hour fire rating.
 - 3) Meet ADA Compliant ANSI A117.1 Accessibility Code.
 - 4) Door Lever:
 - a) Meet California code for **1/2 inch (12.7 mm)** or less return to door.
 2. Lever Operated:
 - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) Grade 2 Standard Duty Key-In Lever Cylindrical Locksets:
 - a) 7K Series Best Lock with 15D Lever by Stanley standard cylinders - (I/C cores may be used when authorized by AEC).
 - b) 175 Series with American Lever by Marks USA.
 - c) 7 Line Series with L Lever by Sargent.
 - d) AL Series with Saturn (SAT) Lever by Schlage.
 - e) 5300LN Series with Augusta (AU) Lever by Yale.
- D. Standard Cylinders:
1. Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a. Match Manufacturer of locksets.

PART 3 - EXECUTION

3.1 CLOSE-OUT ACTIVITIES

- A. Owner's Instructions:
1. Before Final Acceptance Meeting, send master keys to FM Manager.

END OF SECTION

SECTION 08 7108**STOPS AND HOLDERS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Supplied But Not Installed Under This Section:
 - 1. Door stops.
- B. Related Sections:
 - 1. Section 08 7101: Common Hardware Requirements.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Glynn-Johnson, Indianapolis, IN www.glynn-johnson.com.
 - b. Hager, St Louis, MO www.hagerhinge.com.
 - c. Ives, Wallingford, CT www.iveshardware.com.
 - d. Rockwood Manufacturing Co, Rockwood, PA www.rockwoodmfg.com.
 - e. Sargent, New Haven, CT (800) 906-6606 or (203) 562-2151 www.sargentlock.com.
- B. Stops:
 - 1. Use wall type stops unless indicated otherwise on Door Schedule.
 - 2. Provide model appropriate for substrate. Wall stops may be either cast or wrought.
 - 3. Type Two Acceptable Products:
 - a. Interior Wall
 - b. Hager 236W
 - c. Ives WS407CCV
 - d. Rockwood 409
 - e. Equal as approved by Architect before Installation. See Section 01 6200.

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. Interface With Other Work: When using overhead stops, coordinate installation with door closer and other door hardware.

END OF SECTION

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SECTION 08 7109**ACCESSORIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Smoke Gaskets.
- B. Related Requirements:
 - 1. Section 08 7101: 'Common Finish Hardware Requirements' for general finish hardware requirements and Approved Suppliers.

1.2 REFERENCES

- A. Association Publications:
 - 1. American Architectural Manufacturers Association (AAMA):
 - a. AAMA 609 & 609-09, 'Cleaning and Maintenance Guide for Architecturally Finished Aluminum' (combined document).
 - b. AAMA 611-12, 'Voluntary Standards for Anodized Architectural Aluminum'.
 - c. AAMA 701/702-11, 'Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals'.
 - 2. National Association of Architectural Metal Manufacturers (NAAMM):
 - a. AMP 500-06, 'Metal Finishes Manual' for Architectural and Metal Products.
- B. Reference Standards:
 - 1. American National Standards Institute / Builders Hardware Manufacturers Association:
 - a. ANSI / BHMA A156.18-2012, 'Materials and Finishes'.
 - b. ANSI / BHMA A156.21-2014, 'American National Standard for Thresholds'.
 - 2. International Code Council / American National Standards Institute:
 - a. ICC / ANSI A117.1-2009, 'Accessible and Usable Buildings and Facilities'.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Hager, St Louis, MO www.hagerhinge.com.
 - b. NGP - National Guard Products, Memphis, TN www.ngpinc.com.
 - c. Pemko Manufacturing, Ventura, CA www.pemko.com.
- B. Smoke Gaskets:
 - 1. Color as selected by Architect.
 - 2. Type One Acceptable Products:
 - a. 726 by Hager.
 - b. 5050 by NGP.
 - c. PK 55 by Pemko.
 - d. Equal as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install smoke gaskets and acoustical seals in manner to give continuous air-tight fit.
 - 1. Install smoke gaskets as per Manufacturer's installation requirements:
 - a. Hinge Jamb: Install smoke gaskets on jamb face of door frame so door will compress smoke gasket.
 - b. Header and Strike Jamb: Install smoke gaskets on face of stop of door frame so door will compress smoke gasket.
 - 2. Install acoustical seal with seal under door.

END OF SECTION

DIVISION 09: FINISHES

09 0100 MAINTENANCE OF FINISHES

09 0193 REFINISHING INTERIOR CLEAR-FINISHED HARDWOOD

09 0500 COMMON WORK RESULTS FOR FINISHES

09 0503 FLOORING SUBSTRATE PREPARATION

09 2000 PLASTER AND GYPSUM BOARD

09 2900 GYPSUM BOARD

09 9000 PAINTS AND COATINGS

09 9001 COMMON PAINTING AND COATING REQUIREMENTS

09 9123 INTERIOR PAINTED GYPSUM BOARD, PLASTER

09 9124 INTERIOR PAINTED METAL

09 9125 INTERIOR PAINTED WOOD

09 9324 INTERIOR CLEAR-FINISHED HARDWOOD

09 9413 INTERIOR TEXTURED FINISHING

END OF TABLE OF CONTENTS

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SECTION 09 0193**REFINISHING INTERIOR CLEAR FINISHED HARDWOOD****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Preparing and refinishing following existing interior clear finished hardwood as described in Contract Documents:
 - a. Casework.
 - b. Standing and Running Trim.
 - c. Rostrum Casework.
- B. Related Requirements:
 - 1. Section 09 9001: Common Painting Requirements.

PART 2 - PRODUCTS**2.1 SYSTEMS**

- A. Description:
 - 1. Use MPI(r) RIN 6.3E Polyurethane Varnish Finish system. Substitution of lacquer for specified products and systems is not allowed under any circumstances.
- B. Performance:
 - 1. Design Criteria:
 - a. Gloss / Sheen Level Required: Gloss Level 6 or 7.
- C. Materials:
 - 1. Products listed in edition of MPI Approved Product List current at time of bidding are approved, providing they meet VOC requirements in force where Project is located.
 - 2. Stain: MPI Product 90.
 - 3. Finish Coats: MPI Product 56.

PART 3 - EXECUTION**3.1 APPLICATORS**

- A. Acceptable Applicators:
 - 1. Brandon's Majestic Interiors, Heber City, UT.
 - a. Contact information: Brandon, (801) 404-1825, e-mail brandon@majesticinteriors.net.
 - 2. Church Interiors Inc., Charlotte, NC www.churchinteriors.com.
 - a. Contact information: phone (800) 289-7397.
 - 3. Church Specialties Inc., Pleasant Grove, UT:
 - a. Contact information: Nathan Bishop, phone (801) 830-0376, fax (866) 430-0650, e-mail Nate_csi@icloud.com.
 - 4. Commercial Furnishings, LLC, Orem, UT www.commercialfurnishingsllc.com.
 - a. Contact information: Aaron, (801) 319-5814, email aaron@commercialfurnishingsllc.com.
 - 5. Harris Restoration & Upholstery Inc, Orem UT www.harrisupholstery.com.
 - a. Contact Information: email harris.restoration@gmail.com.
 - 6. Mobile Restoration Services, Pleasant Grove, UT:

- a. Contact Information: (801) 368-1493, email mobilerestorationservices@gmail.com.
7. Equal as approved by Architect before bidding. See Section 01 4300.

3.2 EXAMINATION

- A. Site Verification of Conditions:
 1. Using existing wood element that is not to be re-used, apply finish as specified for existing work.
 - a. Notify Architect immediately with preliminary results of testing.
 - b. Within four calendar days of test, meet with Architect and finish applicator to evaluate test results and performance of specified finish system. If specified system is not satisfactory, revised finish system will be determined and specified.

3.3 APPLICATION

- A. General:
 1. See appropriate paragraphs of Section 09 9001.
- B. Touch-up And Recoat:
 1. Sand with fine sandpaper to remove gloss, scratches, and blemishes.
 2. Clean surfaces with mild soap and water. Etch with tri-sodium phosphate (TSP).
 3. Patch scratches and gouges and stain as necessary to match adjacent wood.
 4. Apply two coats of Urethane using professional spray equipment.

END OF SECTION

SECTION 09 0503**FLOORING SUBSTRATE PREPARATION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
1. Coordination and scheduling of Owner Furnished Testing for Alkalinity and Concrete Moisture Testing of concrete slab as described in Contract Documents.
 2. Preparing floor substrate to receive flooring as described in Contract Documents.
 3. Perform building modifications and repairs to accommodate carpet and carpet base as described in Contract Documents.
- B. Related Requirements:
1. Pre-Installation conferences held jointly with Section 09 0503 as described in Administrative Requirements on Part 1 of this specification section.
 2. Section 01 1200: 'Multiple Contract Summary'.
 3. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
 4. Section 01 4000: 'Quality Requirements' for administrative and procedural requirements for quality assurance and quality control.
 5. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
 6. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
 7. Section 01 7800: 'Closeout Submittals'.
 8. Section 09 6816: 'Sheet Carpeting'.

1.2 REFERENCES

- A. Association Publications:
1. American Concrete Institute, Farmington Hills, MI www.concrete.org. Abstracts of ACI Periodicals and Publications.
 - a. ACI 302.2R-06, *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials* (August 15, 2006).
 2. International Concrete Repair Institute: '*ICRI Concrete Slab Moisture Testing Program*' Rosemont, IL www.icri.org.
 - a. ICRI Certification: 'Concrete Slab Moisture Testing Technician, Tier 2, Grade 1'.
- B. Reference Standards:
1. ASTM International:
 - a. ASTM F710-11, 'Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring'.
 - b. ASTM F1869-16, 'Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride'.
 - c. ASTM F2170-16, 'Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
1. Participate in pre-installation conference held jointly if possible for all related Division 09 6000 'Flooring' used for Project.

2. Schedule conference after substrate preparation and before installation of flooring system. (If more than one (1) flooring system is included for project, hold conference at same time if schedule permits).
3. Conference may be held at project site or other convenient site. Participants may also attend by video or audio conference if approved by Project Manager.
4. In addition to agenda items specified in Section 01 3100, review following:
 - a. Review condition of floor with regard to compliance with concrete installation tolerances and other work necessary to prepare floors for installation of flooring.
5. Review condition of floor with regard to compliance with concrete installation tolerances and other work necessary to prepare floors for installation of flooring.
6. Review additional agenda items all related flooring sections.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Storage And Handling Requirements:
1. Provide storage space and protection for flooring and installation accessories if materials are delivered before start of flooring installation.

1.5 FIELD CONDITIONS

- A. Existing Conditions:
1. If asbestos containing materials are suspected or discovered upon removing carpet, stop work and report to Architect and Owner's Representative before proceeding:
 - a. Do not use solvents to wash substrate during abatement process.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION

3.1 PREPARATION

- A. Flooring Preparation:
1. General:
 - a. Prepare floor substrate in accordance with ASTM F710, 'Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring' (This standard is used for preparing concrete floors for all flooring).
 - 1) Required RH test and alkalinity test of concrete slab has been performed.
 - b. Concrete floor slab patching:
 - 1) Cracks, chips and joints must be properly patched or repaired.
 - c. Concrete surface cured, clean, dry, and free of foreign substances that will compromise carpet and/or other flooring installations.
 - 1) Removal of curing compounds.
 - 2) Remove paint, sealer, grease, oil, silicone sealants, and other materials incompatible with flooring adhesives.
 - 3) Removal of overspray from painted walls (essential so glue will stick).
 - d. Vacuum and damp mop floor areas to receive flooring before flooring installation.
 2. Carpeted floor areas:
 - a. Prepare floor substrate in accordance with Carpet And Rug Institute (CRI) best practices to receive carpet installation and to provide installation that meets Carpet Manufacturer's warranty requirements.
- B. Carpet Accessories:
1. Sundry items, such as adhesives, shall be conditioned to building ambient conditions before use.

END OF SECTION

SECTION 09 2900**GYPSUM BOARD****PART 1 - GENERAL****1.1 SUMMARY**

A. Includes But Not Limited To:

1. Furnish and install gypsum board as described in Contract Documents, except behind ceramic tile.

B. Related Requirements:

1. Section 09 9413: 'Interior Textured Finishing'.

1.2 REFERENCES

A. Definitions:

1. Accessories: Metal or plastic beads, trim, or moulding used to protect or conceal corners, edges, or abutments of the gypsum board construction.
2. Drywall Primer: Paint material specifically formulated to fill the pores and equalize the suction difference between gypsum board surface paper and the compound used on finished joints, angles, fastener heads, and accessories and over skim coatings.
3. Skim Coat: Either a thin coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer's recommendations, over the entire surface.
4. Texturing: Regular or irregular patterns typically produced by applying a mixture of joint compound and water, or proprietary texture materials including latex base texture paint, to a gypsum board surface previously coated with drywall primer.

B. Reference Standards:

1. ASTM International:
 - a. ASTM C11-18, 'Standard Terminology Relating to Gypsum and Related Building Materials and Systems'.
 - b. ASTM C475/C475M-17, 'Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board'.
 - c. ASTM C840-18a, 'Standard Specification for Application and Finishing of Gypsum Board'.
 - d. ASTM C1002-18, 'Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs'.
 - e. ASTM C1047-14a, 'Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base'.
 - f. ASTM C1178/C1178M-18, 'Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel'.
 - g. ASTM C1396/C1396M-17, 'Standard Specification for Gypsum Board'.
 - h. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - i. ASTM E119-18b, 'Standard Test Method for Fire Tests of Building Construction and Materials'.
2. Gypsum Association:
 - a. GA-214-15, 'Recommended Levels of Gypsum Board Finish'.
 - b. GA-216-16: 'Application and Finishing of Gypsum Panel Products'.
 - c. GA-600-15, 'Fire Reference Design Manual'.
 - d. GA-801-2017, 'Handling and Storage of Gypsum Panel Products: A Guide for Distributors, Retailers, and Contractors'.

3. International Building Code (IBC) (2018 or latest approved version):
 - a. Chapter 25, 'Gypsum Board And Plaster'.
4. Standards Council of Canada / Underwriters Laboratories of Canada:
 - a. CAN/ULC-S102:2018: 'Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies'.
5. Underwriters Laboratories, Inc.
 - a. UL 263: 'Test Method for Fire Tests of Building Construction and Materials' (14th Edition).
 - b. UL 723: 'Test for Surface Burning Characteristics of Building Materials; (11th Edition).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 1. Schedule MANDATORY pre-installation conference immediately before installation of gypsum wallboard.
 2. In addition to agenda items specified in Section 01 3100, review following:
 - a. Finish requirements necessary for installation of finish materials over gypsum wallboard, and location and installation of ceramic tile backerboard.

1.4 SUBMITTALS

- A. Informational Submittals:
 1. Test And Evaluation Reports:
 - a. Fire test results or assembly diagrams and numbers confirming products used will provide required fire ratings with installation configurations used.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General:
 1. Following recommendations of GA-801 Guide for Handling and Storage of Gypsum Panel Products unless local, state or federal laws or agency rules differing from the recommendations shall take precedence.
- B. Delivery And Acceptance Requirements:
 1. Deliver materials in original packages, containers, or bundles bearing brand name, applicable standard designation, and Manufacturer's name.
- C. Storage And Handling Requirements:
 1. Store material under roof and keep dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack gypsum board flat to prevent sagging.

1.6 FIELD CONDITIONS

- A. Ambient Conditions:
 1. Comply with ASTM C840 or GA-216 requirements, whichever are more stringent:
 - a. Do not install interior products until installation areas are enclosed and conditioned.
 - 1) Temperature shall be 50 deg F (10 deg C) and 95 deg F (35 deg C) maximum day and night during entire joint operation and until execution of Certificate of Substantial Completion.
 - 2) Provide ventilation to eliminate excessive moisture.
 - 3) Avoid hot air drafts that will cause too rapid drying.
 - b. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturers:

1. Manufacturer Contact List:
 - a. American Gypsum, Dallas, TX www.americangypsum.com.
 - b. CertainTeed Gypsum, Inc; Tampa, FL www.certainteed.com.
 - c. Georgia Pacific, Atlanta, GA www.gp.com.
 - d. National Gypsum, Charlotte, NC www.nationalgypsum.com.
 - e. Pabco Gypsum, Newark, CA www.pabco gypsum.com.
 - f. United States Gypsum Co, Chicago, IL www.usg.com.

B. Materials:

1. Interior Gypsum Board:
 - a. General:
 - 1) Size:
 - a) Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
 - 2) Class Two Quality Standard:
 - a) Core: Fire-resistant rated gypsum core.
 - b) Complies with Type X requirements of ASTM C1396/C1396M (Section 5).
 - c) Surface paper: Face paper suitable for painting.
 - d) Long edges: Tapered edge.
 - e) Overall thickness: **5/8 inch (15.9 mm)**.

2.2 ACCESSORIES

A. Manufacturers:

1. Manufacturer Contact List:
 - a. Kinetics Noise Control, Dublin, OH www.kineticsnoise.com.
 - b. Magnum Products, Lenaxa, KS www.levelcoat.com.
 - c. National Gypsum, Charlotte, NC www.nationalgypsum.com.
 - d. Soundproofing Co, San Marcos, CA www.soundproofing.org.
 - e. United States Gypsum Co, Chicago, IL www.usg.com.
 - f. Westpac Materials Inc, Orange, CA www.westpacmaterials.com.
 - g. Wm. Zinsser & Co, Somerset, NJ www.zinsser.com.
 - h. Corner And Edge Trim:
 - 1) Metal, paper-faced metal, paper-faced plastic, or solid vinyl meeting requirements of ASTM C1047. Surfaces to receive bedding cement treated for maximum bonding.
 - i. Control Joint:
 - 1) Bent zinc sheet with V-shaped slot, perforated flanges, covered with plastic tape meeting requirements of ASTM C1047.
2. Gypsum Board Mounting Accessories:
 - a. Furring Channels:
 - 1) Class Two Quality Standards. See Section 01 6200 for definitions:
 - a) Walls: Galvanized DWFC-25.
 - b) Ceilings: Galvanized DWFC-20.
 - 2) Accessories as required by Manufacturer's fire tests to provide necessary fire ratings.
 - b. Corner And Edge Trim:
 - 1) Metal, paper-faced metal, paper-faced plastic, or solid vinyl meeting requirements of ASTM C1047. Surfaces to receive bedding cement treated for maximum bonding.
 - c. Control Joint:
 - 1) Bent zinc sheet with V-shaped slot, perforated flanges, covered with plastic tape meeting requirements of ASTM C1047.
3. Joint Compound:

- a. Best grade or type recommended by Board Manufacturer and meeting requirements of ASTM C475/C475M.
 - 1) Use Taping Compound for first coat to embed tape and accessories.
 - 2) Use Taping Compound or All-Purpose Compound for subsequent coats except final coat.
 - 3) Use Finishing Compound for final coat and for skim coat.
 4. Joint Reinforcing:
 - a. Paper reinforcing tape acceptable to Gypsum Board Manufacturer.
 5. Fasteners:
 - a. Bugle head screws meeting requirements of ASTM C1002:
 - 1) Gypsum Board:
 - a) Type W: For fastening gypsum board to wood members, of length to penetrate wood framing **5/8 inch (15.9 mm)** minimum.
 - b) Type S: For fastening gypsum board to steel framing and ceiling suspension members, of length to penetrate steel framing **3/8 inch (9.5 mm)** minimum.
- B. Primer / Surfacers On Surfaces To Receive Texturing:
1. Type Two Acceptable Products:
 - a. Sheetrock First Coat by USG.
 - b. Prep Coat by Westpac Materials.
 - c. Level Coat by Magnum Products.
 - d. Equal as approved by Architect before bidding. See Section 01 6200.
- C. Primer On Surfaces To Receive Wallcovering:
1. White, self-sizing, water based, all purpose wallcovering primer.
 2. Type Two Acceptable Products:
 - a. Shieldz Universal Pre-Wallcovering Primer by Wm. Zinsser and Company.
 - b. Equal as approved by Architect before application. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
1. Examine substrate and verify framing is suitable for installation of gypsum board.
 2. Examine gypsum board before installation. Reject panels that are wet, moisture damaged, and mold damaged.
 3. Notify Architect of unsuitable conditions in writing.
 - a. Do not install board over unsuitable conditions.
 4. Commencement of Work by installer is considered acceptance of substrate.

3.2 INSTALLATION

- A. Interface With Other Work:
1. Coordinate with Division 06 for location of backblocking for edges and ends of gypsum board and for blocking required for installation of equipment and building specialties.
 2. Do not install gypsum board until required blocking is in place.
- B. General: Install and finish as recommended in ASTM C840 or GA-216 unless specified otherwise in this Section.
- C. Mounting Accessories:
1. Furring Channels: Apply with screws through flanges into each framing member.
- D. Interior Gypsum Board:

1. General:
 - a. Install so trim and reinforcing tape are fully backed by gypsum board. No hollow spaces between pieces of gypsum board over **1/8 inch (3 mm)** wide before taping are acceptable.
 - b. Rout out backside of gypsum board to accommodate items that extend beyond face of framing, but do not penetrate face of gypsum board, such as metal door frame mounting brackets, etc.
 - c. On walls over **108 inches (2 700 mm)** high, apply board perpendicular to support
 - d. Butt edges in moderate contact. Do not force in place. Shim to level.
 - e. Leave facings true with joint, finishing flush. Vertical work shall be plumb and ceiling surfaces level.
 - f. Scribe work closely:
 - 1) Keep joints as far from openings as possible.
 - 2) If joints occur near an opening, apply board so vertical joints are centered over openings.
 - 3) No vertical joints shall occur within **8 inches (200 mm)** of external corners or openings.
 - g. Install board tight against support with joints even and true. Tighten loose screws.
 - h. Caulk perimeter joints in sound insulated rooms with specified acoustical sealant.
2. Fastening:
 - a. Apply from center of board towards ends and edges.
 - b. Apply screws **3/8 inch (9.5 mm)** minimum from ends and edges, **one inch (25 mm)** maximum from edges, and **1/2 inch (13 mm)** maximum from ends.
 - c. Spacing:
 - 1) Ends: Screws not over **7 inches (175 mm)** on center at edges where blocking or framing occurs.
 - 2) Wood Framed Walls And Ceilings: Screws **7 inches (175 mm)** on center in panel field.
 - 3) Metal Framed Walls: Screws **12 inches (300 mm)** on center in panel field.
 - d. Set screw heads **1/32 inch (0.8 mm)** below plane of board, but do not break face paper. If face is accidentally broken, apply additional screw **2 inches (50 mm)** away.
 - e. Screws on adjacent ends or edges shall be opposite each other.
 - f. Drive screws with shank perpendicular to face of board
3. Trim:
 - a. Corner Beads:
 - 1) Attach corner beads to outside corners.
 - a) Attach metal corner bead with staples spaced **4 inches (100 mm)** on center maximum and flat taped over edges of corner bead. Also, apply screw through edge of corner bead where wood trim will overlay corner bead.
 - b) Set paper-faced trim in solid bed of taping compound.
 - b. Edge Trim: Apply where gypsum board abuts dissimilar material. Hold channel and 'L' trim back from exterior window and door frames **1/8 inch (3 mm)** to allow for caulking.
4. Finishing:
 - a. General:
 - 1) Tape and finish joints and corners throughout building as specified below to correspond with final finish material to be applied to gypsum board. When sanding, do not raise nap of gypsum board face paper or paper-faced trim.
 - 2) First Coat:
 - a) Apply tape over center of joint in complete, uniform bed of specified taping compound and wipe with a joint knife leaving a thin coating of joint compound. If metal corner bead is used, apply reinforcing tape over flange of metal corner bead and trim so half of tape width is on flange and half is on gypsum board.
 - b) Completely fill gouges, dents, and fastener dimples.
 - c) Allow to dry and sand lightly if necessary, to eliminate high spots or excessive compound.
 - 3) Second Coat:
 - a) Apply coat of specified joint compound over embedded tape extending **3-1/2 inches (88 mm)** on both sides of joint center. Use finishing compound only if applied coat is intended as final coat.
 - b) Re-coat gouges, dents, and fastener dimples.
 - c) Allow to dry and sand lightly to eliminate high spots or excessive compound.

- 4) Third Coat: Apply same as second coat except extend application **6 inches (150 mm)** on both sides of joint center. Allow to dry and sand with fine sandpaper or wipe with damp sponge.
- 5) Fourth Coat: Apply same as second coat except extend application **9 inches (425 mm)** on both sides of joint center. Allow to dry and sand with fine sandpaper or wipe with damp sponge.
- a. Finishing Levels: Finish panels to levels indicated below and according to ASTM C840, GA-214 and GA-216:
 - 1) Gypsum Board Surfaces to Receive: Painted Texturing - Section 09 9413: 'Interior Textured Finishing':
 - 2) Gypsum Board Surfaces to Receive: Smooth Gypsum Board Surfaces:
 - a) GA-214 Level 4: 'All and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Coat prepared surface with specified primer'.

3.3 FIELD QUALITY CONTROL

A. Non-Conforming Work:

1. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - a. Indications that panels are wet, or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - b. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

3.4 CLEANING

- #### A. Remove from site debris resulting from work of this Section including taping compound spills.

END OF SECTION

SECTION 09 9001

COMMON PAINTING AND COATING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Common procedures and requirements for field-applied painting and coating.
- B. Related Requirements:
 - 1. Section 07 9213: 'Elastomeric Joint Sealants' for quality of Elastomeric Joint Sealants.
 - 2. Sections under 09 9000 heading 'Paints and Coatings'.
 - a. Pre-Installation conferences held jointly with Section 09 9001.

1.2 REFERENCES

- A. Definitions:
 - 1. Damage Caused By Others: Damage caused by individuals other than those under direct control of Painting Applicator (MPI(a), PDCA P1.92).
 - 2. Gloss Levels:
 - a. Specified paint gloss level shall be defined as sheen rating of applied paint, in accordance with following terms and values, unless specified otherwise for a specific paint system.

Gloss Level '1'	Traditional matte finish - flat	0 to 5 units at 60 degrees to 10 units maximum at 85 degrees.
Gloss Level '2'	High side sheen flat - 'velvet-like' finish	10 units maximum at 60 degrees and 10 to 35 units at 85 degrees.
Gloss Level '3'	Traditional 'eggshell-like' finish	10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
Gloss Level '4'	'Satin-like' finish	20 to 35 units at 60 degrees and 35 units minimum at 85 degrees.
Gloss Level '5'	Traditional semi-gloss	35 to 70 units at 60 degrees.
Gloss Level '6'	Traditional gloss	70 to 85 units at 60 degrees.
Gloss Level "7"	High gloss	More than 85 units at 60 degrees.

- 3. Properly Painted Surface:
 - a. Surface that is uniform in appearance, color, and sheen and free of foreign material, lumps, skins, runs, sags, holidays, misses, strike-through, and insufficient coverage. Surface free of drips, spatters, spills, and overspray caused by Paint Applicator. Compliance will be determined when viewed without magnification at a distance of 5 feet (1.50 m) minimum under normal lighting conditions and from normal viewing position (MPI(a), PDCA P1.92).
- 4. Latent Damage: Damage or conditions beyond control of Painting Applicator caused by conditions not apparent at time of initial painting or coating work.

- B. Reference Standards:
 - 1. The latest edition of the following reference standard shall govern all painting work:
 - a. MPI(a), 'Architectural Painting Specification Manual' by Master Painters Institute (MPI), as issued by local MPI Accredited Quality Assurance Association having jurisdiction.
 - b. MPI(r), 'Maintenance Repainting Manual' by Master Painters Institute (MPI), as issued by local MPI Accredited Quality Assurance Association having jurisdiction.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
 - 1. Schedule painting pre-installation conference after delivery of paint or coatings and before or at same time as application of field samples.
 - a. Coordinate pre-installation conferences of all related painting and coating Sections under 09 9000 heading 'Paints and Coatings'.
 - b. Schedule conference before preparation of control samples as specified in Sections under 09 9000 heading 'Paints and Coatings'.
 - c. Conference to be held at same time as Section 09 2900 to review gypsum board finish preparation.
 - 2. In addition to agenda items specified in Section 01 3100, review following:
 - a. Review Quality Assurance for Approval requirements.
 - b. Review Quality Assurance Field Sample requirements.
 - c. Review Submittal requirements for compliance for MPI Approved Products.
 - d. Review Design Criteria requirements.
 - e. Review Cleaning requirements.
 - f. Review painting schedule.
 - g. Review safety issues.
 - 3. Review additional agenda items from Sections under 09 9000 heading 'Paints and Coatings'.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Include following information for each painting product, arranged in same order as in Project Manual.
 - 1) Manufacturer's cut sheet for each product indicating ingredients and percentages by weight and by volume, environmental restrictions for application, and film thicknesses and spread rates.
 - 2) Provide one (1) copy of 'MPI Approved Products List' showing compliance for each MPI product specified.
 - a) MPI Information is available from MPI Approved Products List using the following link: <http://www.paintinfo.com/mpi/approved/index.shtml>.
 - 3) Confirmation of colors selected and that each area to be painted or coated has color selected for it.
 - 2. Samples: Provide two 4 inch by 6 inch (100 mm by 150 mm) minimum draw-down cards for each paint or coating color selected for this Project.
- B. Informational Submittals:
 - 1. Manufacturer Instructions:
 - a. Manufacturer's substrate preparation instructions and application instruction for each painting system used on Project.
 - 2. Qualification Statement:
 - a. Applicator:
 - 1) Provide Qualification documentation if requested by Architect or Owner.
- C. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Record Documentation:
 - 1) Manufacturer's documentation:
 - a) Manufacturer's cut sheet for each component of each system.
 - b) Schedule showing rooms and surfaces where each system was used.

1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approval:

1. Conform to work place safety regulations and requirements of those authorities having jurisdiction for storage, mixing, application and disposal of all paint and related hazardous materials.
2. Paint and painting materials shall be free of lead and mercury, and have VOC levels acceptable to local jurisdiction.
3. Master Painters Institute (MPI) Standards:
 - a. Products: Comply with MPI standards indicated and listed in 'MPI Approved Products List'.
 - b. Preparation and Workmanship: Comply with requirements in 'MPI Architectural Painting Specification Manual' for products and coatings indicated.

B. Qualifications:

1. Applicator: Requirements of Section 01 4301 applies, but not limited to following:
 - a. Minimum five (5) years experience in painting installations.
 - b. Minimum five (5) satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding.
 - c. Maintain qualified crew of painters throughout duration of the Work.
 - d. Upon request, submit documentation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:

1. Deliver specified products in sealed, original containers with Manufacturer's original labels intact on each container.
2. Deliver amount of materials necessary to meet Project requirements in single shipment.

B. Storage And Handling Requirements:

1. Store materials in single place.
2. Keep storage area clean and rectify any damage to area at completion of work of this Section.
3. Maintain storage area at **55 deg F (13 deg C)** minimum.

1.7 FIELD CONDITIONS

A. Ambient Conditions:

1. Perform painting operations at temperature and humidity conditions recommended by Manufacturer for each operation and for each product for both interior and exterior work.
2. Apply painting systems at lighting level of 540 Lux (50 foot candles) minimum on surfaces to be painted.
 - a. Inspection of painting work shall take place under same lighting conditions as application.
 - b. If painting and coating work is applied under temporary lighting, deficiencies discovered upon installation of permanent lighting will be considered latent damage as defined in MPI Manual, PDCA P1-92.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Performance:

1. Design Criteria:
 - a. Provide materials for use within each coating 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.
 - b. All materials, preparation and workmanship shall conform to requirements of 'Architectural Painting Specification Manual' by Master Painters Institute (MPI).
 - c. All paint manufacturers and products used shall be as listed under Approved Product List section of MPI Painting Manual.

- d. Provide Premium Grade systems (2 top coats) as defined in MPI Architectural Painting Specification Manual, except as otherwise indicated.
 - e. Where specified paint system does not have Premium Grade, provide Budget Grade.
 - f. Provide products of same manufacturer for each coat in coating system.
 - g. Where required to meet LEED (Leadership in Energy and Environmental Design) program requirements, use only MPI listed materials having an "L" rating designation.
 - h. Color Levels:
 - 1) Color Level II:
 - a) Number and placement of interior and exterior paint colors and gloss levels shall be as defined by Color Level II from MPI Manual, PDCA P3-93 as modified in following paragraph.
 - b) No more than one paint color or gloss level will be selected for same substrate within designated interior rooms or exterior areas.
- B. Materials:
1. Materials used for any painting system shall be from single manufacturer unless approved otherwise in writing by painting system manufacturers and by Architect. Include manufacturer approvals in Product Data submittal.
 2. Linseed oil, shellac, turpentine, and other painting materials shall be pure, be compatible with other coating materials, bear identifying labels on containers, and be of highest quality of an approved manufacturer listed in MPI manuals. Tinting color shall be best grade of type recommended by Manufacturer of paint or stain used on Project.

PART 3 - EXECUTION

3.1 APPLICATORS

- A. Approved Applicators:
1. Meet Quality Assurance Applicator Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

- A. Verification Of Conditions:
1. Directing applicator to begin painting and coating work will indicate that substrates to receive painting and coating materials have been previously inspected as part of work of other Sections and are complete and ready for application of painting and coating systems as specified in those Sections.
- B. Pre-Installation Testing:
1. Before beginning work of this Section, examine, and test surfaces to be painted or coated for adhesion of painting and coating systems.
 2. Report in writing to Architect of conditions that will adversely affect adhesion of painting and coating work.
 3. Do not apply painting and coating systems until party responsible for adverse condition has corrected adverse condition.
- C. Evaluation And Assessment:
1. Report defects in substrates that become apparent after application of primer or first finish coat to Architect in writing and do not proceed with further work on defective substrate until such defects are corrected by party responsible for defect.

3.3 PREPARATION

- A. Protection Of In-Place Conditions:

1. Protect other finish work and adjacent materials during painting. Do not splatter, drip, or paint surfaces not intended to be painted. These items will not be spelled out in detail but pay special attention to the following:
 - a. Do not paint finish copper, bronze, chromium plate, nickel, stainless steel, anodized aluminum, or monel metal except as explicitly specified.
 - b. Keep cones of ceiling speakers completely free of paint. In all cases where painting of metal speaker grilles is required, paint without grilles mounted to speakers and without grilles on ceiling.
 - c. On existing work where ceiling is to be painted, speakers and grilles are already installed, and ceiling color is not being changed, mask off metal grilles installed on ceiling speakers. If ceiling color is being changed, remove metal grilles and paint, and mask off ceiling speakers.
- B. Surface Preparation:
 1. Prepare surfaces in accordance with MPI requirements and requirements of Manufacturer for each painting system specified, unless instructed differently in Contract Documents. Bring conflicts to attention of Architect in writing.
 2. Fill minor holes and cracks in wood surfaces to receive paint or stain.
 3. Surfaces to be painted shall be clean and free of loose dirt. Clean and dust surfaces before painting or finishing.
 4. Do no exterior painting while surface is damp, unless recommended by Manufacturer, nor during rainy or frosty weather. Interior surfaces shall be dry before painting. Moisture content of materials to be painted shall be within tolerances acceptable to Paint Manufacturer.
 5. Sand woodwork smooth in direction of grain leaving no sanding marks. Clean surfaces before proceeding with stain or first coat application.

3.4 APPLICATION

- A. Interface With Other Work:
 1. Coordinate with other trades for materials and systems that require painting before installation.
 2. Schedule painting and coating work to begin when work upon which painting and coating work is dependent has been completed. Schedule installation of pre-finished and non-painted items, which are to be installed on painted surfaces, after application of final finishes.
- B. Paint or finish complete all surfaces to be painted or coated as described in Contract Documents, including but not limited to following items.
 1. Finish casework and wood trims that are specified to be installed under Section 06 2001 and that are not called out to be factory-or shop-finished. Back prime wood elements to be installed against concrete or masonry or that may be subjected to moisture.
 2. Paint mechanical, electrical, and audio/visual items that require field painting as indicated in Contract Documents. These include but are not limited to:
 - a. Gas pipe from gas meter into building.
 - b. Mechanical flues and pipes penetrating roof.
 - c. Electrical panel and disconnect enclosures.
 - d. Metal protective structures for refrigerant lines.
 3. Metal reveals at ceiling access doors.
 4. Paint inside of chases in occupied spaces flat black for **18 inches (450 mm)** or beyond sightline, whichever is greater.
 5. Paint surfaces behind speaker grilles incorporating grille cloth with flat black paint.
 6. Paint surfaces in organ chamber behind grille cloth with flat black paint.
- C. Apply sealant in gaps **3/16 inch (5 mm)** and smaller between two substrates that are both to be painted or coated. Sealants in other gaps furnished and installed under Section 07 9213.
- D. On wood to receive a transparent finish, putty nail holes in wood after application of stain using natural colored type to match wood stain color. Bring putty flush with adjoining surfaces.

- E. In multiple coat paint work, tint each succeeding coat with slightly lighter color, but approximating shade of final coat, so it is possible to check application of specified number of coats. Tint final coat to required color.
- F. Spread materials smoothly and evenly. Apply coats to not less than wet and dry film thicknesses and at spreading rates for specified products as recommended by Manufacturer.
- G. Touch up suction spots after application of first finish coat.
- H. Paint shall be thoroughly dry and surfaces clean before applying succeeding coats.
- I. Use fine sandpaper between coats as necessary to produce even, smooth surfaces.
- J. Make edges of paint adjoining other materials or colors clean, sharp, and without overlapping.
- K. Finished work shall be a 'Properly Painted Surface' as defined in this Section.

3.5 FIELD QUALITY CONTROL

- A. Non-Conforming Work:
 - 1. Correct deficiencies in workmanship as required to leave surfaces in conformance with 'Properly Painted Surface,' as defined in this Section.
 - 2. Correction of 'Latent Damage' and 'Damage Caused By Others,' as defined in this Section, is not included in work of this Section.

3.6 CLEANING

- A. General:
 - 1. As work proceeds and upon completion of work of any painting Section, remove paint spots from floors, walls, glass, or other surfaces and leave work clean, orderly, and in acceptable condition.
- B. Waste Management:
 - 1. Remove rags and waste used in painting operations from building each night. Take every precaution to avoid danger of fire.
 - 2. Paint, stain and wood preservative finishes and related materials (thinners, solvents, caulking, empty paint cans, cleaning rags, etc.) shall be disposed of subject to regulations of applicable authorities having jurisdiction.
 - 3. Remove debris caused by work of paint Sections from premises and properly dispose.
 - 4. Retain cleaning water and filter out and properly dispose of sediments.

END OF SECTION

SECTION 09 9123**INTERIOR PAINTED GYPSUM BOARD, PLASTER****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Preparing, priming, and finish painting new and existing interior gypsum board and plaster surfaces as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 09 2900: 'Gypsum Board' for:
 - a. Priming new and existing interior gypsum board surfaces to receive sheet wall covering system or texturing.
 - b. Pre-installation conference.
 - 2. Section 09 9001: 'Common Painting And Coating Requirements':
 - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.
 - 3. Section 09 9413: 'Interior Textured Finishing' for textured finishes.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
 - 1. Participate in pre-installation conference as specified in Section 09 2900.
 - a. In addition to agenda items specified in Section 01 3100 and Section 09 2900, review following:
 - 1) Review finish level requirements of gypsum wallboard as specified in Section 09 2900.
 - 2. Participate in pre-installation conference as specified in Section 09 9001.

PART 2 - PRODUCTS**2.1 SYSTEM**

- A. Manufacturers:
 - 1. Category Four Approved Manufacturers and Products. See Section 01 6200 for definitions of Categories.
 - a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.
- B. Description:
 - 1. All Other:
 - a. New Surfaces: Use MPI(a) INT 9.2B Latex Finish system.
 - b. Previously Finished Work: Use MPI(r) RIN 9.2B Latex Finish system.
- C. Performance:
 - 1. Design Criteria:
 - a. New Surfaces: MPI Premium Grade finish requirements.
 - b. Deteriorated Existing Surfaces: MPI Premium Grade finish requirements.
 - c. Sound Existing Surfaces: MPI Custom Grade requirements.
 - d. Gloss / Sheen Required:
 - 1) Remaining Painted Surfaces: Gloss Level 5.

- D. Materials:
 - 1. Primers:
 - a. MPI Product 50, 'Primer Sealer, Latex, Interior'.
 - 2. Finish Coats:
 - a. Remaining Painted Surfaces:
 - 1) MPI Product 141, 'Latex, Interior, High Performance Architectural, Semi-Gloss (MPI Gloss Level 5)'.

PART 3 - EXECUTION

3.1 APPLICATION

- A. General: See appropriate paragraphs of Section 09 9001.
- B. New Surfaces:
 - 1. Primer: Apply primer to be covered with other paint coats with roller only, or with spray gun and back-rolled.
- C. Existing Painted Surfaces:
 - 1. Remove deteriorated existing paint down to sound substrate by scraping or sanding. Feather edges of existing paint by sanding to be smooth with adjacent surfaces.
 - 2. Clean surface with mild soap and water, or with tri-sodium phosphate (TSP). Wash surfaces that have been defaced with marking pens, crayons, lipstick, etc, with solvent recommended by Paint Manufacturer. Spot prime such surfaces.
 - 3. Spackle and tape cracks. Sand to smooth finish and spot prime.
 - 4. Sand or chemically etch existing painted surface as required to prepare surface to accept new paint.
 - 5. Re-clean surface.
 - 6. Apply primer coat.
 - 7. Apply finish coats.

END OF SECTION

SECTION 09 9124**INTERIOR PAINTED METAL****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Preparing and painting new and existing interior metal surfaces as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 09 9001: 'Common Painting And Coating Requirements':
 - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
 - 1. Participate in pre-installation conference as specified in Section 09 9001.

PART 2 - PRODUCTS**2.1 SYSTEM**

- A. Manufacturers:
 - 1. Category Four Approved Products and Manufacturers. See Section 01 6200 for definitions of Categories.
 - a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.
- B. Description:
 - 1. Ferrous Metal:
 - a. New Surfaces: Use MPI(a) INT 5.1B Waterborne Light Industrial Finish system.
 - b. Previously Finished Surfaces: Use MPI(r) RIN 5.1B Waterborne Light Industrial Finish system.
 - 2. Galvanized Metal:
 - a. New Surfaces: Use MPI(a) INT 5.3J Latex Finish system
 - b. Previously Finished Surfaces: Use MPI(r) RIN 5.3AH Latex Finish system.
 - 3. Aluminum:
 - a. New Surfaces: Use MPI(a) INT 5.4E Waterborne Light Industrial Finish system.
 - b. Previously Finished Surfaces: Use MPI(r) REX 5.4E Light Industrial Finish system.
- C. Performance:
 - 1. Design Requirements:
 - a. New Surfaces: MPI Premium Grade finish requirements.
 - b. Deteriorated Existing Surfaces: MPI Premium Grade finish requirements.
 - c. Sound Existing Surfaces: MPI Custom Grade finish requirements.
 - d. Gloss / Sheen Level Required: Gloss Level 5.
- D. Materials:
 - 1. .
 - 2. Primers:
 - a. Ferrous Metal: MPI Product 107, 'Primer, Rust-Inhibitive, Water Based'.

- b. Galvanized Metal: MPI Product 134: 'Primer, Galvanized, Water Based'.
- c. Aluminum: MPI Product 95: 'Primer, Quick Dry, for Aluminum'.
- 3. Finish Coats: MPI Product 153: 'Light Industrial Coating, Interior, Water Based, Semi-Gloss (MPI Gloss Level 5)'.

PART 3 - EXECUTION

3.1 APPLICATION

- A. General:
 - 1. See appropriate paragraphs of Section 09 9001.
 - 2. Systems specified are in addition to prime coats furnished under other Sections.
- B. New Surfaces: Remove rust spots by sanding and immediately spot prime. If all traces of rust cannot be removed, apply rust blocker recommended by Paint Manufacturer before applying full primer coat.

END OF SECTION

SECTION 09 9125**INTERIOR PAINTED WOOD****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Preparing and painting new and existing woodwork not requiring transparent finish, as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 09 9001: 'Common Painting And Coating Requirements':
 - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
 - 1. Participate in pre-installation conference as specified in Section 09 9001.

PART 2 - PRODUCTS**2.1 SYSTEM**

- A. Manufacturers:
 - 1. Category Four Approved Products and Manufacturers. See Section 01 6200 for definitions of Categories:
 - a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.
- B. Description:
 - 1. Systems:
 - a. All Other:
 - 1) New Surfaces: Use MPI(a) INT 6.3T or U Latex Finish system.
 - 2) Previously Finished Surfaces: MPI(r) Rin 6.3U Latex Finish system.
- C. Performance:
 - 1. Design Criteria:
 - a. New Surfaces: MPI Premium Grade finish requirements.
 - b. Deteriorated Existing Surfaces: MPI Premium Grade finish requirements.
 - c. Sound Existing Surfaces: MPI Custom Grade finish requirements.
 - d. Gloss / Sheen Level Required: Gloss Level 5.
- D. Materials:
 - 1. Woodwork:
 - a. Primer Coat: MPI Product 39, 'Primer, Latex, for Interior Wood' or MPI Product 45, 'Primer Sealer, Alkyd, Interior'.
 - b. Finish Coats: MPI Product 153, 'Light Industrial Coating, Interior, Water Based, Semi-Gloss (MPI Gloss Level 5)'.

PART 3 - EXECUTION**3.1 APPLICATION**

- A. General: See appropriate paragraphs of Section 09 9001.
- B. Interface With Other Work:
 - 1. Properly clean and paint light cove interiors before installation of light fixtures.
 - 2. Where back-priming is required, apply one (1) coat of primer.
- C. New Surfaces:
 - 1. Spot prime nail holes, cracks, and blemishes before and after puttying.
 - 2. Apply stain blocker or other product recommended by Paint Manufacturer to knots before applying primer coat.
- D. Existing Painted Surfaces:
 - 1. Remove deteriorated existing paint down to sound substrate by scraping and sanding. Feather edges of existing paint by sanding to be smooth with adjacent surfaces. Spot prime bare wood areas on woodwork.
 - 2. Wash surfaces that have been defaced with marking pens, crayons, lipstick, etc, with solvent recommended by Paint Manufacturer. Spot prime such surfaces.
 - 3. Apply finish coats.

END OF SECTION

SECTION 09 9324**INTERIOR CLEAR-FINISHED HARDWOOD****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Preparing and finishing of new interior clear finished hardwood as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 06 2210: 'Miscellaneous Wood Trim'.
 - 2. Section 06 4512: 'Architectural Woodwork Wood Trim'.
 - 3. Section 09 9001: 'Common Painting And Coating Requirements':
 - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.
 - 4. Section 09 0193: Refinishing existing interior clear finished hardwood.

1.2 REFERENCES

- A. Association Publications:
 - 1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
 - a. Architectural Woodwork Standards (AWS), 1st Edition, 2009.
- B. Reference Standards:
 - 1. Kitchen Cabinet Manufacturers Association / American National Standards Institute:
 - a. ANSI/KCMA A161.1-2000 (R2005) 23-Jan-2001 'Recommended Performance and Construction Standards for Kitchen and Vanity Cabinets.'

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
 - 1. Participate in pre-installation conference as specified in Section 09 9001.
 - 2. In addition to agenda items specified in Section 01 3100 and Section 09 9001, review following:
 - a. Review control sample.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Samples:
 - a. Interior Hardwood for Transparent Finish:
 - 1) Requirements for samples are specified in Related Requirement Sections listed above.
 - b. Design Criteria:
 - 1) Sample will be used as performance standard for evaluating finish provided.
- B. Informational Submittals:
 - 1. Test And Evaluation Reports:
 - a. Before beginning finish work, submit Finish Manufacturer's literature or certification that finish material meets requirements of ANSI / KCMA A161.1.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Materials:

1. Stain: MPI 90, 'Stain, Semi-Transparent, for Interior Wood'.
2. Clear Finish Coats:
 - a. Field Finished:
 - 1) Chemcraft International Inc:
 - a) First, Second, And Third Coats: 20 Sheen Opticlear Pre-Catalyzed Lacquer.
 - 2) ICI Dulux / Trinity:
 - a) First Coat: ICE Vinyl Sanding Sealer.
 - b) Second And Third Coats: ICI Pre-Catalyzed Lacquer.
 - 3) Lilly / Valspar:
 - a) First, Second, And Third Coats: 20 Sheen Pre-Catalyzed Lacquer 587E208.
 - 4) Sherwin-Williams:
 - a) First Coat: T67F3 Vinyl Sealer.
 - b) Second And Third Coats: T77F38 Sherwood Pre-Catalyzed Lacquer DRE.
 - b. Mill Finished: Architectural Woodwork finished in a mill may use one (1) coat of Vinyl Sealer and two (2) coats of Conversion Varnish or three (3) coats of Conversion Varnish from one (1) of the approved Finish Manufacturers, as recommended by Finish Manufacturer.
 - c. Products meeting testing requirements for finishes of ANSI / KCMA A161.1 may be used upon approval of submission by Architect before use. See Section 01 6200.
3. Color:
 - a. Design Criteria:
 - 1) Finish to match Owner selected sample.
 - b. Approved Finish:
 - 1) Performance standard: Owner provided sample of existing wood item from existing project to be used as Control Sample.

B. Performance:

1. Design Criteria: General: See appropriate paragraphs of Section 09 9001.

PART 3 - EXECUTION

3.1 APPLICATION

A. General:

1. See appropriate paragraphs of Section 09 9001.
2. Sand entire exposed surface of item to be finished lightly with 120 to 150 non-stearated sandpaper and clean before applying dye or stain.
3. Apply stain in accordance with Manufacturer's recommendations and as necessary to attain correct color.
4. Scuff sand with 220 non-stearated sandpaper between application of application stain and first finish coat.
5. If wood is finished before installation, finish cut ends and other unfinished, exposed surfaces same as previously finished surfaces after installation of wood.

- B. Where back-priming is required, apply one coat of finish material.

END OF SECTION

SECTION 09 9413**INTERIOR TEXTURED FINISHING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and apply texturing on walls and ceilings as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 09 2900: Priming.
 - 2. Section 09 9001: 'Common Painting And Coating Requirements':
 - a. Pre-installation conference for Sections under 09 9000 heading 'Paints and Coatings'.
 - 3. Section 09 9123: Finish painting.

1.2 REFERENCES

- A. Definitions:
 - 1. Drywall Texture: Compound rolled, sprayed, or troweled onto sheetrock after taping and floating of joints is complete. Uses same material as joint compound, but thinned down with water and applied to wall surface:
 - a. Popcorn: Sprayed texture with Styrofoam or other materials added to drywall mud mixture to create the puffy appearance of cheese or popcorn. Match existing ceiling texture appearance in the adjacent ceilings.
 - b. Light Orange Peel: Sprayed texture leaves light splatter on walls. Resembles peel of orange. If done with fine spray, can be one of the lightest, least noticeable of the texture styles. Match existing ceiling texture appearance in the adjacent ceilings.
 - c. Light Skip Trowel - Texture is applied to ceilings with trowel. Trowel marks may be left on surface to give a rustic, hand crafted look. Match existing ceiling texture appearance in the adjacent ceilings.
 - d. Smooth - Smooth application of texture over sheetrock wall that feathers out sheetrock joints, and creates even, non-textured wall. Match existing ceiling texture appearance in the adjacent ceilings.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
 - 1. Participate in pre-installation conference as specified in Section 09 9001.
 - 2. In addition to agenda items specified in Section 01 3100 and Section 09 9001, review following:
 - a. Review control samples.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Samples:
 - a. Popcorn Texture:
 - 1) Provide minimum of one (1) **24 inch (600 mm)** square control samples on primed gypsum wallboard of 'popcorn' texture to show matching existing texture.
 - b. Light Skip Trowel Texture:
 - 1) Provide minimum of one (1) **24 inch (600 mm)** square control samples on primed gypsum wallboard of light skip trowel texture to show matching existing texture.

1.5 QUALITY ASSURANCE

- A. Field Samples:
 - 1. Before performing work of this Section, prepare control samples.
 - 2. Architect will inspect control sample at pre-installation conference following preparation of control sample. When sample is approved, work of this Section may proceed. Approved samples will be kept at site at all times work of this section is being performed.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. National Gypsum, Charlotte, NC www.nationalgypsum.com.
 - b. U S Gypsum Co, Chicago, IL www.usg.com.
- B. Materials:
 - 1. Class Two Quality Standards: See Section 01 6200.
 - a. ProForm Perfect Spray EM/HF by National Gypsum.
 - b. Sheetrock Wall & Ceiling Texture by U S Gypsum.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Location:
 - 1. Walls:
 - a. Smooth Finish
 - 1) Chapel walls
 - 2. Ceilings:
 - a. Popcorn Texture:
 - 1) Existing popcorn textured ceilings where existing work is removed or disturbed.
 - b. Light Skip Trowel Texture:
 - 1) Existing skip trowel textured ceilings where existing work is removed or disturbed.
 - c. Light Orange Peel Texture:
 - 1) Existing orange peel textured ceilings where existing work is removed or disturbed.
 - d. Smooth Finish (no applied texture) to be applied to the following ceilings:
 - 1) Existing smooth ceilings where existing work is removed or disturbed.
- B. Finishing:
 - 1. Popcorn, Light Skip Trowel and Light Orange Peel Textures:
 - a. After gypsum board is taped, sanded, and primed, apply texture. Closely match samples accepted by Architect.
 - 2. Smooth:
 - a. After gypsum board is taped, sanded, and primed, apply texture.

END OF SECTION

DIVISION 22: PLUMBING

22 0500 COMMON WORK RESULTS FOR PLUMBING

22 0501 COMMON PLUMBING REQUIREMENTS
22 0529 HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT
22 0719 PLUMBING PIPING INSULATION

22 1000 PLUMBING PIPES AND PUMPS

22 1116 DOMESTIC WATER PIPING
22 1313 FACILITY SEWERS

22 4000 PLUMBING FIXTURES

22 4216 COMMERCIAL LAVATORIES AND SINKS

END OF TABLE OF CONTENTS

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SECTION 22 0501**COMMON PLUMBING REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Common requirements and procedures for plumbing systems.
 - 2. Responsibility for proper operation of electrically powered equipment furnished under this Division.
 - 3. Furnish and install sealants relating to installation of systems installed under this Division.
 - 4. Furnish and install Firestop Penetration Systems for plumbing systems penetrations as described in Contract Documents.
- B. Products Furnished But Not Installed Under This Section:
 - 1. Sleeves, inserts, supports, and equipment for plumbing systems installed under other Sections.
- C. Related Requirements:
 - 1. Section 05 0523: 'Metal Fastening' for quality and requirements for welding.
 - 2. Section 07 9213: 'Elastomeric Joint Sealant' for quality at building exterior.
 - 3. Sections Under 09 9000 Heading: 'Paints And Coatings' for painting of plumbing items requiring field painting.
 - 4. Section 22 0548: 'Vibration And Seismic Control for Plumbing Piping and Equipment'.
 - 5. Division 26: 'Electrical' for raceway and conduit, unless specified otherwise, and line voltage wiring.
 - 6. Slots and openings through floors, walls, ceilings, and roofs provided under other Divisions in their respective materials.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's catalog data for each manufactured item.
 - 1) Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
 - 2) Include name, address, and phone number of each supplier.
- B. Informational Submittals:
 - 1. Qualification Statement:
 - a. Plumbing Subcontractor:
 - 1) Provide Qualification documentation if requested by Architect or Owner.
 - b. Installer:
 - 1) Provide Qualification documentation if requested by Architect or Owner.
- C. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Operations and Maintenance Data (Modify and add to requirements of Section 01 7800):
 - 1) At beginning of PLUMBING section of Operations And Maintenance Manual, provide master index showing items included:
 - a) Provide name, address, and phone number of Architect, Architect's Mechanical Engineer, General Contractor, and Plumbing subcontractor.

- b) Identify maintenance instructions by using same equipment identification used in Contract Drawings. Maintenance instructions shall include:
 - (1) 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.
 - (2) 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 instructions.
- c) Provide operating instructions to include:
 - (1) General description of fire protection system.
 - (2) Step by step procedure to follow for shutting down system or putting system into operation.
- b. Warranty Documentation:
 - 1) Include copies of warranties required in individual Sections of Division 22.

1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Perform work in accordance with applicable provisions of Plumbing Codes applicable to Project. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
 - 2. In case of differences between building codes, laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Notify Architect in writing of such differences before performing work affected by such differences.
 - 3. Identification:
 - a. Motor and equipment name plates as well as applicable UL / ULC and AGA / CGA labels shall be in place when Project is turned over to Owner.
- B. Qualifications. Requirements of Section 01 4301 applies, but not limited to following:
 - 1. Plumbing Subcontractor:
 - a. Company specializing in performing work of this section.
 - 1) Minimum five (5) years experience in plumbing installations.
 - 2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
 - b. Upon request, submit documentation.
 - 2. Installer:
 - a. Licensed for area of Project.
 - b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
 - c. Upon request, submit documentation.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Accept valves on site in shipping containers with labeling in place.
 - 2. Provide temporary protective coating on cast iron and steel valves.
 - 3. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- B. Storage And Handling Requirements:
 - 1. In addition to requirements specified in Division 01, stored material shall be readily accessible for inspection by Architect until installed.
 - 2. Store items subject to moisture damage in dry, heated spaces.

1.5 WARRANTY

- A. Manufacturer Warranty:
 - 1. Provide certificates of warranty for each piece of equipment made out in favor of Owner.
- B. Special Warranty:
 - 1. Guarantee plumbing systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.
 - 2. If plumbing sub-contractor with offices located more than 150 miles (240 km) from Project site is used, provide service / warranty work agreement for warranty period with local plumbing sub-contractor approved by Architect. Include copy of service / warranty agreement in warranty section of Operation And Maintenance Manual.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Components shall bear Manufacturer's name and trade name. Equipment and materials of same general type shall be of same make throughout work to provide uniform appearance, operation, and maintenance.
- B. Pipe And Pipe Fittings:
 - 1. Weld-O-Let and Screw-O-Let fittings are acceptable.
- C. Sleeves:
 - 1. General:
 - a. Two sizes larger than bare pipe or insulation on insulated pipe.
 - 2. In Concrete And Masonry:
 - a. Sleeves through outside walls, interior shear walls, and footings shall be schedule 80 black steel pipe with welded plate.
 - 3. In Framing And Suspended Floor Slabs:
 - a. Standard weight galvanized iron pipe, Schedule 40 PVC, or 14 ga (2 mm) galvanized sheet metal.
- D. Valves:
 - 1. Valves of same type shall be of same manufacturer.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Acceptable Installers:
 - 1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

- A. 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 Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over Plumbing Drawings.
 - 3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that 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.

B. Verification Of Conditions:

1. Examine premises to understand conditions that may affect performance of work of this Division before submitting proposals for this work. Examine adjoining work on which plumbing work is dependent for efficiency and report work that requires correction.
2. Ensure 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. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.
3. Check that slots and openings provided under other Divisions through floors, walls, ceilings, and roofs are properly located. Perform cutting and patching caused by neglecting to coordinate with Divisions providing slots and openings at no additional cost to Owner.
4. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.

3.3 PREPARATION

A. Demolition Requirements:

1. Remove existing water closets, urinals, sinks, floor drains and other existing work not shown to remain.

B. Changes Due To Equipment Selection:

1. Where equipment specified or otherwise approved requires different arrangement or connections from that shown in Contract Documents, submit drawings showing proposed installations.
2. If proposed changes are approved, install equipment to operate properly and in harmony with intent of Contract Documents. Make incidental changes in piping, ductwork, supports, installation, wiring, heaters, panelboards, and as otherwise necessary.
3. Provide additional motors, valves, controllers, fittings, and other equipment required for proper operation of systems resulting from selection of equipment.
4. Be responsible for proper location of rough-in and connections provided under other Divisions.

3.4 INSTALLATION

A. Interface With Other Work:

1. Furnish exact location of electrical connections and complete information on motor controls to installer of electrical system.
2. Furnish sleeves, inserts, supports, and equipment that are to be installed by others in sufficient time to be incorporated into construction as work proceeds. Locate these items and confirm that they are properly installed.

B. Cut carefully to minimize necessity for repairs to previously installed or existing work. Do not cut beams, columns, or trusses.

C. Locating Equipment:

1. Arrange pipes and equipment to permit ready access to valves, cocks, unions, traps, and to clear openings of doors and access panels.
2. Adjust locations of pipes, equipment, and fixtures to accommodate work to interferences anticipated and encountered.
3. Install plumbing work to permit removal of equipment and parts of equipment requiring periodic replacement or maintenance without damage to or interference with other parts of equipment or structure.
4. Determine exact route and location of each pipe before fabrication.
 - a. Right-Of-Way:

- 1) Lines that pitch shall have right-of-way over those that do not pitch. For example, plumbing drains shall normally have right-of-way.
 - 2) Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.
 - b. Offsets, Transitions, and Changes in Direction:
 - 1) Make offsets, transitions, and changes in direction in pipes as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
 - 2) Furnish and install all traps, air vents, sanitary vents, and devices as required to effect these offsets, transitions, and changes in direction.
- D. Penetration Firestops:
1. Install Penetration Firestop System appropriate for penetration at plumbing systems penetrations through walls, ceilings, roofs, and top plates of walls.
- E. Sealants:
1. Seal openings through building exterior caused by penetrations of elements of plumbing systems.
 2. Furnish and install acoustical sealant to seal penetrations through acoustically insulated walls and ceilings.
- F. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus:
1. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Division from responsibility for proper installation of plumbing systems.
 2. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings:
 - a. Arrange so as to facilitate removal of tube bundles.
 - b. Provide accessible flanges or ground joint unions, as applicable for type of piping specified, at connections to equipment and on bypasses.
 - 1) Make connections of dissimilar metals with di-electric unions.
 - 2) Install valves and unions ahead of traps and strainers. Provide unions on both sides of traps.
 - c. Do not use reducing bushings, bull head tees, close nipples, or running couplings. Street elbows are allowed only on potable water pipe **3/4 inch (19 mm)** in diameter and smaller.
 - d. Install piping systems so they may be easily drained
 - e. Install piping to insure noiseless circulation.
 - f. Place valves and specialties to permit easy operation and access. Valves shall be regulated, packed, and glands adjusted at completion of work before final acceptance.
 3. Do not install piping in shear walls.
 4. Cut piping accurately to measurements established at site. Remove burr and cutting slag from pipes.
 5. Work piping into place without springing or forcing. Make piping connections to pumps and other equipment without strain at piping connection. Remove bolts in flanged connections or disconnect piping to demonstrate that piping has been so connected, if requested.
 6. Make changes in direction with proper fittings.
 7. Expansion of Thermoplastic Pipe:
 - a. Provide for expansion in every **30 feet (9 meters)** of straight run.
 - b. Provide **12 inch (300 mm)** offset below roof line in each vent line penetrating roof.
 8. Expansion of PEX Pipe: Allow for expansion and contraction of PEX pipe as recommended by Pipe Manufacturer.
- G. Sleeves:
1. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete slabs on grade.
 2. Provide sleeves around pipes passing through concrete or masonry floors, walls, partitions, or structural members. Seal sleeves with specified sealants. Follow Pipe Manufacturer's recommendations for PEX pipe penetrations through studs and floor slabs.
 3. Sleeves through floors shall extend **1/4 inch (6 mm)** above floor finish in mechanical equipment rooms above basement floor. In other rooms, sleeves shall be flush with floor.
 4. Sleeves through floors and foundation walls shall be watertight.

H. Escutcheons:

1. Provide spring clamp plates where pipes run through walls, floors, or ceilings and are exposed in finished locations of building. Plates shall be chrome plated heavy brass of plain pattern and shall be set tight on pipe and to building surface.

3.5 REPAIR / RESTORATION

- A. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it:
1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown.
 2. Surface finishes shall exactly match existing finishes of same materials.

3.6 FIELD QUALITY CONTROL

- A. Field Tests:
1. Perform tests on plumbing piping systems. Furnish devices required for testing purposes.
- B. Non-Conforming Work:
1. Replace material or workmanship proven defective with sound material at no additional cost to Owner.
 2. Repeat tests on new material, if requested.

3.7 CLEANING

- A. Remove dirt, grease, and other foreign matter from each length of piping before installation:
1. After each section of piping used for movement of water or steam is installed, flush with clean water, except where specified otherwise.
 2. Arrange temporary flushing connections for each section of piping and arrange for flushing total piping system.
 3. Provide temporary cross connections and water supply for flushing and drainage and remove after completion of work.
- B. Clean exposed piping, equipment, and fixtures. Remove stickers from fixtures and adjust flush valves.

3.8 CLOSEOUT ACTIVITIES

- A. Instruction of Owner:
1. Instruct building maintenance personnel and Stake Physical Facilities Representative in operation and maintenance of plumbing systems utilizing Operation And Maintenance Manual when so doing.
 2. Conduct instruction period after Substantial Completion inspection when systems are properly working and before final payment is made.

3.9 PROTECTION

- A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of system. Do not use plugs of rags, wool, cotton waste, or similar materials.

END OF SECTION

SECTION 22 0529**HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Common hanger and support requirements and procedures for plumbing systems.
- B. Products Installed But Not Furnished Under This Section:
 - 1. Paint identification for gas piping used in HVAC equipment.
- C. Related Requirements:
 - 1. Section 05 0523: 'Metal Fastening' for quality and requirements for welding.
 - 2. Sections Under 09 9000 Heading: Painting of mechanical items requiring field painting.
 - 3. Slots and openings through floors, walls, ceilings, and roofs provided under other Divisions in their respective materials.
 - 4. Section 23 0529: 'Hangers And Supports For HVAC Piping And Equipment' for gas piping used with HVAC equipment.
 - 5. Section 23 0553: 'Identification For HVAC Piping And Equipment' for paint identification of gas piping used with HVAC equipment.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's catalog data for each manufactured item.

PART 2 - PRODUCTS**2.1 ASSEMBLIES**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Anvil International, Portsmouth, NH www.anvilintl.com.
 - b. Cooper B-Line, Highland, IL www.b-line.com.
 - c. Unistrut, Wayne, MI www.tyco-unistrut.com.
- B. Materials:
 - 1. Hangers, Rods, And Inserts
 - a. Galvanized and UL approved for service intended.
 - b. Support horizontal piping from hangers or on roller assemblies with channel supports, except where trapeze type hangers are explicitly shown on Drawings. Hangers shall have double nuts.
 - 1) Support insulated pipes **2 inches (50 mm)** in diameter and smaller with adjustable swivel ring hanger with insulation protection shield. Gauge and length of shield shall be in accordance with Anvil design data.
 - a) Type Two Acceptable Products:
 - (1) Swivel Ring Hanger: Anvil Fig. 69.
 - (2) Insulation Protection Shield: Anvil Fig. 167.
 - (3) Equals by Cooper B-Line.

- 2) Support insulated pipes **2-1/2 inches (64 mm)** in diameter and larger with clevis hanger or roller assembly with an insulation protection shield. Gauge and length of shield shall be according to Anvil design data.
 - a) Type Two Acceptable Products:
 - (1) Clevis Hanger: Anvil Fig. 260.
 - (2) Roller Assembly: Anvil Fig. 171.
 - (3) Insulation Protection Shield: Anvil Fig. 167.
 - (4) Equals by Cooper B-Line.
- 3) Support uninsulated copper pipe **2 inches (50 mm)** in diameter and smaller from swivel ring hanger, copper plated and otherwise fully suitable for use with copper tubing. Support non-copper uninsulated pipes from swivel ring hanger.
 - a) Type Two Acceptable Products:
 - (1) Swivel Ring Hanger For Copper Pipe: Anvil Fig. CT-69.
 - (2) Swivel Ring Hanger For Other Pipe: Anvil Fig. 69.
 - (3) Equals by Cooper B-Line.
- 4) Support uninsulated copper pipe **2-1/2 inches (64 mm)** in diameter and larger from clevis hanger, copper plated hangers and otherwise fully suitable for use with copper tubing. Support non-copper uninsulated pipes from clevis hanger.
 - a) Type Two Acceptable Products:
 - (1) Clevis Hanger For Copper Pipe: Anvil Fig. CT-65.
 - (2) Clevis Hanger For Other Pipe: Anvil Fig. 260.
 - (3) Equals by Cooper B-Line.
- c. Support rods for single pipe shall be in accordance with following table:

Rod Diameter	Pipe Size	Rod Diameter	Pipe Size
3/8 inch	2 inches and smaller	10 mm	50 mm and smaller
1/2 inch	2-1/2 to 3-1/2 inches	13 mm	64 mm to 88 mm
5/8 inch	4 to 5 inches	16 mm	100 mm to 125 mm
3/4 inch	6 inches	19 mm	150 mm
7/8 inch	8 to 12 inches	22 mm	200 mm to 300 mm

- d. Support rods for multiple pipe supported on steel angle trapeze hangers shall be in accordance with following table:

Rods		Number of Pipes per Hanger for Each Pipe Size						
Number	Diameter	2 Inch	2.5 Inch	3 Inch	4 Inch	5 Inch	6 Inch	8 Inch
2	3/8 Inch	Two	0	0	0	0	0	0
2	1/2 Inch	Three	Three	Two	0	0	0	0
2	5/8 Inch	Six	Four	Three	Two	0	0	0
2	5/8 Inch	Nine	Seven	Five	Three	Two	Two	0
2	5/8 Inch	Twelve	Nine	Seven	Five	Three	Two	Two

Rods		Number of Pipes per Hanger for Each Pipe Size						
Number	Diameter	50mm	64mm	75mm	100mm	125mm	150mm	200mm
2	10 mm	Two	0	0	0	0	0	0
2	13 mm	Three	Three	Two	0	0	0	0
2	16 mm	Six	Four	Three	Two	0	0	0
2	19 mm	Nine	Seven	Five	Three	Two	Two	0
2	22 mm	Twelve	Nine	Seven	Five	Three	Two	Two

- 1) Size trapeze angles so bending stress is less than **10,000 psi (69 MPa)**.
- e. Riser Clamps For Vertical Piping:
 - 1) Type Two Acceptable Products:
 - a) Anvil Fig. 261.
 - b) Equals by Cooper B-Line.
- f. Concrete Inserts:
 - 1) Individual Inserts:

- a) Suitable for special nuts size **3/8 inch (9.5 mm)** through **7/8 inch (22 mm)** with yoke to receive concrete reinforcing rods, and with malleable iron lugs for attaching to forms.
- b) Type Two Acceptable Products:
 - (1) Anvil Fig. 282.
 - (2) Equals by Cooper B-Line.
- 2) Continuous Inserts:
 - a) Class Two Quality Standard: Equal to Unistrut P-3200 series.
- g. Steel Deck Bracket:
 - 1) Class Two Quality Standard: Equal to Unistrut P1000 with clamp nut, minimum **6 inch (150 mm)** length.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Piping:
 - 1. Properly support piping and make adequate provisions for expansion, contraction, slope, and anchorage.
 - a. Except for underground pipe, suspend piping from roof trusses or clamp to vertical walls using Unistrut and clamps. Do not hang pipe from other pipe, equipment, or ductwork. Laying of piping on any building element is not allowed.
 - b. Supports For Horizontal Piping:
 - 1) Support metal piping at **96 inches (2 400 mm)** on center maximum for pipe **1-1/4 inches (32 mm)** or larger and **72 inches (1 800 mm)** on center maximum for pipe **1-1/8 inch (29 mm)** or less.
 - 2) Support thermoplastic pipe at **48 inches (1 200 mm)** on center maximum.
 - 3) Support PEX pipe at **32 inches (800 mm)** minimum on center.
 - 4) Provide support at each elbow. Install additional support as required.
 - c. Supports for Vertical Piping:
 - 1) Place riser clamps at each floor or ceiling level.
 - 2) Securely support clamps by structural members, which in turn are supported directly from building structure.
 - d. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.
 - 2. Gas piping Identification:
 - a. Apply paint identification for gas piping used with HVAC equipment as specified in Section 23 0553.

END OF SECTION

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SECTION 22 0719

PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install insulation on hot and cold water lines, fittings, valves, and accessories as described in Contract Documents.
 - 2. Furnish and install insulation on roof drain piping as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 22 1116: 'Domestic Water Piping'.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Armacell, Mebane, NC www.armacell.com.
 - b. Childers Products Co, Eastlake, OH www.fosterproducts.com.
 - c. IMCOA, Youngsville, NC www.nomacokflex.com.
 - d. Johns-Manville, Denver, CO www.jm.com.
 - e. Knauf, Shelbyville, IN www.knauffiberglass.com.
 - f. Manson, Brossard, PQ, Canada www.isolationmanson.com.
 - g. Nomaco Inc, Yopungsville, NC www.nomacokflex.com.
 - h. Owens-Corning, Toledo, OH www.owenscorning.com.
 - i. Speedline Corp, Solon, OH www.speedlinepvc.com.
- B. Materials:
 - 1. Above Grade Metal Piping:
 - a. Insulation For Piping:
 - 1) Snap-on glass fiber or melamine foam pipe insulation, or heavy density pipe insulation with factory vapor jacket.
 - 2) Insulation Thickness:

Service Water Temperature	Pipe Sizes		
170 - 180 Deg F	Up to 1-1/4 In	1-1/2 to 2 In	Over 2 In
170 - 180 Deg F	One In	1-1/2 In	2 In
140 - 160 Deg F	1/2 In	One In	1-1/2 In
45 - 130 Deg F	1/2 In	1/2 In	One In
 - 3) Performance Standards: Fiberglas ASJ by Owens-Corning.
 - 4) Type One Acceptable Manufacturers:
 - a) Childers Products.
 - b) Knauf.
 - c) Manson.
 - d) Owens-Corning.
 - e) Johns-Manville.
 - f) Equal as approved by Architect before bidding. See Section 01 6200.
 - b. Fitting, Valve, And Accessory Covers:
 - 1) PVC.

- 2) Performance Standard: Zeston by Johns-Manville.
- 3) Type One Acceptable Manufacturers:
 - a) Knauf.
 - b) Speedline.
 - c) Johns-Manville.
 - d) Equal as approved by Architect before bidding. See Section 01 6200.
2. Below Grade Metal Piping:
 - a. Insulation:
 - 1) 1/2 inch (13 mm) thick.
 - 2) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
 - a) SS Tubolit by Armacell.
 - b) ImcoLock by Imcoa.
 - c) Nomalock or Therma-Cel by Nomaco.
 - b. Joint Sealant:
 - 1) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
 - a) Armacell 520.
 - b) Nomaco K-Flex R-373.
3. Pex Piping, Above And Below Grade:
 - a. Insulation:
 - 1) 1/2 inch (13 mm) thick.
 - 2) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
 - a) SS Tubolit by Armacell.
 - b) ImcoLock by Imcoa.
 - c) Nomalock or Therma-Cel by Nomaco.
 - b. Joint Sealant:
 - 1) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
 - a) Armacell 520.
 - b) Nomaco K-Flex R-373.
 - c)
4. PP-R Piping, Above And Below Grade:
 - a. Insulation:
 - 1) 1/2 inch (13 mm) thick.
 - 2) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
 - a) SS Tubolit by Armacell.
 - b) ImcoLock by Imcoa.
 - c) Nomalock or Therma-Cel by Nomaco.
 - b. Joint Sealant:
 - 1) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
 - a) Armacell 520.
 - b) Nomaco K-Flex R-373.
5. PVC or ABS Piping, Above And Below Grade - Facility Storm Drain:
 - a. Insulation:
 - 1) 1/2 inch (13 mm) thick.
 - 2) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
 - a) SS Tubolit by Armacell.
 - b) ImcoLock by Imcoa.
 - c) Nomalock or Therma-Cel by Nomaco.
 - b. Joint Sealant:
 - 1) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
 - a) Armacell 520.
 - b) Nomaco K-Flex R-373.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Above Grade Piping:
 1. Apply insulation to clean, dry piping with joints tightly butted.

2. Install insulation in manner to facilitate removal for repairs. Place sections or blocks so least possible damage to insulation will result from inspection or repairs of piping or equipment.
 3. Piping up to **1-1/4 inch (32 mm)** Diameter:
 - a. Adhere 'factory applied vapor barrier jacket lap' smoothly and securely at longitudinal laps with white vapor barrier adhesive.
 - b. Adhere **3 inch (76 mm)** wide self-sealing butt joint strips over end joints.
 4. Piping **1-1/2 inches (38 mm)** Diameter And Larger:
 - a. Use broken-joint construction in application of two-layer covering.
 - b. Fill cracks and depressions with insulating cement mixed to thick plastic paste.
 - 1) Apply by hand in several layers to make up total specified thickness.
 - 2) Final layer shall have smooth uniform finish before application of covering.
 5. Fittings, Valves, And Accessories:
 - a. Do not apply insulation over flanged joints or victaulic couplings until piping has been brought up to operating temperature and flange bolts have been fully tightened. Insulate valves so wheel, stem, and packing nut are exposed.
 - b. Insulate with same type and thickness of insulation as pipe, with ends of insulation tucked snugly into throat of fitting and edges adjacent to pipe insulation tufted and tucked in.
 - c. Piping Up To **1-1/4 Inch (32 mm)** Diameter:
 - 1) Cover insulation with one piece fitting cover secured by stapling or taping ends to adjacent pipe covering.
 - 2) Alternate Method:
 - a) Insulate fittings, valves, and accessories with one inch of insulating cement and vapor seal with two **1/8 inch (3 mm)** wet coats of vapor barrier mastic reinforced with glass fabric extending **2 inches (50 mm)** onto adjacent insulation.
 - d. Piping **1-1/2 inches (38 mm)** To **2 Inches (50 mm)**:
 - 1) Insulate with hydraulic setting insulating cement or equal, to thickness equal to adjoining pipe insulation.
 - 2) Apply final coat of fitting mastic over insulating cement.
 - e. Piping **2-1/2 inch (64 mm)** And Larger:
 - 1) Insulate with segments of molded insulation securely wired in place and coated with skim coat of insulating cement.
 - 2) Apply fitting mastic, fitting tape and finish with final coat of fitting mastic.
 6. Pipe Hangers:
 - a. Do not allow pipes to come in contact with hangers.
 - b. Pipe Shield:
 - 1) Provide schedule 40 PVC by **6 inch (150 mm)** long at each clevis and/or unistrut type hanger.
 - 2) Provide **16 ga (1.64 mm)** by **6 inch (150 mm)** long galvanized shields at each pipe hanger to protect pipe insulation from crushing by clevis hanger.
 - 3) Provide **22 ga (0.85 mm)** by **6 inch (150 mm)** long galvanized shield at each pipe hanger to protect insulation from crushing by Unistrut type hanger.
 - c. At Pipe Hangers:
 - 1) Provide rigid calcium silicate insulation (**100 psi (690 kPA)** compressive strength) at least **2 inches (50 mm)** beyond shield.
 7. Protect insulation wherever leak from valve stem or other source might drip on insulated surface, with aluminum cover or shield rolled up at edges and sufficiently large in area and of shape that dripping will not splash on surrounding insulation.
- B. Below Grade Piping:
1. Slip underground pipe insulation onto pipe and seal butt joints.
 2. Where slip-on technique is not possible, slit insulation, apply to pipe, and seal seams and joints.

END OF SECTION

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SECTION 22 1116**DOMESTIC WATER PIPING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
1. Perform excavating and backfilling required by work of this Section.
 2. Furnish and install potable water piping complete with necessary valves, connections, and accessories inside building and connect with outside utility lines **5 feet (1 50 m)** from building perimeter as described in Contract Documents.
- B. Related Requirements:
- a. Pre-installation conference held jointly with other concrete related sections.
 2. Section 22 0501: 'Common Piping Requirements'.
 3. Section 22 0719: 'Plumbing Piping Insulation'.

1.2 REFERENCES

- A. Reference Standards:
1. American National Standards Institute / American Society of Sanitary Engineers:
 - a. ANSI/ASSE 1003-2009, 'Water Pressure Reducing Valves for Domestic Water Distribution Systems'.
 - b. ANSI/ASSE 1017-2009, 'Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems'.
 - c. ANSI/ASSE 1070-2015, 'Performance Requirements for Water Temperature Limiting Devices'.
 2. American Water Works Association:
 - a. AWWA C904-16, 'Cross-Linked Polyethylene (PEX) Pressure Pipe, 1/2 inch (12 mm) Through 3 inch (76 mm) for Water Service'.
 3. ASTM International:
 - a. ASTM B88-14, 'Standard Specification for Seamless Copper Water Tube'.
 - b. ASTM E84-15b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - c. ASTM F876-15a, 'Standard Specification for Crosslinked Polyethylene (PEX) Tubing'.
 - d. ASTM F877-11a, 'Standard Specification for Crosslinked Polyethylene (PEX) Hot- and Cold-Water Distribution Systems'.
 - e. ASTM F1807-15, 'Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing'.
 - f. ASTM F2023-15, 'Standard Test Method for Evaluating the Oxidative Resistance of Crosslinked Polyethylene (PEX) Tubing and Systems to Hot Chlorinated Water'.
 - g. ASTM F2389-15, 'Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems'.
 4. NSF International Standard:
 - a. NSF P171, 'Protocol for Chlorine Resistance of Plastic Piping Materials' (1999).
 5. NSF International Standard / American National Standards Institute:
 - a. NSF/ANSI 14-2015, 'Plastic Piping System Components and Related Materials'.
 - b. NSF/ANSI 61-2015, 'Drinking Water System Components - Health Effects'.
 - c. NSF/ANSI 372-2016, 'Drinking Water System Components - Lead Content'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Qualifications:
 - 1. Manufacturer Qualifications:
 - a. PP-R pipe and PP-RCT pipe:
 - 1) Certified by NSF International.
 - 2. Installers Qualifications:
 - a. PP-R pipe and PP-RCT pipe:
 - 1) Certified by Manufacturer.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's Literature:
 - 1) PEX pipe and PEX pipe fittings.
 - 2) PP-R pipe and PP-R pipe fittings.
 - 3) PP-RCT pipe and PP-RCT pipe fittings.
 - 2. Samples:
 - a. PEX pipe fitting.
- B. Informational Submittals:
 - 1. Test And Evaluation Reports:
 - a. Written report of sterilization test.

1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.
 - 2. California only: California Assembly Bill 1953 (AB1953) Compliant for Lead Free

1.6 WARRANTY

- A. Manufacturer Warranty:
 - 1. Manufacturer's Warranty covering property damage caused by defective product including renovation costs or replacement costs.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Aquatherm, Inc., Lindon, UT www.aquathermpipe.com.
 - b. Acorn Controls, City of Industry, CA www.acorneng.com
 - c. Cash Acme, Cullman, AL www.cashacme.com
 - d. Chicago Faucets, Des Plaines, IL, www.chicagofaucets.com.
 - e. Cla-Val Company, Costa Mesa, CA or Cla-Val Canada Ltd, Beamsville, ON www.cla-val.com.
 - f. Conbraco Industries Inc, Matthews, NC www.conbraco.com or Conbraco (Honeywell Ltd), Scarborough, ON (416) 293-8111.

- g. Hammond Valve, New Berlin, WI www.hammondvalve.com.
- h. Handy & Harmon Products Div, Fairfield, CT www.handyharmon.com or Handy and Harmon of Canada Ltd, Rexdale, ON (800) 463-1465 or (416) 675-1860.
- i. Harris Products Group, Cincinnati, OH www.harrisproductsgroup.com.
- j. Honeywell Inc, Minneapolis, MN www.honeywell.com.
- k. Leonard Valve Co, Cranston, RI www.leonardvalve.com.
- l. Milwaukee Valve Co, New Berlin, WI www.milwaukeevalve.com.
- m. Nibco Inc, Elkhart, IN www.nibco.com.
- n. Nupi Americas, Early Branch, SC www.nupiamericas.com.
- o. Rehau, Leesburg, VA www.rehau-na.com.
- p. Sloan Valve Co, Franklin Park, IL www.sloanvalve.com.
- q. Spence Engineering Co, Walden, NY www.spenceengineering.com.
- r. Symmons Industries, Braintree, MA www.symmons.com.
- s. Uponor Inc, Apple Valley, MN www.uponor-usa.com.
- t. Viega ProPress, Wichita, KS www.viega-na.com.
- u. Watts Regulator Co, Andover, MA www.wattsreg.com.
- v. Wilkins (Zurn Wilkins), Paso Robles, CA www.zurn.com.
- w. Zurn PEX, Inc., Commerce, TX www.zurnpex.com.

B. Materials:

1. Design Criteria:
 - a. All drinking water products, components, and materials above and below grade used in drinking water systems must meet NSF International Standards for Lead Free.
 - b. No CPVC allowed.
2. Pipe:
 - a. Copper:
 - 1) Above-Grade:
 - a) Meet requirements of ASTM B88, Type L.
 - 2) Below-Grade:
 - a) Meet requirements of ASTM B88, Type K. **3/4 inch (19 mm)** minimum under slabs.
 - b) **2 inches (50 mm)** And Smaller: Annealed soft drawn.
 - c) **2-1/2 inches (64 mm)** And Larger: Hard Drawn.
 - b. Cross-Linked Polyethylene (PEX):
 - 1) Certified with NSF International against NSF Standards NSF/ANSI 14, NSF/ANSI 61, NSF/ANSI 372, and NSF P171 Protocol.
 - 2) Copper tube size (CTS) outside dimensions and Standard Dimension Ratio (SDR) of 9.
 - 3) Pressure rated for **160 psi (1.10 MPa)** at **73 deg F (22.8 deg C)**, **100 psi (0.69 MPa)** at **180 deg F (82 deg C)**, and **80 psi (0.552 MPa)** at **200 deg F (93 deg C)**.
 - 4) Marked with Manufacturer's name, design pressure and temperature ratings, and third party certification stamp for NSF-PW.
 - 5) Manufactured by Engel or peroxide method (PEX-A) or by silane method (PEX-B).
 - 6) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Raupex by Rehau.
 - b) Wirsbo Aquapex by Uponor.
 - c) ViegaPEX by Viega.
 - d) Zurn PEX by Zurn PEX.
 - c. Polypropylene-Random (PP-R):
 - 1) Above-Grade:
 - a) Meet requirements of ASTM F2389 and be certified by NSF International per ASTM F2389, NSF/ANSI 14, and NSF/ANSI 61.
 - b) Aquatherm: SDR 7.4 Greenpipe faser for domestic hot water and SDR 7.4 or SDR 11 greenpipe for domestic cold water. Aquatherm Lilac SDR 11 purple piping for recycled/reclaimed water systems.
 - c) Nupi Americas: Clima pipe for domestic Hot water SDR-7.3 or cold water SDR 11 Nupi Niron Monolayer purple pipe for recycled/ reclaimed water Systems.
 - 2) Below-Grade:
 - a) Meet requirements of ASTM F2389 and be certified by NSF International per ASTM F2389, NSF/ANSI 14, and NSF/ANSI 61.

- b) Aquatherm: SDR 7.4 Greenpipe faser for domestic hot water and SDR 7.4 or SDR 11 greenpipe for domestic cold water. Aquatherm Lilac SDR 11 purple piping for recycled/reclaimed water systems.
 - c) Nupi Americas: Clima pipe for domestic Hot water SDR-7.3 or cold water SDR 11 Nupi Niron Monolayer purple pipe for recycled/ reclaimed water Systems.
 - 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Aquatherm Greenpipe, Greenpipe faser, and Lilac by Aquatherm.
 - b) Nupi Americas Clima pipe, and Nupi Niron.
- 3. Fittings:
 - a. For Copper Pipe: Wrought copper.
 - b. For PEX Pipe:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Everloc by Rehau.
 - b) Viega PEX Press Zero Lead Fittings with attached stainless steel sleeves or Viega PEX Press Radel-R Polymer with attached stainless steel sleeves by Viega.
 - c) ProPEX fittings by Uponor including EP flow-through multiport tees.
 - d) Zurn PEX XL, DZR and CR fittings.
 - c. For PP-R Pipe:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Greenpipe by Aquatherm.
 - b) Niron Clima by Nupi Americas.
- 4. Connections For Copper Pipe:
 - a. Above-Grade:
 - 1) Sweat copper type with 95/5 or 96/4 Tin-Antimony solder, Bridgit solder, or Silvabrite 100 solder. Use only lead-free solder.
 - 2) Viega ProPress System
 - b. Below Grade:
 - 1) Brazed using following type rods:
 - a) Copper to Copper Connections:
 - (1) AWS Classification BCuP-4 Copper Phosphorus (6 percent silver).
 - (2) AWS Classification BCuP-5 Copper Phosphorus (15 percent silver).
 - 2) Copper to Brass or Copper to Steel Connections: AWS Classification BAg-5 Silver (45 percent silver).
 - 3) Do not use rods containing Cadmium.
 - 4) Brazing Flux:
 - a) Approved Products:
 - (1) Stay-Silv white brazing flux by Harris Product Group.
 - (2) High quality silver solder flux by Handy & Harmon.
 - 5) Joints under slabs acceptable only if allowed by local codes.
- 5. Connections For PP-R Pipe:
 - a. Above-Grade:
 - 1) Socket-fusion, fusion-outlet, electrofusion, buttwelding, and mechanical transition fittings including threaded adapters, groove adapters, and flanges.
 - b. Below-Grade:
 - 1) All joints shall be fusion-welded or electro-fusion welded PP-RCT except that flanges may be used when connecting to other piping systems. Mechanical fittings shall not be used below grade.
 - 2) Joints under slabs acceptable only if allowed by local codes.
- 6. Ball Valves:
 - a. Use ball valves exclusively unless otherwise specified. Ball valves shall be by single manufacturer from approved list below.
 - b. Valves shall be two-piece, full port for 150 psi (1.03 MPa) SWP.
 - 1) Operate with flow in either direction, suitable for throttling and tight shut-off.
 - 2) Body: Bronze, 150 psig (1.03 MPa) wsp at 350 deg F (177 deg C) and 400 psig (2.76 MPa) wog.
 - 3) Seat: Bubble tight at 100 psig (0.69 MPa) under water.
 - c. Class One Quality Standard: Nibco T585 or S585.
 - 1) Equal by Conbraco 'Apollo,' Hammond, Milwaukee, or Watts.
 - d. PP-R piping if used:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:

- a) PP-R fusion-weld ball valves by Aquatherm.
- b) PP-RCT Fusion by Nupi Americas.
7. Combination Pressure Reducing Valve / Strainer:
 - a. Integral stainless steel strainer, or separate 'Y' strainer installed upstream of pressure reducing valve.
 - b. Meet ANSI/ASSE 1003 or CSA B356 requirements.
 - c. Built-in thermal expansion bypass check valve.
 - d. Class One Quality Standard: Watts LFU5B:
 - 1) Equal by Cash Acme, Cla-Val Hi Capacity, Conbraco 36C, Honeywell-Braukmann, Spence Hi Capacity, Watts, or Wilkins. See Section 01 6200.
8. Mixing Valve For Lavatories:
 - a. Solid brass construction and CSA B125 certified.
 - b. Includes integral check valves and inlet screen. Features advanced paraffin-based actuation technology.
 - c. Flow of **5.7 GPM (21.58 LPM)** with maximum **10 psi (69 kPA)** pressure drop. Perform to minimum flow of **0.5 GPM (1.89 LPM)** in accordance with ASSE 1070.
 - d. Set for **110 deg F (43 deg C)** Service.
 - e. Match Construction Drawings for connection sizes.
 - f. Class One Quality Standard: Powers LFLM495. See Section 01 6200.
 - g. Acceptable Manufacturers: Acorn, Chicago Faucets, Leonard, Powers, Sloan, Symmons and Watts.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Locate cold water lines a minimum of **6 inches (150 mm)** from hot water line.

3.2 FIELD QUALITY CONTROL

- A. Field Tests:
 1. Before pipes are covered, test systems in presence of Architect/Engineer at **125 psig (0.86 MPa)** hydrostatic pressure for four (4) hours and show no leaks.
 2. Disconnect equipment not suitable for **125 psig (0.86 MPa)** pressure from piping system during test period.
 3. PP-R Piping:
 - a. Test in accordance with Manufacturer's instructions prior to covering.
 - 1) Provide documentation.

3.3 CLEANING

- A. Sterilize potable water system with solution containing 200 parts per million minimum of available chlorine and maintaining pH of 7.5 minimum. Introduce chlorinating materials into system in manner approved by Architect/Engineer. Allow sterilization solution to remain for twenty-four (24) hours and open and close valves and faucets several times during that time.
- B. After sterilization, flush solution from system with clean water until residual chlorine content is less than 0.2 parts per million.
- C. Water system will not be accepted until negative bacteriological test is made on water taken from system. Repeat dosing as necessary until such negative test is accomplished.

END OF SECTION

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SECTION 22 1313**FACILITY SANITARY SEWERS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install soil, waste, and vent piping systems within building.
 - 2. Perform excavation and backfill required by work of this Section.
- B. Related Requirements:
 - 1. Section 22 0501: 'Common Plumbing Requirements'.
 - 2. Section 22 1319: 'Facility Sanitary Sewer Specialties' for furnishing of sewer specialties.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference: Participate in pre-installation conference specified in Section 03 3111.

1.3 REFERENCES

- A. Reference Standards:
 - 1. American National Standards Institute / American Water Works Association:
 - a. ANSI/AWWA C110/A21.10-12, 'Ductile-Iron and Gray-Iron Fittings'.
 - b. ANSI/AWWA C111/A21.11-12, 'Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings'.
 - c. ANSI/AWWA C115/A21.15-11, 'Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges'.
 - d. ANSI/AWWA C116/A21.16-15, 'Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service'.
 - e. ANSI/AWWA C150/A21.50-14, 'Thickness Design of Ductile-Iron Pipe'.
 - f. ANSI/AWWA C151/A21.51-09, 'Ductile-Iron Pipe, Centrifugally Cast, for Water'.
 - g. ANSI/AWWA C153/A21.53-11, 'Ductile-Iron Compact Fittings for Water Service'.
 - 2. American Water Works Association (AWWA):
 - a. AWWA M41, 'Ductile-Iron Pipe and Fittings' (3rd Edition).
 - 3. ASTM International:
 - a. ASTM A74-15, 'Standard Specification for Cast Iron Soil Pipe and Fittings'.
 - b. ASTM A888-15, 'Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications'.
 - c. ASTM C564-14, 'Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings'.
 - d. ASTM D2235-04(2011), 'Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings'.
 - e. ASTM D2321-14, 'Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications'.
 - f. ASTM D2564-12, 'Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems'.
 - g. ASTM D3034-14, 'Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings'.
 - h. ASTM F628-12, 'Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe With a Cellular Core'.
 - i. ASTM F656-15, 'Standard Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings'.

- j. ASTM F891–10, 'Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Plastic Pipe With a Cellular Core'.
4. Cast Iron Soil Pipe Institute:
 - a. CISPI Standard 301-09, 'Standard Specification for Hubless Cast Iron Soil Pipe End Fittings for Sanitary & Storm Drain, Waste, and Vent Piping Applications'.
 - b. CISPI 310-11, 'Standard Specification for Couplings for use in connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications'.
 - c. CISPI Handbook. 'Cast Iron Soil Pipe and Fittings Handbook' (2006).
5. International Code Council:
 - a. ICC IPC-2015, 'International Plumbing Code'.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:

1. Manufacturer Contact List:
 - a. American Brass & Iron (AB&I), Oakland, CA www.abifoundry.com.
 - b. Clamp-All Corp, Haverhill, MA www.clampall.com.
 - c. Anaco-Husky, Corona, CA www.anaco-husky.com.
 - d. Josam Co, Michigan City, IN www.josam.com.
 - e. Jay R. Smith Manufacturing Co, Montgomery, AL www.jrsmith.com.
 - f. MG Piping Products Co, Stanton, CA www.mgcoupling.com.
 - g. Mifab Manufacturing Inc, Chicago, IL www.mifab.com.
 - h. Mission Rubber Co., Corona, CA www.missionrubber.com.
 - i. Wade Div Tyler Pipe, Tyler, TX www.wadedrains.com.
 - j. Watts Drainage, Spindale, NC www.watts.com or Watts Industries, Burlington, ON, Canada www.wattscda.com.
 - k. Zurn Cast Metals, Erie, PA or Zurn Industries Limited, Mississauga, ON www.zurn.com.

B. Performance:

1. Design Criteria:
 - a. Minimum size of waste piping installed under floor slab on grade shall be **2 inches (50 mm)**.

C. Materials:

1. Use materials and fittings to match and tie in with existing piping on site.
2. Piping And Fittings: PVC Schedule 40 cellular core plastic pipe and pipe fittings meeting requirements of ASTM F891, joined using cement primer meeting requirements of ASTM F656 and pipe cement meeting requirements of ASTM D2564.
 - a. Furnish wall cleanouts with chrome wall cover and screw.
3. Piping And Fittings: ABS Schedule 40 cellular core plastic pipe and pipe fittings meeting requirements of ASTM F628, joined with pipe cement meeting requirements of ASTM D2235.
 - a. Furnish wall cleanouts with chrome wall cover and screw.
4. Cast Iron Buried Piping:
 - a. Approved Types: Service weight, single-hub or no-hub type cast iron soil pipe meeting requirements of ASTM A74.
 - b. Joint Material:
 - 1) Single-Hub: Rubber gaskets meeting requirements of ASTM C564.
 - 2) No-Hub:
 - a) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - b) American Brass & Iron: SuperGrip 304.
 - c) Anaco-Husky: Husky SD 4000 coupling.
 - d) Clamp-All: Neoprene gaskets with type 304 stainless steel clamp and 24 ga type 304 stainless steel housing.
 - e) Mission Rubber: Heavy weight coupling.

- f) MG Piping: MG Coupling.
- g) Mifab: MI-XHUB – Heavy duty shielded coupling type 301 or 304 stainless steel.
- 5. Cast Iron Above Grade Piping And Vent Lines:
 - a. Approved Types:
 - 1) Service weight, single-hub or no-hub type cast iron soil pipe meeting requirements of ASTM A74.
 - 2) Vent lines **2-1/2 inches (64 mm)** or smaller may be Schedule 40 galvanized steel.
 - b. Joint Material:
 - 1) Single-Hub: Rubber gaskets meeting requirements of ASTM C564.
 - 2) No-Hub Pipe: Neoprene gaskets with stainless steel cinch bands.
- 6. Cast Iron Fittings:
 - a. Cast Iron Pipe: Hub and spigot, except fittings for no-hub pipe shall be no-hub, and meet requirements of ASTM A74.
 - 1) Joint Material: Rubber gaskets meeting requirements of ASTM C564.
 - 2) Galvanized Pipe: Screwed Durham tarred drainage type.
 - b. Traps installed on cast iron bell and spigot pipe shall be service weight cast iron. Traps installed on threaded pipe shall be recess drainage pattern type.
 - c. P-Traps:
 - 1) Trap shall have clean out plug if installed in other than slab on grade.
 - 2) Type Two Acceptable Products.
 - a) JR Smith: 7220 deep seal cast iron.
 - b) Mifab: MI-950.
 - c) Zurn: Zurn Z-1000.
 - d) Equal as approved by Architect before installation. See Section 01 6200.
- 7. Cleanouts:
 - a. Furnish wall cleanouts with chrome wall cover and screw.
 - b. Type Two Acceptable Products:
 - 1) Finish Floors:
 - a) Josam: 56010.
 - b) J. R. Smith: 4023.
 - c) Mifab: C1100C-R-1.
 - d) Wade: W-6000.
 - e) Watts: CO-200-R.
 - f) Zurn: Z-1402.
 - 2) Finished Wall:
 - a) Josam: 58790.
 - b) J. R. Smith: 4530.
 - c) Mifab: C1460RD.
 - d) Wade: W8560E.
 - e) Watts: CO-460-RD.
 - f) Zurn: Z-1446.
 - 3) General Purpose:
 - a) Josam: 58900.
 - b) J. R. Smith: 4400.
 - c) Mifab: C1300-MF
 - d) Wade: W8550E.
 - e) Watts: CO-380.
 - f) Zurn: Z-1440.
 - 4) Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Excavate and backfill as specified in Sections 31 2316 and 31 2323 with following additional requirements:
 - 1. Runs shall be as close as possible to those shown on Drawings.

2. Excavate to required depth and grade to obtain fall required. Grade soil and waste lines within building perimeter **1/4 inch (6 mm)** fall in **one foot (300 mm)** in direction of flow.
 3. Bottom of trenches shall be hard. Tamp as required.
 4. Remove debris from trench before laying of pipe.
 5. Do not cut trenches near footings without consulting Architect.
- B. Metal Pipe And Fittings:
1. Provide depression under bell of each joint to maintain even bearing of sewer pipe.
 2. Connect to street main as required by local authorities.
 3. Use jacks to make-up gasketed joints.
 4. Do not caulk threaded work.
 5. Use torque wrench to obtain proper tension in cinch bands when using hubless cast iron pipe. Butt ends of pipe against centering flange of coupling.
- C. Thermoplastic Pipe And Fittings:
1. General: Piping and joints shall be clean and installed according to Manufacturer's recommendations. Break down contaminated joints, clean seats and gaskets and reinstall.
 2. Above Grade: Locate pipe hangers every **4 feet (1.2 m)** on center maximum and at elbows.
 3. Below Grade:
 - a. Install in accordance with Manufacturer's recommendations and ASTM D2321.
 - b. Stabilize unstable trench bottoms.
 - c. Bed pipe true to line and grade with continuous support from firm base.
 - 1) Bedding depth: **4 to 6 inches (100 to 150 mm)**.
 - 2) Material and compaction to meet ASTM standard noted above.
 - d. Excavate bell holes into bedding material so pipe is uniformly supported along its entire length. Blocking to grade pipe is forbidden.
 - e. Trench width at top of pipe:
 - 1) Minimum: **18 inches (450 mm)** or diameter of pipe plus **12 inches (300 mm)**, whichever is greater.
 - 2) Maximum: Outside diameter of pipe plus **24 inches (600 mm)**.
 - f. Do not use backhoe or power equipment to assemble pipe.
 - g. Initial backfill shall be **12 inches (300 mm)** above top of pipe with material specified in referenced ASTM standard.
 - h. Minimum cover over top of pipe not under building slab:
 - 1) **36 inches (900 mm)** before wheel loading.
 - 2) **48 inches (1 200 mm)** before compaction.
- D. Install piping so cleanouts may be installed as follows:
1. Where shown on Drawings and near bottom of each stack and riser.
 2. At every 135 degrees of accumulative change in direction for horizontal lines.
 3. Every **100 feet (30 meters)** of horizontal run.
 4. Extend piping to accessible surface. Do not install piping so cleanouts must be installed in carpeted floors. In such locations, configure piping so wall type cleanouts may be used.
- E. Each fixture and appliance discharging water into sanitary sewer or building sewer lines shall have seal trap in connection with complete venting system so gasses pass freely to atmosphere with no pressure or siphon condition on water seal.
- F. Vent entire waste system to atmosphere. Join lines together in fewest practicable numbers before projecting above roof. Set back vent lines so they will not pierce roof near edge or valley. Vent line terminations shall be:
1. **6 inches (150 mm)** minimum above roof and **12 inches (300 mm)** minimum from any vertical surface.
 2. Same size as vent pipe.
 3. In areas where minimum design temperature is below **0 deg F (minus 18 deg C)** or where frost or snow closure may be possible:
 - a. Vent line terminations shall be same size as vent pipe, except no smaller than **2 inches (50 mm)** in diameter.
 - b. Vents shall terminate **10 inches (250 mm)** minimum above roof or higher if required by local codes.

- G. Furnish and install firestopping at penetrations of fire-rated structures as required under Sections 07 8400 and 22 0501.
- H. If test Tees are used for testing, plug Tees so wall finish can be installed. Do not leave as exposed cleanouts.

3.2 FIELD QUALITY CONTROL

- A. Field Tests:
 - 1. Conduct tests for leaks and defective work. Notify Architect before testing.
 - 2. Metal Pipe System: After backfilling and compacting of trenches is complete but before placing floor slab, fill waste and vent system with water to roof level or **10 feet (3 meters)** minimum, and show no leaks for two hours. Uncover pipe and correct leaks and defective work. Re-backfill and compact and re-test.
 - 3. Thermoplastic Pipe System:
 - a. Before backfilling and compacting of trenches, Fill waste and vent system with water to roof level or **10 feet (3 meters)** minimum, and show no leaks for two hours. Correct leaks and defective work.
 - b. After backfilling and compacting of trenches is complete but before placing floor slab, re-test as specified above. Uncover pipe and correct leaks and defective work. Re-backfill and compact and re-test.

END OF SECTION

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SECTION 22 4216**COMMERCIAL LAVATORIES AND SINKS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install plumbing fixtures as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 07 9213: 'Elastomeric Joint Sealants' for sealants used between fixtures and other substrates.
 - 2. Section 22 0501: 'Common Plumbing Requirements'.
 - 3. Section 22 1116: 'Domestic Water Piping'.

1.2 REFERENCES

- A. Reference Standard:
 - 1. American National Standards Institute / International Code Council:
 - a. ANSI/ICC A117.1-2017, 'Standard for Accessible and Usable Buildings and Facilities'.
 - 2. American Society of Mechanical Engineers / Canadian Standards Association (CSA Group):
 - a. ASME A112.18.1-2018/CSA B125.1-18, 'Plumbing Supply Fittings'.
 - b. ASME A112.19.1-2018/CSA B45.2-18, 'Enamelled Cast Iron and Enamelled Steel Plumbing Fixtures'.
 - c. ASME A112.19.3-2017/CSA B45.4-17, 'Stainless steel plumbing fixtures'.
 - 3. NSF International Standard / American National Standards Institute:
 - a. NSF/ANSI 61-2017, 'Drinking Water System Components - Health Effects'.
 - b. NSF/ANSI 372-2016, 'Drinking Water System Components - Lead Content'.

1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.
 - 2. California only: California Assembly Bill 1953 (AB1953) Compliant for Lead Free.

1.4 SUBMITTALS

- A. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Final, executed copy of Warranty.

1.5 WARRANTY

- A. Manufacturer Warranty:
 - 1. Manufacturer's standard Warranty against material or Manufacturing defects.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:

1. Manufacturer Contact List:
 - a. American Standard Brands, Piscataway, NJ www.americanstandard-us.com or American Standard Canada, Mississauga, ON www.americanstandard.ca.
 - b. Brocar Products Inc, Cincinnati, OH www.brocar.com.
 - c. CECO, Huntington Park, CA www.cecosinks.com.
 - d. Chicago Faucet Co, Des Plaines, IL www.chicagofaucets.com.
 - e. Dearborn Brass, Tyler, TX www.dearbornbrass.com.
 - f. Delta Faucet Co, Indianapolis, IN www.deltafaucet.com or Delta Faucet Canada, London, ON (519) 659-3626.
 - g. Engineered Brass Co. (EBC) (Just Manufacturing Co.), Franklin Park, IL www.justmfg.com.
 - h. Elkay Manufacturing Co, Oak Brook, IL www.elkay.com.
 - i. Gerber Plumbing Fixtures LLC, Woodridge, IL www.gerberonline.com.
 - j. Josam Co, Michigan City, IN www.josam.com.
 - k. Jay R. Smith Manufacturing Co, Montgomery, AL www.jrsmith.com.
 - l. Just Manufacturing Co, Franklin Park, IL www.justsinks.com.
 - m. Keeney Manufacturing Co, Newington, CT www.keeneymfg.com.
 - n. Kindred USA, Midland, ON www.kindred-sinkware.com.
 - o. Kohler Co Plumbing Div, Kohler, WI www.us.kohler.com.
 - p. McGuire Manufacturing Co, Cheshire, CT www.mcguiremfg.com.
 - q. Mifab Manufacturing Inc, Amherst, NY www.mifab.com.
 - r. Moen Incorporated, North Olmsted, OH, or Moen Canada, Oakville, ON www.moen.com.
 - s. Omni Flow Controls, Harbor City, CA www.chronomite.com or www.omniflowcontrols.com.
 - t. Plumberex Specialty Products, Palm Springs, CA www.plumberex.com.
 - u. Sloan Valve Co, Franklin Park, IL www.sloanvalve.com.
 - v. Speakman Company, New Castle, DE www.speakmancompany.com.
 - w. Symmons, Braintree, MA www.symmons.com.
 - x. T & S Brass & Bronze Works Inc, Travelers Rest, SC www.tsbrass.com.
 - y. TrueBro Inc, Collierville, TN www.truebro.com.
 - z. Wade Div Tyler Pipe, Tyler, TX www.wadedrains.com.
 - aa. Watts Drainage, Spindale, NC www.wattsdrainage.com or Watts Industries, Burlington, ON, Canada www.wattscda.com.
 - bb. Zurn Commercial Brass, Sanford, NC www.zurn.com or Zurn Industries Ltd, Mississauga, ON (905) 795-8844.
 - cc. Zurn Cast Metal, Erie, PA www.zurn.com.

B. Performance:

1. Design Criteria:
 - a. Interior exposed pipe, valves, and fixture trim, including trim behind custom casework doors, shall be chrome plated.
 - b. Faucets and other fixture fittings shall conform to requirements of ASME A112.18.1/CSA B125.1.
 - c. Lavatories shall conform to requirements of:
 - 1) Stainless steel plumbing fixtures:
 - a) ASME A112.19.3/CSA B45.4.
 - b) CSA B45.4/ASME A112.19.3.

C. Components:

1. Stainless Steel Sinks And Fittings:
 - a. Design Criteria:
 - 1) Not required to meet NSF International Standards for Lead Free.
 - 2) Self-rimming, 18 gauge (1.2 mm) stainless steel, satin finish.
 - b. Single Compartment Sink:
 - 1) Description:
 - a) Size: 22 by 19.5 inches (559 mm by 495 mm) nominal.

- 2) Design Criteria:
 - a) Not required to meet NSF International Standards for Lead Free.
- 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - a) Elkay: LR-2219.
 - b) Just: SL-1921-AG-R.
 - c) Kindred: LBS 4008P-1.
- c. Stainless Steel Sink Fittings:
 - 1) Faucets for Sacramento Preparation Room Sink:
 - a) Design Criteria:
 - (1) Meet NSF International Standards for Lead Free.
 - b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) American Standard: Gooseneck Swivel Spout 7100.241H.
 - (2) Chicago: 350-ABCP.
 - (3) Delta: 27C643-R4.
 - (4) Gerber: C4-44-701.
 - (5) Kohler: K-7895-C.
 - (6) Moen: 8103.
 - (7) Speakman: SC-7112.
 - (8) T & S: 0305-01.
 - (9) Zurn: Z-825B1FC.
 - 2) Supply pipes with stops:
 - a) Design Criteria:
 - (1) Meet NSF International Standards for Lead Free.
 - b) Accessories:
 - (1) Provide chrome plated quarter-turn brass ball valve, 12 inches (300 mm) long braided stainless steel riser, and chrome-plated steel flange.
 - c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) McGuire: BV2165CC.
 - (2) Zurn: Z8804 LRQ-PC.
 - 3) Flow Control Fitting:
 - a) Design Criteria:
 - (1) Meet NSF International Standards for Lead Free.
 - b) Accessories:
 - (1) Provide vandal-proof type in place of aerator. Flow shall be 1.5 gpm.
 - c) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
 - (1) Omni A-200 Series by Chronomite Laboratories.
 - 4) Waste For Sacramento Preparation Room Sink:
 - a) Design Criteria:
 - (1) Not required to meet NSF International Standards for Lead Free.
 - b) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Elkay: LK18.
 - (2) Just: J-35FS.
 - (3) Kohler: K8807G.
 - (4) McGuire: 152.
 - (5) Zurn Z-8739-PC.
 - 5) Trap:
 - a) Description:
 - (1) 17 gauge (1.4 mm) tube 'P' trap, chrome plated.
 - b) Design Criteria:
 - (1) Not required to meet NSF International Standards for Lead Free.
 - c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - (1) Dearborn.
 - (2) Engineered Brass Company (EBC).
 - (3) Keeney Manufacturing.
 - (4) McGuire: MCT150075NCZN.

(5) Zurn.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install each fixture with separate vent line. Do not circuit vent.
- B. Ensure provisions are made for proper support of fixtures and that rough-in piping is accurately set and protected from movement and damage.
- C. Seal wall-mounted fixtures around edges to wall and counter top fixtures to countertop with sealant specified in Section 07 9213.
- D. Unless otherwise noted, provide each individual fixture supply with chrome-plated stop valve with hand wheel.
- E. Install fixtures with accessible stop or control valve in each hot and cold water branch supply line.
- F. Self-Supporting Lavatories: Install using carriers. Support carrier free of finished wall.
- G. Install Safety Covers on all under sink / lavatories with exposed water supply pipes and traps.
- H. Install Handicap Accessible Lavatories as per ADA height mounting requirements.

3.2 CLEANING

- A. Polish chrome finish at completion of Project.

END OF SECTION

DIVISION 26: ELECTRICAL

26 0500 COMMON WORK RESULTS FOR ELECTRICAL

- 26 0501 COMMON ELECTRICAL REQUIREMENTS
- 26 0519 LINE-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
- 26 0523 CONTROL-VOLTAGE ELECTRICAL CABLES
- 26 0526 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
- 26 0533 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS
- 26 0613 ELECTRICAL EQUIPMENT MOUNTING HEIGHT SCHEDULE

26 2000 LOW-VOLTAGE ELECTRICAL TRANSMISSION

- 26 2726 WIRING DEVICES

END OF TABLE OF CONTENTS

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SECTION 26 0501**COMMON ELECTRICAL REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. General electrical system requirements and procedures.
 - 2. Make electrical connections to equipment provided under other Sections.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Provide following information for each item of equipment:
 - 1) Catalog Sheets.
 - 2) Assembly details or dimension drawings.
 - 3) Installation instructions.
 - 4) Manufacturer's name and catalog number.
 - 5) Name of local supplier.
 - b. Furnish such information for following equipment:
 - 1) Section 26 2726: Wiring devices / Lighting control / Dimming equipment.
 - c. Do not purchase equipment before approval of product data.
 - 2. Shop Drawings:
 - a. Indicate precise equipment to be used, including all options specified. Indicate wording and format of nameplates where applicable. Submit in three-ring binder with hard cover.
- B. Informational Submittals:
 - 1. Test And Evaluation Reports: Report of site tests, before Substantial Completion.
- C. Closeout Submittals:
 - 1. Operations And Maintenance Manual Data:
 - a. Modify and add to requirements of Section 01 7000 as follows:
 - 1) Provide operating and maintenance instructions for each item of equipment submitted under Product Data.
 - 2) Include copy of approved shop drawings.

1.3 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
 - 1. NEC and local ordinances and regulations shall govern unless more stringent requirements are specified.
 - 2. Material and equipment provided shall meet standards of NEMA or UL and bear their label wherever standards have been established and label service is available.

1.4 OWNER'S INSTRUCTIONS

- A. Provide competent instructor for three days to train maintenance personnel in operation and maintenance of electrical equipment and systems. Factory representatives shall assist this instruction as necessary. Schedule instruction period at time of final inspection.

1.5 SCHEDULING

- A. Include detailed sequence of individual electrical demolition operations on Construction Schedule specified in Section 01 3200.
- B. Coordinate with Owner for equipment and materials to be removed by Owner.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 EXAMINATION

- A. All relocations, reconnections, and removals are not necessarily indicated on Drawings. Include such work without additional cost to Owner.
- B. Confirm dimensions, ratings, and specifications of equipment to be installed and coordinate these with site dimensions and with other Sections.

3.2 PREPARATION

- A. Disconnect equipment that is to be removed or relocated. Carefully remove, disassemble, or dismantle as required, and store in approved location on site, existing items to be reused in completed work.
- B. Where affected by demolition or new construction, relocate, extend, or repair raceways, conductors, outlets, and apparatus to allow continued use of electrical system. Use methods and materials as specified for new construction.
- C. Perform drilling, cutting, block-offs, and demolition work required for removal of necessary portions of electrical system. Do not cut joists, beams, girders, trusses, or columns without prior written permission from Architect.
- D. Remove concealed wiring abandoned due to demolition or new construction. Remove circuits, conduits, and conductors that are not to be re-used back to next active fixture, device, or junction box.
- E. Patch, repair, and finish surfaces affected by electrical demolition work, unless work is specifically specified to be performed under other Sections of the specifications.

3.3 INSTALLATION

- A. General:
 - 1. Locations of electrical equipment shown on Drawings are approximate only. Field verify actual locations for proper installation.
 - 2. Coordinate electrical equipment locations and conduit runs with those providing equipment to be served before installation or rough-in.
 - a. Notify Architect of conflicts before beginning work.
 - b. Coordinate locations of power and lighting outlets in mechanical rooms and other areas with mechanical equipment, piping, ductwork, cabinets, etc, so they will be readily accessible and functional.

3. Work related to other trades which is required under this Division, such as cutting and patching, trenching, and backfilling, shall be performed according to standards specified in applicable Sections.

B. Install Penetration Firestop System appropriate for penetration at electrical system penetrations through walls, ceilings, and top plates of walls.

3.4 FIELD QUALITY CONTROL

A. Field Tests:

1. Test systems and demonstrate equipment as working and operating properly. Notify Architect before test. Rectify defects at no additional cost to Owner.
2. Measure current for each phase of each motor under actual final load operation, i.e. after air balance is completed for fan units, etc. Record this information along with full-load nameplate current rating and size of thermal overload unit installed for each motor.

3.5 CLEANING

A. Remove obsolete raceways, conductors, apparatus, and lighting fixtures promptly from site and dispose of legally.

END OF SECTION

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SECTION 26 0519**LINE-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Quality of conductors used on Project except as excluded below.
- B. Related Requirements:
 - 1. Section 26 0501: Common Electrical Requirements.

1.2 REFERENCES

- A. Definitions:
 - 1. Line Voltage: Over 70 Volts.

PART 2 - PRODUCTS**2.1 SYSTEMS**

- A. Line Voltage Conductors:
 - 1. Copper with AWG sizes as shown:
 - a. Minimum size shall be No. 12 except where specified otherwise.
 - b. Conductor size No. 8 and larger shall be stranded.
 - 2. Insulation:
 - a. Standard Conductor Size No. 10 And Smaller: 600V type THWN or XHHW (75 deg C).
 - b. Standard Conductor Size No. 8 And Larger: 600V Type THW, THWN, or XHHW (75 deg C).
 - c. Higher temperature insulation as required by NEC or local codes.
 - 3. Colors:
 - a. 208Y / 120 V System:
 - 1) Black: Phase A.
 - 2) Red: Phase B.
 - 3) Blue: Phase C.
 - 4) Green: Ground.
 - 5) White: Neutral.
 - b. 480Y / 277 Volt System:
 - 1) Brown: Phase A.
 - 2) Orange: Phase B.
 - 3) Yellow: Phase C.
 - 4) Gray: Neutral.
 - 5) Green: Ground.
 - c. Conductors size No. 10 and smaller shall be colored full length. Tagging or other methods for coding of conductors size No. 10 and smaller not allowed.
 - d. For feeder conductors larger than No. 10 at pull boxes, gutters, and panels, use painted or taped band or color tag color-coded as specified above.
- B. Line Voltage Cables:
 - 1. Metal Clad Cable (MC) may be used as restricted below:
 - a. Copper conductors
 - b. Sizes #12 through #8
 - c. Use only in indoor dry locations where:

- 1) Not subject to damage.
- 2) Not in contact with earth.
- 3) Not in concrete.

C. Standard Connectors:

1. Conductors No. 8 And Smaller: Steel spring wire connectors.
2. Conductors Larger Than No. 8: Pressure type terminal lugs.
3. Connections Outside Building: Watertight steel spring wire connections with waterproof, non-hardening sealant.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Conductors and cables shall be continuous from outlet to outlet.
2. Do not use direct burial cable.

B. Line Voltage Conductors:

1. Install conductors in raceway where indicated on Drawings. Run conductors of different voltage systems in separate conduits.
2. Route circuits at own discretion, however, circuiting shall be as shown in Panel Schedules. Group circuit homeruns to panels as shown on Drawings.
3. Neutrals:
 - a. On three-phase, 4-wire systems, do not use common neutral for more than three circuits.
 - b. On single-phase, 3-wire systems, do not use common neutral for more than two circuits.
 - c. Run separate neutrals for each circuit where specifically noted on Drawings.
 - d. Where common neutral is run for two or three home run circuits, connect phase conductors to breakers in panel which are attached to separate phase legs so neutral conductors will carry only unbalanced current. Neutral conductors shall be of same size as phase conductors unless specifically noted otherwise.
4. Pulling Conductors:
 - a. Do not pull conductors into conduit until raceway system is complete and cabinets and outlet boxes are free of foreign matter and moisture.
 - b. Do not use heavy mechanical means for pulling conductors.
 - c. Use only listed wire pulling lubricants.

C. Line Voltage Cables:

1. Route circuits at own discretion, however, circuiting and numbering shall be as shown in Panel Schedules.
2. Support cables using approved staples, cable ties, straps, hangers, or similar fittings, spaced as required.
3. Where installing in framing, do not bore holes in joists or beams outside center 1/3 of member depth or within **24 inches (600 mm)** of bearing points. Do not bore holes in vertical framing members outside center 1/3 of member width. Holes shall be one inch diameter maximum.
4. Conceal cables within ceilings and walls of finished areas. Cables may be exposed in unfinished areas but not run on floors of mechanical equipment spaces or in such a way that they obstruct access to, operation of, or servicing of equipment.
5. Install exposed cables parallel to or at right angles to building structure lines.
6. Keep cables **6 inches (150 mm)** minimum from hot water pipes.
7. Do not support cables from mechanical ducts or duct supports without Architect's written approval.
8. Prohibited procedures:
 - a. Boring holes for installation of cables in vertical truss members.
 - b. Notching of structural members for installation of cables.

END OF SECTION

SECTION 26 0523**CONTROL-VOLTAGE ELECTRICAL CABLES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install control-voltage electrical cables as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 01 1100: 'Summary Of Work' for Owner will terminate building telephone cables at terminal board.
 - 2. Section 14 4216: Control Cables for Vertical Wheelchair Lift
 - 3. Section 26 0501: 'Common Electrical Requirements'.

1.2 REFERENCES

- A. Definitions:
 - 1. Control Voltage: 70 Volts and under.

PART 2 - PRODUCTS**2.1 SYSTEM**

- A. Manufacturers:
 - 1. Category Four Approved Cable Manufacturers. See Section 01 6200 for definitions of Categories:
 - a. Alpha Wire Co, Elizabeth, NJ www.alphawire.com.
 - b. Belden Wire & Cable Co, Richmond, IN www.belden.com.
 - c. Liberty Wire & Cable, Colorado Springs, CO www.libertycable.com.
 - d. West Penn Wire Corp, Washington, PA www.westpenn-cdt.com.

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. General:
 - 1. Cables shall be continuous and without splices from source to outlet.
 - 2. Install cables in raceway. Run cables of different systems in separate conduits.
 - 3. Pulling cables into conduit:
 - a. Do not pull cables until raceway system is complete and cabinets and outlet boxes are free of foreign matter and moisture.
 - b. Do not use heavy mechanical means for pulling cables.
 - c. Use only listed wire pulling lubricants.
 - 4. Prohibited procedures:
 - a. Boring holes for installation of cables in vertical truss members.
 - b. Notching of structural members for installation of cables.

END OF SECTION

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SECTION 26 0526**GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install grounding for electrical installation as described in Contract Documents except as excluded below.
- B. Related Requirements:
 - 1. Section 03 3111: 'Normal Weight Structural Concrete'.
 - a. Pre-installation conference held jointly with other concrete related sections.
 - 2. Section 26 0501: Common Electrical Requirements.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 - 1. Participate in pre-installation conference as specified in Section 03 3111.
 - 2. In addition to agenda items specified in Section 01 3100 and 31 3111, review following:
 - a. Review Architect's inspection of grounding conductor installation before placement of concrete.

1.3 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals: Requirements of Section 27 1501 applies, but is not limited to following:
 - 1. Cable assemblies shall be UL / CE Listed and CSA Certified. Cables shall be a distinctive green or green/yellow in color, and all jackets shall be UL, VW-1 flame rated.
 - 2. Grounding shall conform to all required Commercial Building Grounding and Bonding Requirements for Telecommunications, Electrical Codes, and Manufacturer's grounding requirements.
- B. Qualifications: Requirements of Section 01 4301 applies, but is not limited to following:
 - 1. Installers Qualifications:
 - a. Grounding and Bonding:
 - 1) Licensed electrical contractor shall perform installation and termination of main bonding conductor to building service entrance ground.
 - 2) Licensed in State that Work is to be performed.

PART 2 - PRODUCTS**2.1 SYSTEM**

- A. Manufacturers:
 - 1. Type One Acceptable Products:
 - a. 'Cadweld' by Erico International, Solon, OH www.erico.com.
 - b. 'ThermOweld' by Continental Industries, Tulsa, NE www.conind.com.
 - c. Equal as approved by Architect before bidding. See Section 01 6200.
- B. Performance:

1. Design Criteria:
 - a. Size materials as shown on Drawings and in accordance with applicable codes.
- C. Materials:
 1. Grounding And Bonding Jumper Conductors: Bare copper or with green insulation.
 2. Make grounding conductor connections to ground rods and water pipes using approved bolted clamps listed for such use.
 3. Service Grounding Connections And Cable Splices: Make by exothermic process.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Interface With Other Work: Coordinate with Section 03 3111 in installing grounding conductor and placing concrete. Do not allow placement of concrete before Architect's inspection of grounding conductor installation.
- B. Grounding conductors and bonding jumper conductors shall be continuous from terminal to terminal without splice. Provide grounding for following.
 1. Electrical service, its equipment and enclosures.
 2. Conduits and other conductor enclosures.
 3. Neutral or identified conductor of interior wiring system.
 4. Main panelboard, power and lighting panelboards.
 5. Non-current-carrying metal parts of fixed equipment such as motors, starter and controller cabinets, instrument cases, and lighting fixtures.
- C. Grounding connection to main water supply shall be accessible for inspection and made within **6 inches (150 mm)** of point of entrance of water line to building. Provide bonding jumpers across water meter and valves to assure electrical continuity.
- D. Provide concrete-encased electrode system by embedding **20 feet (6.10 m)** minimum of No. 2/0 bare copper conductor in concrete footing that is in direct contact with the earth, **2 inches (50 mm)** minimum below concrete surface. Extend No. 2/0 copper conductor to main panel as shown on Drawings.
- E. Ground identified common conductor of electrical system at secondary side of main transformer supplying building. Ground identified grounded (neutral) conductor of electrical system on supply side of main service disconnect.
- F. Pull grounding conductors in non-metallic raceways, in flexible steel conduit exceeding **72 inches (1 800 mm)** in length, and in flexible conduit connecting to mechanical equipment.
- G. Provide grounding bushings on all feeder conduit entrances into panelboards and equipment enclosures.
- H. Bond conduit grounding bushings to enclosures with minimum #10 AWG conductor.
- I. Connect equipment grounds to building system ground.
 1. Use same size equipment grounding conductors as Phased conductors up through #10 AWG.
 2. Use NEC Table 250-95 for others unless noted otherwise in Drawings.
- J. Run separate insulated grounding cable from each equipment cabinet to electrical panel. Do not use intermediate connections or splices. Affix directly to cabinet.
- K. On motors, connect ground conductors to conduit with approved grounding bushing and to metal frame with bolted solderless lug.

- L. Ground cabinet of transformers to conduit and ground wires, if installed. Bond transformer secondary neutral conductor to cabinet.

3.2 FIELD QUALITY CONTROL

- A. Field Inspections:
 - 1. Notify Architect for inspection two (2) days minimum before placing concrete over grounding conductor.

END OF SECTION

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SECTION 26 0533**RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Quality of material and installation procedures for raceway, boxes, and fittings used on Project but furnished under other Divisions.
 - 2. Furnish and install raceway, conduit, and boxes used on Project not specified to be installed under other Divisions.
- B. Related Requirements:
 - 1. Section 23 0933: 'Electric and Electronic Control System for HVAC' for concealed raceway and extensions for temperature control system.
 - 2. Section 26 0501: 'General Electrical Requirements'.

PART 2 - PRODUCTS**2.1 SYSTEM**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Cooper B-Line, Highland, IL www.b-line.com.
 - b. Hubbell Incorporated, Milford, CT www.hubbell-wiring.com or Hubbell Canada Inc, Pickering, ON (905) 839-4332.
 - c. Square D, Palatine, IL www.squared.com.
 - d. Thomas & Betts, Memphis, TN www.tnb.com or Thomas & Betts Ltd, Iberville, PQ (450) 347-5318.
 - e. Walker Systems Inc, Williamstown, WV (800) 240-2601 or Walker Systems Inc / Wiremold Canada Inc, Fergus, ON (519) 843-4332.
 - f. Wiremold Co, West Hartford, CT www.wiremold.com.
- B. Materials:
 - 1. Raceway And Conduit:
 - a. Sizes:
 - 1) **3/4 inch (19 mm)** for exterior use, unless indicated otherwise.
 - 2) **1/2 inch (13 mm)** for interior use, unless indicated otherwise.
 - b. Types: Usage of each type is restricted as specified below by product.
 - 1) Galvanized rigid steel or galvanized intermediate metal conduit (IMC) is allowed for use in all areas. Where in contact with earth or concrete, wrap buried galvanized rigid steel and galvanized IMC conduit and fittings completely with vinyl tape.
 - 2) Galvanized Electrical Metallic Tubing (EMT) and Flexible Steel Conduit:
 - a) Allowed for use only in indoor dry locations where it is:
 - (1) Not subject to damage.
 - (2) Not in contact with earth.
 - (3) Not in concrete.
 - b) For metal conduit systems, flexible steel conduit is required for final connections to indoor mechanical equipment.
 - 3) Schedule 40 Polyvinyl Chloride (PVC) Conduit:
 - a) Allowed for use only underground or below concrete with galvanized rigid steel or IMC elbows and risers.
 - 4) Listed, Liquid-Tight Flexible Metal Conduit:

- a) Use in outdoor final connections to mechanical equipment, length not to exceed **36 inches (900 mm)**.
- 5) Pre-wired **3/8 Inch (9.5 mm)** Flexible Fixture Whips: Allowed only for connection to recessed lighting fixtures, lengths not to exceed **72 inches (1 800 mm)**.
- c. Prohibited Raceway Materials:
 - 1) Aluminum conduit.
 - 2) Armored cable type AC (BX) cable.
2. Raceway And Conduit Fittings:
 - a. Rigid Steel Conduit And IMC: Threaded and designed for conduit use.
 - b. EMT:
 - 1) Compression type.
 - 2) Steel set screw housing type.
 - c. PVC Conduit:
 - 1) PVC type. Use PVC adapters at all boxes.
 - 2) PVC components, (conduit, fittings, cement) shall be from same Manufacturer.
 - d. Flexible Steel Conduit: Screw-in type.
 - e. Liquid-tight Flexible Metal Conduit: Sealtite type.
 - f. Expansion fittings shall be equal to OZ Type AX sized to raceway and including bonding jumper.
 - g. Prohibited Fitting Materials:
 - 1) Crimp-on, tap-on, indenter type fittings.
 - 2) Cast set-screw fittings for EMT.
 - 3) Spray (aerosol) PVC cement.
3. Seal Devices: OZ Type WSK.
4. Outlet Boxes:
 - a. Galvanized steel of proper size and shape are acceptable for all systems. Where metal boxes are used, provide following:
 - 1) Provide metal supports and other accessories for installation of each box.
 - 2) Equip ceiling and bracket fixture boxes with fixture studs where required.
 - 3) Equip outlets in plastered, paneled, and furred finishes with plaster rings and extensions to bring box flush with finish surface.
 - b. Non-metallic boxes may be used only for control voltage wiring systems.
 - c. Telephone / data outlet boxes shall be single device outlet boxes.
 - d. HVAC Instrumentation And Control:
 - 1) Junction boxes in mechanical equipment areas shall be **4 inches (100 mm)** square.
 - 2) Boxes for remote temperature sensor devices shall be recessed single device.
 - 3) Boxes for thermostats shall be **4 inches (100 mm)** square with raised single device cover.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 1. Confirm dimensions, ratings, and specifications of materials to be installed and coordinate these with site dimensions and with other Sections.

3.2 INSTALLATION

- A. Interface With Other Work:
 1. Before rough-in, verify locations of boxes with work of other trades to insure that they are properly located for purpose intended.
 - a. Coordinate location of outlets adjacent to or in millwork with Division 06 before rough-in. Refer conflicts to Architect and locate outlet under his direction.
 2. Install pull wires in raceways installed under this Section where conductors or cables are to be installed under other Divisions.

B. Conduit And Raceway:

1. Conceal raceways within ceilings, walls, and floors, except at Contractor's option, conduit may be exposed on walls or ceilings of mechanical equipment areas and above acoustical panel suspension ceiling systems. Install exposed raceway runs parallel to or at right angles to building structure lines.
2. Keep raceway runs **6 inches (150 mm)** minimum from hot water pipes.
3. Make no more than four quarter bends, 360 degrees total, in any conduit run between outlet and outlet, fitting and fitting, or outlet and fitting.
 - a. Make bends and offsets so conduit is not injured and internal diameter of conduit is not effectively reduced.
 - b. Radius of curve shall be at least minimum indicated by NEC.
4. Cut conduit smooth and square with run and ream to remove rough edges. Cap raceway ends during construction. Clean or replace raceway in which water or foreign matter have accumulated.
5. Installation in Concrete:
 - a. Install no conduit in concrete unless outside diameter is less than 1/3 of slab, wall, or beam thickness in which it is embedded.
 - b. Position conduits in center of concrete below reinforcing steel, and separated by minimum lateral spacing of three diameters.
 - c. Elbows embedded in concrete shall be rigid steel or IMC and stubouts from concrete slabs shall extend **3 inches (75 mm)** minimum before making connection to EMT.
 - d. Separate conduits penetrating structural slabs in buildings by **2 inches (50 mm)** minimum.
 - e. Install seal device where underground raceways penetrate concrete building wall.
6. Installation In Framing:
 - a. Do not bore holes in joists or beams outside center 1/3 of member depth or within **24 inches (600 mm)** of bearing points. Do not bore holes in vertical framing members outside center 1/3 of member width.
 - b. Holes shall be **one inch (25 mm)** diameter maximum.
7. Underground Raceway And Conduit:
 - a. Bury underground raceway installed outside building **24 inches (600 mm)** deep minimum.
 - b. Bury underground conduit in planting areas **18 inches (450 mm)** deep minimum. It is permissible to install conduit directly below concrete sidewalks, however, conduit must be buried **18 inches (450 mm)** deep at point of exit from planting areas.

C. Boxes:

1. Boxes shall be accessible and installed with approved cover.
2. Do not locate device boxes that are on opposite sides of framed walls in the same stud space. In other wall construction, do not install boxes back to back.
3. Locate boxes so pipes, ducts, or other items do not obstruct outlets.
4. Install outlets flush with finished surface and level and plumb.
5. Support switch boxes larger than two-gang with side brackets and steel bar hangers in framed walls.
6. At time of substantial completion, install blank plates on uncovered outlet boxes that are for future use.
7. Install air-vapor barrier boxes.
 - a. Follow Manufacturer's installation instructions.
8. Location:
 - a. Install boxes at door locations on latch side of door, unless explicitly shown otherwise on Drawings. Verify door swings shown on electrical drawings with architectural drawings, and report discrepancies to Architect before rough-in. Distance of box from jamb shall be within **6 inches (150 mm)** of door jamb.
 - b. Properly center boxes located in walls with respect to doors, panels, furring, trim and consistent with architectural details. Where two or more outlets occur, space them uniformly and in straight lines with each other, if possible.
 - c. Center ceramic tile boxes in tile.

END OF SECTION

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SECTION 26 0613

ELECTRICAL EQUIPMENT MOUNTING HEIGHT SCHEDULE

PART 1 - GENERAL: Not Used

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Unless otherwise indicated, mount center of outlets or boxes at following heights above finish floor. Refer special conditions to Architect before rough-in and locate outlet under his direction.
- B. Mounting Heights:
 - 1. Electrical:
 - a. Receptacles: 18 inches (450 mm).
 - b. Wall Switches: 42 inches (1 065 mm).

END OF SECTION

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SECTION 26 2726**WIRING DEVICES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install wiring devices complete with plates as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 26 0501: 'Common Electrical Requirements'.

PART 2 - PRODUCTS**2.1 COMPONENTS**

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. Cooper Wiring Devices, Peachtree City, GA www.cooperwiringdevices.com.
 - b. General Electric Industrial Systems, Charlotte, NC www.geindustrial.com.
 - c. Hubbell Building Automation, Austin, TX www.hubbell-automation.com.
 - d. Hubbell Inc, Milford, CT www.hubbell-wiring.com or Hubbell Canada Inc, Pickering, ON (800) 263-4622 or (905) 839-4332.
 - e. Hunt Control Systems Inc, Fort Collins, CO www.huntdimming.com.
 - f. Intermatic Inc, Spring Grove, IL www.intermatic.com.
 - g. Leviton Manufacturing Co, Little Neck, NY www.leviton.com or Leviton Manufacturing of Canada Ltd, Pointe-Claire, QB (800) 461-2002 or (514) 954-1840.
 - h. Lightolier Controls, Dallas, TX www.lolcontrols.com or Lightolier CFI, Lachine, QB (800) 565-5486 or (514) 636-0670.
 - i. Lutron Electronics Co Inc, Coopersburg, PA www.lutron.com.
 - j. Novitas Inc, Peachtree City, GA www.novitas.com.
 - k. Ortronics, New London, CT www.ortronics.com.
 - l. Paragon Electric Co Inc, Carol Stream, IL www.icca.invensys.com/paragon or Paragon Electric, Mississauga, ON (800) 951-5526 or (905) 890-5956.
 - m. Pass & Seymour, Syracuse, NY www.passandseymour.com or Pass & Seymour Canada Inc, Concord, ON (905) 738-9195.
 - n. Red Dot div of Thomas & Betts, Memphis, TN www.tnbcom.
 - o. Sensorswitch, Wallingford, CT www.sensorswitch.com.
 - p. Siemon Company, Watertown, CT www.siemon.com.
 - q. Square D Co, Palatine, IL www.squared.com.
 - r. Suttle, Hector, MN www.suttleonline.com.
 - s. Tork Inc, Mount Vernon, NY www.tork.com.
 - t. Watt Stopper Inc, Santa Clara, CA www.wattstopper.com.
 - 2. Product Options:
 - a. Faces shall be nylon where available.
 - b. Devices of single type shall be from same Manufacturer.
 - c. Devices are listed as white. Use white devices on light colored walls, brown on dark colored walls and where installed in wood casework, and black on black walls.
- B. Switches:
 - 1. Standard Style:
 - a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) 20 AMP, single pole:

- a) Cooper: 2221V.
- b) Hubbell: HBL1221-I.
- c) Pass & Seymour: 20AC1-I.
- d) Leviton: 1221-2I.

C. Receptacles:

1. Standard Style:

- a. 15 AMP, specification grade, back and side wired, self grounding.
- b. Verified by UL to meet Fed Spec WC-596F.
- c. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) Cooper: 5252V.
 - 2) Hubbell: HBL5252I.
 - 3) Leviton: 5252-I.
 - 4) Pass & Seymour: 5252-I.

2. Ground Fault Circuit Interrupter (GFCI):

- a. 15 AMP, specification grade.
- b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
 - 1) Cooper: GF15W.
 - 2) Hubbell: GF5252WA.
 - 3) Leviton: 8599-W.
 - 4) Pass & Seymour: 1594-W.

D. Plates:

1. Standard Cover Plates:

- a. Office / Occupied Areas:
 - 1) Nylon or high impact resistant thermoplastic.
 - 2) Color shall match wiring device.
- b. All Other: Steel.
- c. Ganged switches shall have gang plates.
- d. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
 - 1) Cooper.
 - 2) Hubbell.
 - 3) Leviton.
 - 4) Pass & Seymour.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install devices flush with walls, straight, and solid to box.

END OF SECTION

DIVISION 27: COMMUNICATIONS

27 5000 DISTRIBUTED COMMUNICATIONS AND MONITORING SYSTEMS

27 5117 AUDIO SYSTEMS

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SECTION 27 5117**AUDIO SYSTEMS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
1. Furnish and install complete and operational sound system as described in Contract Documents including:
 - a. Complete systems for amplifying sound signals from microphones and media source equipment and distributing them to loudspeakers at various locations.
 2. Assist Audiovisual Consultant with final inspection and equalization of system and provide necessary test equipment for audio system and partition noise isolation tests if applicable. Correct problems found at time of final inspection of system.
- B. Related Requirements:
1. Division 26 'Electrical':
 - a. Raceway, boxes, and installation of speaker enclosures and mounting rings furnished by Division 27.
 - b. Power to equipment location and power relay wiring if applicable.
 2. Audiovisual Consultant will perform final inspection, system balance, equalization, and instruct local leaders in operation of system.
- C. Related Requirements:
1. Section 01 6400: Owner will furnish Webcast Communicator or Webcast Capable Device such as personal computer or laptop. This Section establishes quality of materials and installation for information of Contractor, Architect, and Owner's Representatives.

1.2 REFERENCES

- A. Association Publications:
1. Building Industry Consulting Service International (BISCI):
 - a. *Information Transport Systems Installation Methods Manual (ITSIMM)* (5th Edition).
 - b. *Telecommunications Distribution Methods Manual (TDMM)* (12th Edition).
 2. InfoComm International Association:
 - a. *Audiovisual Best Practices: The Design & Integration Process for the AV and Construction Industries*.
 - b. *AV Design Reference Manual* (1st Edition, 2006).
 - c. *Basics of Audio and Visual Systems Design* (2003).
 3. Institute of Electrical and Electronics Engineers:
 - a. IEEE 1100-2005, '*Recommended Practice for Powering and Grounding Electric Equipment*'.
- B. Reference Standards:
1. American National Standards Institute/InfoComm International Association:
 - a. ANSI/INFOCOMM 1M:2009, 'Audio Coverage Uniformity in Enclosed Listener Areas'.
 - b. ANSI/INFOCOMM 2M:2010, 'Standard Guide for Audiovisual Systems Design and Coordination Processes'.
 - c. ANSI/INFOCOMM 4:2012, 'Audiovisual Systems Energy Management'.
 2. National Fire Protection Association:
 - a. NFPA 70: 'National Electrical Code (NEC)' (2014 Edition).
 - b. NFPA 72: 'National Fire Alarm and Signaling Code' (2016 Edition).
 3. Telecommunications Industry Association:
 - a. TIA-568-C.2, 'Balanced Twisted-Pair Telecommunications Cabling and Components Standards' (Revision C, 2009).

- b. TIA-569, 'Telecommunications Pathways And Spaces' (Revision D, 2015).
 - c. TIA-606, 'Administration Standard for Telecommunications Infrastructure' (Revision B, 2012).
 - d. TIA-607, 'Telecommunications Bonding and Grounding (Earthing) for Customer Premises' (Revision C, 2015).
 - e. TIA-758, 'Customer-Owned Outside Plant Telecommunication Infrastructure Standard' (Revision B, 2012).
4. Underwriters Laboratories (UL):
 - a. UL 486A-486B, 'Wire Connectors' (January 2013).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 1. Coordinate final inspection schedule of audio system before Audiovisual Consultant's final inspection.
- B. Schedule:
 1. After completion of audio system installation of this section, Installer to perform Field Testing before Audiovisual Consultant Final Inspection of audio system.
 2. Notify Audiovisual Consultant two (2) weeks minimum before Audiovisual Consultant's final inspection as specified in Field Quality Control in Part 3 of this specification.

1.4 SUBMITTALS

- A. Informational Submittals:
 1. Special Procedure Submittals:
 - a. Provide itemized list of equipment to be supplied.
 - b. Provide proposed labeling for system components.
 2. Qualification Statement:
 - a. Installer:
 - 1) Provide Qualification documentation as requested by Engineer/Architect including:
 - a) List of Projects requested.
 - b) List of certified technician(s) with dates of training courses completed.
- B. Closeout Submittals:
 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Operations and Maintenance Data:
 - 1) Equipment Manufacture's manual:
 - a) Audio system operation and maintenance instructions.
 - b) List of equipment provided, including portable equipment, showing make, model, and serial number.
 - b. Warranty Documentation:
 - 1) Include copy of final, executed warranty.
 - c. Record Documentation:
 - 1) Software and Programming: Copies of all manufacturers' software used for programming various components and functions of the system shall be furnished to the Owner:
 - a) Original audio processor program files, source codes and compiled codes used for system control, audio setup and any other computerized functions of system including screen layout generation, configuration and layouts and any other related computer files shall also be furnished to Owner.
 - b) In each and every case, all programming, code generation, configuration files, layout files and any other software and/or code written and generated of setup and operation of this system are property of Owner of system and not of Audiovisual Consultant, Contractor or Integrator.

1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. System shall be installed in accordance with applicable standards, requirements, and recommendations of International Building Code, National Electrical Code and all local authorities having jurisdiction.
- B. Qualifications:
 - 1. Installer. Requirements of Section 01 4301 applies, but not limited to following:
 - a. Approved Installers:
 - 1) Installers are to furnish and install components of audio system and meet qualification requirements.
 - 2) Approval subject to agreement process for Pre-Approval Installers.
 - b. Alternate Installer(s):
 - 1) Firm specializing in performing work of this section:
 - a) Minimum three (3) years of successful installation experience of AV system projects of comparable size, and complexity required for this project. Audio systems must have included complete installation and setup work and must have been completed by factory trained and certified technician.
 - b) Firm successfully completed minimum of three (3) projects in past two (2) years before bidding.
 - c) Firms must have certified technician that has successfully completed all relevant training courses recommended by manufacturers and proficient of all specified equipment of this section.
 - d) Comply with specifications and Contract Documents.
 - 2) Submit documentation of compliance of qualifications before bid to Architect or Owner's Representative.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Materials shall be delivered in original, unopened packages with labels intact.
- B. Storage And Handling Requirements:
 - 1. Provide secure location protected from weather in cool, dry location, out of direct sunlight in compliance with Manufacturer's instructions and recommendations.
 - 2. Keep materials free from dirt and foreign matter.

1.7 WARRANTY

- A. Special Warranty:
 - 1. Provide complete warranty repair or replacement for one (1) year at no cost to Owner, except in case of obvious abuse.
 - 2. If failure causes Chapel or Cultural Center audio system to be inoperative or unusable for its intended purpose, Installer, when notified of problem before Wednesday, shall repair system so it will be operational and usable by following Sunday. If defective components cannot be repaired in time, furnish and install temporary loaner equipment as required.
 - 3. Honor component warranties for term established by Manufacturer, if greater than one (1) year.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Manufacturers Contact List:

1. Category Four components as shown on Drawings from following Manufacturers. See Section 01 6200 for definition of Categories.
 - a. Atlas Sound, Phoenix, AZ www.atlassound.com.
 - b. Audio-Technica US Inc, Stow, OH www.audio-technica.com.
 - c. Belden Wire & Cable Co, Richmond, IN www.belden.com.
 - d. BSS Audio, Sandy, UT www.bssaudio.com.
 - e. Chatsworth, Westlake Village, CA www.chatsworth.com.
 - f. Community Professional Loudspeakers, Chester, PA www.communitypro.com.
 - g. Conquest Sound Co, Tinley Park, IL www.conquestsound.com.
 - h. Crown Audio Inc, Elkhart, IN www.crownaudio.com.
 - i. Countryman, Menlo Park, CA www.countryman.com.
 - j. EIKI International, Laguna Niguel, CA www.eiki.com.
 - k. Electro-Voice Inc, Burnsville, MN www.electro-voice.com.
 - l. Emtech Electronics Inc, Orem, UT www.emtechelectronics.com.
 - m. Extron, Anaheim, CA www.extron.com.
 - n. HellermannTyton, Milwaukee, WI www.hellermann.tyton.com.
 - o. Hubbell Inc, Orange, CT www.hubbell-wiring.com.
 - p. IVIE Technologies Inc, Lehi, UT www.ivie.com.
 - q. JBL Professional, Northridge, CA www.jblpro.com.
 - r. König & Meyer, Wertheim, Germany www.k-m.de/en.
 - s. Leviton Manufacturing Co, Little Neck, NY www.leviton.com.
 - t. Liberty AV Solutions, Colorado Springs, CO www.libertycable.com.
 - u. Lowell Manufacturing Co, Pacific, MO www.lowellmfg.com.
 - v. Middle Atlantic Products, Fairfield, NJ www.middleatlantic.com.
 - w. Neutrik USA Inc, Lakewood, NJ (732) 901-9488. www.neutrikusa.com.
 - x. Newark Electronics, Sola and Triad, Chicago, IL www.newark.com.
 - y. QSC Audio Products, Costa Mesa, CA www.qscaudio.com.
 - z. Radio Design Labs, Carpinteria, CA www.rdlnet.com.
 - aa. Rane Corp, Mukilteo, WA www.rane.com.
 - bb. Shure Brothers, Evanston, IL www.shure.com.
 - cc. SoundTech, Mundelein, IL www.soundtech.com.
 - dd. Soundtube Entertainment, Park City, UT www.soundtube.com.
 - ee. Surgex, Knightdale, NC www.surgex.com.
 - ff. Switchcraft, Chicago, IL www.switchcraft.com.
 - gg. TOA Electronics, South San Francisco, CA www.toaelectronics.com.
 - hh. TV One, Erlanger, KY www.tvone.com.
 - ii. Whirlwind Music Distributors, Inc., Rochester, NY www.whirlwindusa.com.
 - jj. Wireworks Corp, Hillside, NJ www.wireworks.com.

B. Performance:

1. Capabilities:
 - a. Installations with audio DSP shall meet following performance parameters:
 - 1) From 100 Hz to 2 kHz, flat within plus or minus 2 dB.
 - 2) Above 2 kHz, slope down along an approximate 3 dB per octave slope to 8 kHz.
 - b. No noise, hum, RFI pickup or distortion shall be audible under normal operating conditions.
 - c. Audio systems shall reproduce program material at level of 80 to 85 dBA without audible distortion.
 - d. All input levels shall be pre-set so system may be operated without going into feedback under normal conditions.
 - e. Seat-to-seat variations in the 4kHz octave band shall not exceed plus or minus 2 dB in the Chapel or Cultural Center.
 - f. Sound masking system:
 - 1) Sound masking system shall provide adequate speech privacy in Corridor when set between 42 dBA and 46 dBA at ear-height under speaker so conversation in Office at slightly raised voice levels cannot be understood in Corridor.

C. System Requirements:

1. General:
 - a. Provide complete and fully functional audio systems using materials and equipment of types, sizes, ratings, and performances as indicated in equipment list in accompanying drawings:

- 1) Use materials and equipment that comply with referenced standards and manufacturers' standard design and construction in accordance with published product information.
 - 2) Coordinate features of materials and equipment so they form integrated system with components and interconnections matched for optimum performance of specified functions.
2. Provide all wire, cable, and connectors as required to complete installation of all systems as designed and specified.
- D. Equipment And Materials:
1. General:
 - a. Provide equipment selected from equipment list on drawings, or as substituted following proscribed substitution process, using all solid state components fully rated for continuous duty at ratings indicated or specified.
 - b. Select equipment for normal operation on input power supplied at 105 130 V, 60 Hz.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Approved Installers:
1. Category Four Approved Installers. See Section 01 6200 for definitions of Categories:
 - a. Qualifications:
 - 1) Meet qualification requirements as specified in Quality Assurance in Part 1 of this specification.
 - b. General Communications: (801) 266-5731.
 - c. Marshall Industries: (801) 266-2428.
 - d. Poll Sound: (801) 261-2500.
 - e. Professional Systems Technology: (801) 649-6696.

3.2 EXAMINATION

- A. Verification Of Conditions:
1. Verify compliance with following items before beginning work of this Section:
 - a. No cables spliced.
 - b. Isolated ground run back to electrical panel from all equipment cabinets.
 - c. Specified conduit, cables, speaker enclosures and equipment cabinets are properly installed.
 - d. Location and angle of speaker cabinets.
 2. Ensure that no solid structural or decorative member impedes sound propagation from speakers and that no member with cross section greater than **3/4 inch (19 mm)** is placed in front of speakers.
 3. Verify installation of fiberglass insulation in field-fabricated speaker enclosures.
 4. Verify proper functionality for all system components being reused or remaining untouched.

3.3 INSTALLATION

- A. General:
1. Install system in accordance with NFPA 70 'National Electrical Code', NFPA 72 'National Fire Alarm and Signaling', and other applicable codes. Install equipment in accordance with manufacturer's written instructions.
- B. Mounting And Securing Equipment:
1. Equipment shall be firmly secured in place unless requirements of portability dictate otherwise.
 2. Fastenings and supports shall be adequate to support their loads with safety factor of at least three (3) times weight of equipment being installed.

3. Any structural mounting that is not able to meet this requirement due to specific nature of equipment, manufacturer's requirements or limitations of facility, shall not be installed without prior approval of Engineer.
 4. Install all boxes, equipment, hardware, and other materials plumb, level, and square.
- C. Millwork:
1. Install technology equipment and support equipment in podium and other millwork in neat and cosmetically dressed out manner.
 2. Saw cuts, holes and recesses into laminates and woodwork shall be straight.
 3. Radius and circular cuts shall be consistent, and all uneven surfaces shall be corrected. This shall include use of moldings, grommets, bushings, laminates, and wood products as required to dress out installation of equipment.
 4. Install equipment and panels in technology racks and podiums using matching screws, hardware and grommets.
- D. Speakers:
1. Maintain uniform polarity in speakers and wiring.
 2. Employ no positive stop in rotation of speaker volume controls. Controls shall be capable of continuous rotations in either direction.
 3. Mount transformers with screws securely to speaker brackets or enclosures. Adjust torsion springs as necessary to securely support speaker assembly.
 4. Neatly mount speaker grilles, panels, connector plates, control panels, etc., tight, plumb, and square unless indicated otherwise on drawings.
 5. Provide brackets, screws, adapters, springs, rack mounting kits, etc, recommended by manufacturer for correct assembly and installation of speaker assemblies and electronic components.
 6. Line factory-fabricated speaker back boxes with **one inch (25 mm)** minimum fiberglass if not done by Back box Manufacturer.
 7. Speaker Back Boxes shall be secured to structure using **12 ga (2.7 mm)** minimum seismic safety cables.
- E. Technology:
1. Provide sufficient ventilation for adequate cooling of equipment.
 2. Install vent rack panels in unused spaces. Install vent panels at top and bottom and above each power amplifier.
 3. Securely fasten equipment plumb and square in place. Where equipment is installed in rack cabinets, utilize all fastening holes and cove open spaces with perforated panels.
 4. Securely fasten relays and small components. Do not use sticky-back tape for fasteners.
 5. Install balancing transformer on each unbalanced input or output that connects to devices outside equipment cabinet, or that connects to balanced input or output within equipment cabinet.
 6. Connect powered components to 120 VAC outlets on transient voltage surge suppressors. Do not connect to outlets on other components.
 7. Leave sufficient service loops to uniform length on cables to allow operation of system with chassis outside cabinet.
 8. Equipment shall be held firmly in place with proper types of mounting hardware as recommended and/or supplied by manufacturer:
 - a. Mounting hardware provided with equipment shall be used when practical. This shall include, but not be limited to, front and rear rack rails, angle brackets and rack mount kits.
 - b. Equipment shall be installed so as to provide reasonable safety to operator.
- F. Cables, Wires, And Connectors:
1. Cables:
 - a. Cable and wire shall be new and unspliced.
 - b. Splicing:
 - 1) Splicing of cables and conductors is expressly prohibited in any location other than equipment racks.
 - 2) Splicing of control and speaker level conductors shall be accomplished via punch block or terminal strip connections only.

- c. Additional cable length shall be provided at all connector locations. Duplex box, junction box, and floor box locations shall be installed with sufficient cable length behind cover plates to permit wiring maintenance and connector replacement in the future.
 - d. When cable runs utilize vertical cable raceways located within walls, acoustic integrity of walls shall be maintained:
 - 1) Cables that pass through cover plates of junction boxes and raceways, through slab-to-slab walls, and through conduit lines shall be properly gasketed and sealed. Acoustic material shall be restored or replaced.
 - e. Separation between system cables and other services shall be maximized to prevent and/or minimize potential for electro-magnetic interference (EMI):
 - 1) Provide at least **12 inches (305 mm)** separation from electrical lines whenever feasible.
 - 2) Where separation is unavoidable, distribution cables shall cross other services at right angles whenever practical to minimize EMI.
 - f. Do not install signal cables on top of light fixtures, ceiling speakers, projection screens, HVAC controls or sensing devices, fire safety and sprinkler system detection technology, or any other technology or mechanical equipment.
 - g. Install system cables shall not block access to other equipment or services, across removable service panels and/or in any other manner to prohibit routine maintenance of HVAC systems, fire safety equipment and building mechanical control systems.
 - h. Inter-rack cabling:
 - 1) Inter-rack cabling shall be neatly laced, dressed, strain relieved and adequately supported.
 - 2) Inter-rack cables shall be grouped according to signals being carried to reduce signal contamination. Separate groups shall be formed for following:
 - a) Power.
 - b) Control.
 - c) Video.
 - d) Audio cables carrying signals less than -20 dBm.
 - e) Audio cables carrying signals between -20 dBm and +20 dBm.
 - f) Audio cables carrying signals over +20 dBm.
 - i. Power cables, control cables, and high level cables shall be run on left side of equipment racks as viewed from rear. All other cables shall be run on right side of all equipment racks as viewed from rear.
 - j. Cables, except video cables which must be cut to electrical length, shall be cut to length dictated by cable run.
 - k. Terminal blocks, boards, strips or connectors, shall be furnished by installer for all cables which interface with racks, cabinets, consoles, or equipment modules. Affix terminal blocks, boards, strips or connectors to equipment racks using screws only. Double sided tape will not be accepted.
 - l. Shields for audio cables shall be grounded at input end only of various equipment items on system to prevent potential for ground loops.
 - m. Shields for microphone cables shall be grounded at both ends to allow Phantom Power to pass.
2. Wiring and Cabling:
 - a. Comply with industry standard circuit polarity and loudspeaker wiring polarity. No cables shall be terminated with polarity reversal between connectors at either end.
 - b. System wire, after being cut and stripped, shall have wire strands twisted back to their original lay and be terminated by approved soldered or mechanical means. No bare wire ends shall be accepted.
 - c. Do not place any wires and cables for this system in any conduit, raceway, wire way or cable tray that is used for mechanical systems of building.
 - d. Route all cable and wiring within equipment racks, cabinets and millwork according to function, separating wires of different signal levels (microphone, line level, amplifier output, AV, control, etc.) by as much distance as possible. Neatly arrange, harness and bundle all cable with velcro straps.
 - e. After completion of wiring and cable installation, all trough and box covers shall be notched out and grommetted for clearance of various cable bundles, (i.e., separate audio, video, and control). Panel covers shall be screwed back in place and all gaskets shall be restored or replaced.
 3. Connectors:

- a. Provide connectors of type and quality as detailed in Contract Drawings and/or as required to meet minimum bandwidth requirements of equipment to which connectors are terminated. Overall quantity of connectors shall not be limited by quantities indicated in Contract Drawings and shall be provided as required.
 - b. No connectors shall be installed in non-accessible locations or used for splicing cables. Connectors shall be new.
 - c. Connectors shall incorporate strain relief mechanisms which firmly grip the jacket of connected cables.
 - d. Connectors shall be properly polarized to prevent improper seating.
 - e. Connectors shall provide appropriate electrical characteristics for circuitry to which they are attached.
 - f. Exposed conductors inside of equipment racks shall be dressed with heavy duty neoprene heat-shrink tubing.
 - g. Heat-shrink type tubing shall be used to insulate and dress ends of all wire and cables including separate tube for ground or drain wire.
 - h. Solder connections shall be made with rosin-core solder. Temperature controlled soldering irons rated at least 60 watts shall be used for all soldering work. No soldering guns, gas or butane, or temperature unregulated irons shall be used on job site.
 - i. Mechanical connections shall be made with approved crimp lugs of correct size and type for connection. Wire nuts shall not be permitted except inside speaker enclosures. Each connector shall be attached with proper size controlled-duty-cycle ratcheting crimp tool approved by manufacturer.
 - j. Conventional non-ratcheting type crimping tools are unacceptable, and shall not be used on job site. Presence of such tools on job site shall constitute evidence of mechanical connections made with unauthorized tools and shall provide sufficient grounds for rejection of all mechanical connections in system, and will be considered non-conforming work.
- G. Equipment Cabinet:
1. Install vent panels at top and bottom of equipment cabinets and between components where possible for maximum ventilation. Locate amplifiers at top of cabinet. Locate equalizers below amplifiers, separated by several vent panels.
 2. Securely fasten equipment plumb and square in place. Utilize all fastening holes in front of cabinet.
 3. Securely fasten in place equipment that is not rack mounted, including relays and other small components. Do not use sticky-back tape.
 4. Install balancing / isolation transformer when balanced and unbalanced components are connected.
 5. Wire XLR-type connections with pin 2 hot, pin 1 shield.
 6. Connect powered components to 120 VAC outlets on voltage suppressor power bars. Do not connect to outlets on other components.
 7. Identification:
 - a. Legibly identify user-operated system controls and system input / output jacks using engraved, permanently attached laminated plastic plates or imprinted Lexan labels. Label equipment and controls within equipment cabinets using similar labels or printed labels from a label maker or laser printer.
 - b. Affix label to rack panel inside cabinet listing name and telephone number of installer. Appropriate warranty instructions may be included.
- H. Identification And Labeling:
1. Cables, regardless of length, shall be identified with machine-printed wrap-around labeling system at both ends:
 - a. These labels shall be self-laminating to ensure durability.
 - b. Label format used shall be equal, or better than, system detailed.
 2. There shall be no unmarked cables any place in system.
 3. Marking codes used on cables shall correspond to codes provided with submittals, and/or written documentation of 'Record Drawings'.
 4. Connectors, controls, equipment components, terminal blocks and equipment racks are to be permanently labeled in format approved during submittal process.
 5. Equipment labels are to be permanently engraved in metal. Alternative method shall be approved during submittal process only.

6. Clearly and permanently label all jacks, controls, connections, and so forth. Embossed or printed label tape shall not be used and is considered unacceptable for this system. Attach labels with double stick tape as required.
 7. Labeling shall be completed prior to acceptance of final system.
- I. Grounding:
1. Provide equipment grounding connections for audio system as indicated. Tighten connections to comply with tightening torques specified in UL Standard 486A-486B to assure permanent and effective grounds.
 2. Ground equipment, conductor, and cable shields to eliminate shock hazard and to eliminate ground loops, common mode returns, noise pickup, cross talk, and other impairments. Provide 5 ohm ground at main equipment location. Measure, record, and report ground resistance.
 3. Provide grounding conductor with green insulation between as indicated on Contract Drawings. Comply with IEEE and TIA standards.
- J. Pulpit:
1. Install pulpit microphone pre-amplifier to be accessible below lectern. Do not alter factory supplied microphone cable and connectors.
 2. Install pulpit microphone so tip of microphone head is **2 inches (50 mm)** inside edge of lectern when microphone is tilted down to maximum extent.
- K. Seismic Bracing:
1. Comply with IBC and local seismic requirements for all equipment and conduit pathways.

3.4 FIELD QUALITY CONTROL

- A. Field Tests:
1. Installer Testing:
 - a. After completion of installation but before inspection by Audiovisual Consultant, perform following:
 - 1) Conduct system tests and make necessary corrections for proper system operation including, but not limited to, following:
 - a) Output level uniformity.
 - b) Polarity.
 - c) Shock, strain excited hum, and oscillation.
 - d) Clipping, hum, noise, and RFI in all system configurations.
 - e) Speaker line impedances.
 - f) Loose parts and poor workmanship or soldering.
 - 2) Sweep speaker systems with high-level sine wave or 1/3 octave pink noise source. Correct causes of buzzes or rattles related to speakers or enclosures. Notify Contractor and Audiovisual Consultant of external causes of buzzes or rattles.
 - 3) Rough Balance: Balance system well enough that it can be used for meetings before final inspection.
 - b. Complete documentation required by Audiovisual Consultant and submit to consultant within five (5) days of Substantial Completion.
- B. Field Inspections:
1. Audiovisual Consultant Inspection And Equalization:
 - a. Coordinate final inspection schedule with Audiovisual Consultant two (2) weeks minimum before Consultant's final inspection.
 - b. Have copy of Installer redlined documents sent to Audiovisual Consultant two (2) weeks minimum to before field inspection.
 - c. Have loose equipment (microphones, cables, etc.) available at time of inspection.
 - d. Assist Audiovisual Consultant in final inspection of completed system.
 - e. Assist Audiovisual Consultant in noise isolation testing of folding partitions and office doors.
 - f. Provide following test equipment in good working order:
 - 1) Laptop computer:
 - a) Operating System: Microsoft Window 7.

- b) Processor: 2 GHz Dual-Core Intel Processor or faster (or compatible).
 - c) RAM: 2 GB or greater.
 - d) Video: Graphics processor with 128 M dedicated video RAM, minimum 1024x768 display or better.
 - e) Sound Hardware: Audio Hardware with OS compatible ASIO, Wav/WDB drivers, sample rate of up to 192kHz and bit-resolutions of up to 32. Bit, or better.
- 2) 1/3 octave real-time audio spectrum analyzer with SPL meter, and precision microphone.
 - 3) Digitally generated random pink noise generator, 20Hz-20KHz, minimum two (2) hour repetition rate or ten (10) minutes minimum of equivalent signal recorded on compact disc.
 - 4) Direct reading audio impedance meter, minimum three (3) frequencies, and ten (10) percent accuracy.
 - 5) Digital Volt-Ohmmeter.
 - 6) Audio oscillator, variable frequency, 20Hz-20KHz.
 - 7) MP3 player with pre-recorded speech and music program material.
 - 8) Necessary chargers, cables, test leads, adapters, and other accessories for test equipment.
 - 9) Tools and spare parts for making adjustments and corrections to system.
 - 10) CAT-5 / RJ-45 continuity tester similar to Ideal 62-200 or Amprobe DCT-300.
- g. Correct minor items so Audiovisual Consultant may certify satisfactory completion during his visit.
- C. Non-Conforming Work:
1. Correct any work found defective or not complying with contract document requirements at no additional cost to the Owner.
- D. Manufacturer Services:
1. Provide services of factory authorized service representative to supervise field assembly and connection of components and pretesting, testing, and adjustment of system.

3.5 CLEANING

- A. Waste Management:
1. All work areas are to be kept clean, clear and free of debris at all times.
 2. Disposal of rubbish, debris, and packaging materials in proper manner.

END OF SECTION