

PROJECT MANUAL

LORIN FARR 2, 4, 6 PAVILION, NEW – STAKE
PAVILION

770 15TH STREET.
OGDEN, UT 84404

503319523030101

22th APRIL, 2024

THE CHURCH OF
JESUS CHRIST
OF LATTER-DAY SAINTS



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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:

Hall Construction
Toro Construction
Peterbuilt Construction Inc
Saunders Construction Inc
M&D& Sons
Gines Construction

2. PROJECT:

Lorin Farr 2, 4, 6 Pavilion

3. LOCATION:

770 15th Street, Ogden, UT 84404

4. OWNER:

The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole
c/o
Utah North PM Office
435 N Wall Ave, Suite D
Ogden, UT 84404

5. CONSULTANT:

Uncommon Architects
Brittany White Johnson, Architect
684 W. Center Street
Midvale, UT 84047
(801)-417-9951

6. DESCRIPTION OF PROJECT:

- A. NEW – Stake Pavilion
- 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 45 calendar days and will be as noted in the Agreement.

9. BID OPENING: Bids will be received by Owners preferred method at 3:00 p.m. on May 3th to be announced. Bids will be publicly opened at 2:15 p.m. on May 15th to be announced.

10. BIDDING DOCUMENTS:

- A. Bidding Documents may be examined at the following plan room locations:
 - 1) Dodge Data and Analytics
 - 2) Mountainlands Area Plan Room

- 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.

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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) TBD

END OF DOCUMENT

INFORMATION AVAILABLE TO BIDDERS (U.S.)

1. GEOTECHNICAL DATA

A. Geotechnical Report -

- 1) Owner has secured the services of a geotechnical engineer to aid in design of the Project. Following conditions apply -
 - a) A geotechnical report has been prepared by AGECE-Applied Geotechnical, referred to as the Geotechnical Engineer.
 - b) A copy of this report will be issued to each invited Contractor.
 - c) This report was obtained solely for use in design by Consultant and is not a part of the Contract Documents. It is not intended that Contractor rely on geotechnical engineer's report.
 - d) Reports are provided for Contractor's information but are not a warranty of subsurface conditions.
- 2) Prior to bidding, Contractor may make his own subsurface investigations to satisfy himself with site and subsurface conditions.

2. ASBESTOS-CONTAINING MATERIAL (ACM)

N/A

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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.
 - 4) updated Construction Schedule.
- 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.**

- a. 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.
- b. For any Change Order, Contractor will timely furnish a proposal for the Change Order containing a price breakdown itemized as required by Owner. The break down will be in sufficient detail to allow Owner to determine any increase or decrease in the Contractor's direct out of pocket cost to perform the Change Order Work. Any amount claimed for Subcontractors will be supported by a similar price breakdown and will itemize the Subcontractor's direct out of pocket costs as well as profit and overhead charges resulting from the Change in the Work. Profit and overhead will be subject to the following limitations:
 1. The Subcontractor's profit and overhead will not exceed eight (8%) percent of Subcontractor's Direct Costs.
 2. Contractor's profit and overhead mark-up on work performed by its own crews will not exceed five (5%) percent of Contractor's direct out of pocket costs for such work.
 3. Contractor's profit and overhead mark up on work performed by Subcontractors will not exceed five percent (5%).
 4. Amounts due Owner as a result of a credit change will be the actual net decrease in the Contractor's direct out of pocket costs to perform the Work as a result of the Change in the Work. Overhead and profit for the Change Order will be calculated based on the net increase or decrease in Contractor's direct out of pocket costs resulting from the Change in the Work.

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:

- a. any portion of the Work which
 - 1) fails to conform to the requirements of the Contract Documents, or
 - 2) 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.
- b. 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 for 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.**
 - a. 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 Owner with a 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, nonperformance 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 a 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 Sundays 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's 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 ACORD 25 (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 and attorney fees incurred by that party in obtaining the dismissal, including without limitation copy costs, and expert 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 profits 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, Products, 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 an opportunity to obtain reasonable protection for such information in connection with such disclosure. For purposes of this Agreement, "Confidential Information" means:
- The name or address of any affiliate, customer or contractor of Owner or any information concerning the transactions of any such person with Owner;
 - 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;
 - Any other information that is marked or noted as confidential at the time of its disclosure.
28. **No Commercial Use of Transaction or Relationship.** 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:
- 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;
 - 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
 - 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:

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:

Sample Form of Agreement

GENERAL CONDITIONS

For a Fixed Sum (U.S.)

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SECTION 1 - GENERAL PROVISIONS

1.1 DEFINITIONS

- A. Adverse Weather: weather conditions that are seasonally abnormal and could not have been reasonably anticipated.
- B. Agreement: the document entitled "Agreement Between Owner and Contractor for a Fixed Sum (U.S.), executed by Owner and Contractor for performance of the Work.
- C. Architect: the entity identified as such in the Agreement.
- D. Change In The Work: a modification to the requirements of the Contract Documents or a delay in Substantial Completion resulting from an instruction from Owner or Architect to Contractor or from another event or circumstance.
- E. Change Order: a written instrument prepared by Architect and signed by Owner, Contractor, and Architect stating their agreement upon the following: (1) the occurrence of a Change in the Work; (2) the amount of the adjustment, if any, in the Contract Sum as a result of the Change in the Work; and (3) the extent of the adjustment, if any, in the Contract Time as a result of the Change in the Work.
- F. Construction Change Directive: a written order prepared by Architect and signed by Architect and Owner which: (1) orders a Change in the Work if the terms of a Change Order cannot be agreed upon prior to performance of a Change in the Work described in Section 7.1 or after occurrence of an event or circumstance described in Section 7.2; and (2) states a proposed basis for adjustment, if any, in the Contract Sum, the Contract Time, or both, resulting from the Change in the Work.
- G. Contract Documents: the documents identified as such in the Agreement.
- H. Contract Sum: the total amount set forth in the Agreement payable by Owner to Contractor for performance of the Work.
- I. Contract Time: the period of time set forth in the Agreement for the Substantial Completion of the Work.
- J. Contractor: the entity identified as such in the Agreement.
- K. Day: calendar day unless otherwise specifically defined.
- L. Direct Costs: actual costs for labor, materials, equipment, insurance, bonds, subcontract costs and onsite supervision relating to the Project. They do not include labor costs for project managers or other off-site administration.
- M. Drawings: the documents identified as such in the Agreement.
- N. Field Change: a written order prepared by Architect and signed by Architect and Contractor for a minor Change in the Work consistent with the general intent of the Contract Documents costing \$1,000 or less, resulting in no time extension, and which is necessary to avoid delaying the Work.
- O. Modification: a written amendment to the Contract Documents in the form of a:
 - 1. Change Order;
 - 2. Construction Change Directive; or
 - 3. Field Change.
- P. Owner: the entity identified as such in the Agreement.
- Q. Project: the total construction designed by Architect of which the Work performed under the Contract Documents may be the whole or a part.

- R. Product Data: standard illustrations, schedules, performance charts, instructions, brochures, diagrams, and other information furnished by Contractor to illustrate details regarding materials or equipment to be used in the Work, or the manner of installation, operation, or maintenance of such materials or equipment.
- S. Project Manual: the document identified as such in the Agreement.
- T. Samples And Mock-ups: physical examples that illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged.
- U. Shop Drawings: drawings, diagrams, illustrations, schedules, performance charts, fabrication and installation drawings, setting diagrams, patterns, templates, and other data which illustrate some portion of the Work and confirm dimensions and conformance to the Contract Documents specially prepared by Contractor or any Subcontractor, manufacturer, supplier, or distributor.
- V. Specifications: the documents identified as such in the Agreement.
- W. Subcontractor: any entity supplying labor, materials, equipment, construction or services for the Work under separate contract with Contractor or any other Subcontractor.
- X. Submittals: Shop Drawings, Product Data, Samples and Mock-ups and any other documents or items furnished by Contractor or its Subcontractors to Owner or Architect to demonstrate how any portion of the Work will be accomplished or the type of materials or products that will be used in the Work.
- Y. Substantial Completion: Completion of the Work to a point where Owner can use the Work for its intended purposes. The date of Substantial Completion is the date certified as such by Architect in accordance with the Contract Documents.
- Z. Work: all labor, materials, equipment, construction, and services required by the Contract Documents.
- AA. Written Notice: notice in writing given from one party to the other at the addresses or facsimile numbers listed in the Agreement, or at such other addresses or facsimile numbers as the parties will designate from time to time by Written Notice, and will be effective at the earliest of:
 1. The date of personal delivery to the other party with signed acknowledgment of receipt; or
 2. The date sent by facsimile transmission to the other party provided receipt of the facsimile is verified by an electronic confirmation report by the party sending the facsimile transmission and further provided that a confirmation copy is sent to the other party by courier or by registered or certified mail within twenty-four (24) hours after the time and date of the facsimile transmission; or
 3. The date of receipt by the other party as stated on the return receipt if sent by registered or certified mail, or by courier.

1.2 CORRELATION AND INTENT OF CONTRACT DOCUMENTS

- A. The intent of the Contract Documents is to require Contractor to provide all labor, materials, equipment, construction, and services necessary for the proper execution and completion of the Work. The Contract Documents are complementary and what is required by any one will be as binding as if required by all. Contractor will perform the Work in accordance with the requirements expressly set forth in or reasonably inferable from the Contract Documents.
- B. The organization of the Contract Documents is not intended to control Contractor in dividing the Work among Subcontractors or to establish the extent of the Work to be performed by any trade.
- C. Words used in the Contract Documents that have well known technical or trade meanings are used therein in accordance with such recognized meanings.
- D. In the interest of brevity, the Contract Documents may omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

1.3 OWNERSHIP AND USE OF CONTRACT DOCUMENTS

The Drawings, the Project Manual, and copies thereof are the property of Owner. Contractor will not use these documents on any other project. Contractor may retain one copy of the Drawings and the Project Manual as a contract record set and will return or destroy all remaining copies following final completion of the Work.

1.4 PUBLIC STATEMENTS REGARDING PROJECT

Contractor will not make any statements or provide any information to the media about the Project without the prior written consent of Owner. If Contractor receives any requests for information from media, Contractor will refer such requests to Owner.

1.5 OWNERSHIP AND USE OF RENDERINGS AND PHOTOGRAPHS

Renderings representing the Work are the property of Owner. All photographs of the Work, whether taken during performance of the Work or at completion, are the property of the Owner. The Owner reserves all rights including copyrights to renderings and photographs of the Work. No renderings or photographs shall be used or distributed without written consent of the Owner.

1.6 NO COMMERCIAL USE OF TRANSACTION OR RELATIONSHIP

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, Sub-subcontractors or employees shall make any private commercial use of their relationship to Owner or the Project, including, without limitation:

- A. By referring to this Agreement, Owner, or the 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 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 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 Project.

Notwithstanding the foregoing, Contractor may include a reference to Owner and the services and equipment provided under this Agreement 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, the services and equipment is included with at least several other similar references and is given no more prominence than such other references.

1.7 CONFIDENTIALITY / PROPERTY RIGHTS

- A. 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 for or relative to Work performed under this Agreement, such products, services, and Work of Contractor constituting works made for hire. Contractor will not reuse any portions of such items provided by Owner or developed by Contractor 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.
- B. In addition, Contractor shall ensure that Contractor, 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 an opportunity to obtain reasonable protection for such information in connection with such disclosure. For purposes of this Agreement, "Confidential Information" means:
 - 1. The name or address of any affiliate, customer or contractor of Owner or any information concerning the transactions of any such person with Owner;
 - 2. Any information relating to contracts, agreements, business plans, budgets or other financial information of Owner to the extent such information has not been made available to the public by the Owner; and
 - 3. Any other information that is marked or noted as confidential by the Owner at the time of its disclosure.

1.8 COMPLY WITH INTELLECTUAL PROPERTY RIGHTS OF OTHERS

Contractor represents and warrants that no Work (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).

SECTION 2 - OWNER

2.1 OWNER'S DESIGNATED REPRESENTATIVE

Owner will designate in writing a representative who will have express authority to bind Owner with respect to all matters requiring Owner's approval or authorization.

2.2 INFORMATION AND SERVICES REQUIRED OF OWNER

- A. Owner will be responsible for establishment of property lines and benchmarks for grading.
- B. Owner will furnish to Contractor any information or services it is required to furnish under the Contract Documents with reasonable promptness to avoid delay in the orderly progress of the Work.
- C. Owner will furnish to Contractor a reasonable number of copies of the Drawings, the Project Manual, and the Addenda.

2.3 OWNER'S RIGHT TO INSPECT THE WORK

Owner and its representatives will have the right to inspect any portion of the Work wherever located at any time.

2.4 OWNER'S RIGHT TO STOP THE WORK

If Contractor fails to carry out the Work in accordance with the Contract Documents or fails to correct Work which is not in accordance with the Contract Documents in a timely manner, Owner may order Contractor in writing to stop the Work, or any portion thereof, until the cause for that order has been eliminated.

SECTION 3 - CONTRACTOR

3.1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

- A. By executing the Agreement, Contractor represents that it has visited the Project site, familiarized itself with the local conditions under which the Work is to be performed, and correlated its own observations with the requirements of the Contract Documents.
- B. Contractor will carefully review and compare the Contract Documents and any other available information relating to the Project prior to commencing and during performance of each portion of the Work and will immediately report to Architect any errors, inconsistencies, and omissions it discovers.
- C. Should Contractor or any of its Subcontractors become aware of any question regarding the meaning or intent of any part of the Contract Documents prior to commencing that portion of the Work about which there is a question, Contractor will request an interpretation or clarification from Architect before proceeding. Contractor proceeds at its own risk if it proceeds with the Work without first making such a request and receiving an interpretation or clarification from Architect. If neither Contractor nor its Subcontractors become aware of the question until after work on the relevant portion of the Work has commenced, then the following precedence will govern for purposes of determining whether resolution of the question constitutes a Change in the Work:
 - 1. The Agreement takes precedence over all other Contract Documents.
 - 2. The Supplementary Conditions take precedence over the General Conditions.
 - 3. The General Conditions and Supplementary Conditions take precedence over the Drawings and the Specifications.
 - 4. An Addendum or a Modification takes precedence over the document(s) modified by the Addendum or Modification.
 - 5. The Specifications take precedence over the Drawings.
 - 6. Within the Drawings, larger scale drawings take precedence over smaller scale drawings, figured dimensions over scaled dimensions, and noted materials over graphic indications.
- D. Contractor will give Architect notice of any additional drawings, specifications, or instructions required to define the Work in greater detail, or to permit the proper progress of the Work, sufficiently in advance of the need for information so as not to delay the Work.
- E. It is not Contractor's responsibility to ascertain that the Contract Documents are in accordance with requirements of applicable laws, statutes, ordinances, building codes, rules and regulations. However, if Contractor observes that portions of the Contract Documents are at variance with those requirements, Contractor will immediately notify Architect in writing. Contractor will not proceed unless Owner and/or Architect effects Modifications to the Contract Documents required for compliance with such requirements. Contractor will be fully responsible for any work knowingly performed contrary to such requirements and will fully indemnify Owner against loss and bear all costs and penalties arising therefrom.
- F. Contractor will take field measurements and verify field conditions and will compare such field measurements and conditions and other information known to Contractor with the Contract Documents before ordering any materials or commencing construction activities. Contractor will immediately report errors, inconsistencies, and omissions that it discovers to Architect. If Contractor orders materials or commences construction activities before taking field measurements and verifying field conditions, Contractor will not be entitled to any compensation for additional costs to Contractor resulting from field measurements or conditions different from those anticipated by Contractor which would have been avoided had Contractor taken field measurements and verified field conditions prior to ordering the materials or commencing construction activities.
- G. If site conditions indicated in the Contract Documents or other information provided by Owner or Architect to Contractor differ materially from those Contractor encounters in performance of the Work, Contractor will immediately notify Architect in writing of such differing site conditions.
- H. Where the Contract Documents require the Contractor to provide professional services for architecture or engineering, the Contractor shall cause such services to be performed by appropriately licensed professionals.

3.2 SUPERVISION OF CONSTRUCTION PROCEDURES

- A. Contractor will supervise and direct the Work. Contractor will be solely responsible for all construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work. All loss, damage, liability, or cost of correcting defective work arising from the use of any construction means, methods, techniques, sequences or procedures will be borne by Contractor, notwithstanding that such construction means, methods, techniques, sequences or procedures are referred to, indicated or implied by the Contract Documents, unless Contractor has given timely notice to Owner and Architect in writing that such means, methods, techniques, sequences or procedures are not safe or suitable, and Owner has then instructed Contractor in writing to proceed at Owner's risk.
- B. Contractor will utilize its best skill, efforts, and judgment to provide efficient business administration and supervision, to furnish at all times an adequate supply of workers and materials, and to perform the Work in an expeditious and economical manner consistent with the interests of Owner.
- C. Contractor will be responsible for:
 - 1. The proper observance of property lines and set back requirements as shown in the Contract Documents;

2. The location and layout of the Work as shown in the Contract Documents with respect to the position of the Work on the property and the elevation of the Work in relation to grade; and
 3. Setting and maintaining construction stakes.
- D. Contractor will be responsible to Owner for the acts and omissions of its employees and Subcontractors as well as persons either directly or indirectly employed by Subcontractors.
 - E. Contractor will not be relieved of its obligation to perform the Work in accordance with the Contract Documents as a result of any tests, inspections, or approvals by Owner, Architect or their consultants.
 - F. Contractor will be responsible for inspection of portions of the Work already completed to determine that such portions are in proper condition to receive subsequent portions of the Work.
 - G. Contractor recognizes that the Project site and the surrounding area is frequently visited by the public and is important to Owner's image and function and will maintain the premises free from debris and waste materials resulting from Construction. At the completion of Construction, Contractor shall promptly remove construction equipment, tools, surplus materials, waste materials and debris.

3.3 LABOR AND MATERIALS

- A. Unless otherwise provided in the Contract Documents, Contractor will provide and pay for all labor, materials, equipment, tools, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work.
- B. Contractor will at all times enforce strict discipline and good order among those performing the Work and will not permit employment of any unfit person or anyone not skilled in the tasks assigned to them.
- C. Contractor is fully responsible for the Project and all materials and work connected therewith until Owner has accepted the Work in writing. Contractor will replace or repair at its own expense any materials or work damaged or stolen, regardless of whether it has received payment for such work or materials from the Owner.
- D. Contractor will remedy all damage or loss to any property caused in whole or in part by Contractor, any Subcontractor, or by anyone for whose acts any of them may be liable.
- E. Contractor will be responsible for determining that all materials furnished for the Work meet all requirements of the Contract Documents. Architect may require Contractor to produce reasonable evidence that a material meets such requirements, such as certified reports of past tests by qualified testing laboratories, reports of studies by qualified experts, or other evidence which, in the opinion of Architect, would lead to a reasonable certainty that any material used, or proposed to be used, in the work meets the requirements of the Contract Documents. All such data will be furnished at Contractor's expense. This provision will not require Contractor to pay for periodic testing of different batches of the same material, unless such testing is specifically required by the Contract Documents to be performed at Contractor's expense.
- F. Contractor will coordinate and supervise the work performed by Subcontractors so that the Work is carried out without conflict between trades and so that no trade, at any time, causes delay to the general progress of the Work. Contractor and all Subcontractors will at all times afford each trade, any separate contractor, or Owner, reasonable opportunity for the installation of Work and the storage of materials.
- G. Contractor warrants to Owner that the materials and equipment furnished for the Work will be new unless otherwise specified by the Contract Documents, and that the Work will be free from defects, and will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective in the discretion of Owner. If required by Architect, Contractor will furnish satisfactory evidence as to the kind and quality of the materials and equipment used in performing the Work.
- H. Owner may elect to purchase materials required for the Work. In that event, Contractor will comply with the procedures set forth in the Contract Documents relating to such materials.

3.4 COMPLIANCE WITH LAWS

Contractor will comply with all applicable laws, ordinances, rules, regulations, and orders of any public authorities relating to performance of the Work.

3.5 TAXES

- A. Contractor will pay all sales, use, consumer, payroll, workers compensation, unemployment, old age pension, surtax, and similar taxes assessed in connection with the performance of the Work.
- B. Owner will pay all taxes and assessments on the real property comprising the Project site.

3.6 PERMITS AND FEES

- A. Owner will obtain and pay for all zoning and use permits and permanent easements necessary for completion of the Work.

- B. Contractor will obtain and pay for the building permit, and all other permits, governmental fees, licenses and inspections necessary for the proper execution and completion of the Work.
- C. Contractor will secure any certificates of inspection and of occupancy required by authorities having jurisdiction over the Work. Contractor will deliver these certificates to Architect prior to issuance of the Certificate of Substantial Completion by Architect.

3.7 CONTRACTOR'S ON-SITE REPRESENTATIVE

Contractor will employ a competent representative acceptable to Owner to supervise the performance of the Work. This representative will be designated in writing by Contractor prior to commencement of work and will not be changed prior to final inspection of the Work without prior written consent of Owner. This representative will represent Contractor for all purposes, including communication with Owner.

3.8 CONTRACTOR'S CONSTRUCTION SCHEDULES

- A. Contractor will prepare and submit for Owner's and Architect's information Contractor's construction schedule for the Work in accordance with the requirements of the Contract Documents.
- B. Contractor will prepare and maintain a Submittal schedule which is coordinated with Contractor's construction schedule and sets forth specified times for Architect to review Submittals.

3.9 DOCUMENTS AND SUBMITTALS AT THE SITE

Contractor will keep at the Project site for use by Owner, Architect, or their representatives, a record copy of the Project Manual, the Drawings, all Addenda, and all Modifications. These documents will be maintained in good order and currently marked to record changes and selections made during construction. In addition, Contractor will keep at the Project site one copy of all Submittals.

3.10 SUBMITTALS

- A. Submittals are not Contract Documents and do not alter the requirements of the Contract Documents unless incorporated into the Contract Documents by a Modification.
- B. Contractor will review, approve, and submit to Architect Submittals in accordance with the Contract Documents. By approving Submittals, Contractor represents that it has determined and verified field measurements, field construction criteria, materials, catalog numbers, and similar data, and that it has checked and coordinated each Submittal with the requirements of the Work and of the Contract Documents or will make such determination, verification, check, and coordination prior to commencing the relevant portion of the Work. In reviewing Submittals Architect will be entitled to rely upon Contractor's representation that such information is correct and accurate.
- C. Contractor will inform Architect in writing at the time of submission of any Submittal or portion thereof which deviates from the requirements of the Contract Documents. Contractor will provide Architect with documentation demonstrating to Architect that the Submittal is equal to or better than the specified product or work. Contractor will not be relieved of responsibility for deviations from the requirements of the Contract Documents by Architect's acceptance of a Submittal unless Contractor has informed Architect in writing of the deviation and Architect has incorporated the deviation into the Contract Documents by a Modification.
- D. Contractor will not perform any portions of the Work requiring Submittals until the respective Submittal has been reviewed and accepted in writing by Architect.
- E. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, Owner will be entitled to rely upon such certifications, and neither Owner nor Architect will be expected to make any independent examination with respect thereto.
- F. Submittals not required by the Contract Documents may be returned to Contractor without action.

3.11 CUTTING AND PATCHING

Contractor will be responsible for any cutting, fitting, and patching that may be required to complete the Work and make its parts fit together properly.

3.12 ACCESS TO WORK

Contractor will permit Owner, Architect, their representatives and consultants, access to the Work wherever located at any time.

3.13 ROYALTIES AND PATENTS

Contractor will pay all royalties and license fees required by the Work or by Contractor's chosen method of performing the Work. Contractor will defend and hold Owner harmless from all suits or claims for infringement of any patent, license or other intellectual property rights or any loss on account thereof.

3.14 INDEMNIFICATION

- A. Contractor will indemnify and hold harmless Owner and Owner's representatives, employees, agents, architects, and consultants from and against any and all claims, 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 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 Owner with a 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, nonperformance 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 a Subcontractor under worker's compensation acts, disability benefit acts, or other employee benefit acts.

3.15 PROJECT MEETINGS

Contractor will attend and participate in meetings as required by the Contract Documents.

SECTION 4 - ADMINISTRATION OF THE CONTRACT

4.1 ARCHITECT

In the event that Owner terminates its contractual relationship with Architect, Owner will appoint in writing another architect, whose status under the Contract Documents will be that of the former Architect in all respects.

4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

- A. Architect will make periodic visits to the site to familiarize itself generally with the progress and quality of the Work and to determine if the Work is proceeding in accordance with the Contract Documents. Although Architect is required to make periodic inspections, it is not required to make exhaustive or continuous onsite inspections. On the basis of its observations while at the site, Architect will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defects and deficiencies in the Work. Architect's failure to observe a defect or deficiency in the Work will not relieve Contractor of its duty to perform the Work in accordance with the Contract Documents.
- B. Architect will review Contractor's payment requests and determine the amounts due Contractor in accordance with Section 9.
- C. Communications between Contractor and Owner relating to the Work will be through Architect. Communications between Owner or Contractor with Architect's consultants relating to the Work will be through Architect. Communications between Owner or Architect and subcontractors relating to the Work will be through Contractor. Communications between Contractor and any separate contractor will be through Architect, except as otherwise specified in the Contract Documents.
- D. Owner and/or Architect will have the right to reject and require removal of the following at Contractor's expense:
 1. Any portion of the Work that does not meet the requirements of the Contract Documents.
 2. Any portion of the Work damaged or rendered unsuitable during installation or resulting from failure to exercise proper protection.
- E. Architect will have authority to suspend the Work, with concurrence of Owner, whenever such suspension may be necessary in its reasonable opinion to insure the proper performance of the Work.
- F. Architect will review Contractor's Submittals and will accept or take other appropriate action regarding the Submittals. Architect's review of the Submittals will be for the limited purpose of checking for general conformance with the Contract Documents and will not be conducted for the purpose of determining the accuracy and completeness of details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of Contractor. Architect's review of Submittals will not relieve Contractor of its obligations under the Contract Documents. Architect's review of Submittals will not constitute acceptance of safety precautions or construction

means, methods, techniques, sequences or procedures. Architect's acceptance of a specific item will not indicate acceptance of an assembly of which the item is a component.

- G. Architect has authority to order Construction Change Directives and Field Changes in accordance with Section 7.
- H. Architect will conduct inspections to determine the dates of Substantial Completion and final completion, will receive and review written guarantees and related documents required by the Contract and assembled by Contractor, and will review and certify or reject Contractor's final payment request.
- I. Architect will be the interpreter of the performance and requirements of the Contract Documents. Architect's interpretations will be in writing or in the form of drawings.
- J. Architect's decisions in matters relating to aesthetic effect will be final if consistent with the Contract Documents and approved by Owner.

SECTION 5 - SUBCONTRACTORS

5.1 AWARD OF SUBCONTRACTS FOR PORTIONS OF THE WORK

- A. Contractor will enter into contracts with Subcontractors to perform all portions of the Work that Contractor does not customarily perform with its own employees.
- B. Contractor will not contract with any Subcontractor who has been rejected by Owner. Contractor will not be required to contract with any Subcontractor against whom it has a reasonable objection.
- C. If Owner rejects any Subcontractor proposed by Contractor, Contractor will propose an acceptable substitute to whom Owner has no reasonable objection.
- D. Contractor will not make any substitution for any Subcontractor that has been accepted by Owner and Architect without the prior written approval of Owner and Architect.

5.2 SUBCONTRACTUAL RELATIONS

- A. Contractor's responsibility for the Work includes the labor and materials of all Subcontractors, including those recommended or approved by Owner. Contractor will be responsible to Owner for proper completion and guarantee of all workmanship and materials under any subcontracts. Any warranties required for such work will be obtained by Contractor in favor of Owner and delivered to Architect. It is expressly understood and agreed that there is no contractual relationship between Owner and any Subcontractor, and under no circumstances will Owner be responsible for the non-performance or financial failure of any Subcontractor or any effects therefrom.
- B. Contractor agrees to pay the Subcontractors promptly upon receipt of payment from Owner for that portion of the funds received which represents the Subcontractor's portion of the Work completed to Contractor's satisfaction for which Owner has made payment.
- C. Contractor will require each Subcontractor to:
 - 1. Be licensed by the state in which the Project is located where such licensing is required by the governing authority;
 - 2. Be bound by the terms of the Contract Documents as far as they are applicable to the Subcontractor's work;
 - 3. Assume toward Contractor the same obligations Contractor has assumed toward Owner, including the prompt payment of its Subcontractors;
 - 4. Submit its applications for payment to Contractor in time to permit Contractor to make timely application to Owner;
 - 5. Execute claim or lien releases or lien waivers for payments made by Contractor; and
 - 6. Make all claims for Changes in the Work to Contractor in the same manner as Contractor is required to make such claims to Owner.

SECTION 6 - CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM WORK OR AWARD SEPARATE CONTRACTS

- A. Owner reserves the right to perform work itself or to award separate contracts in connection with the Project.
- B. When separate contracts are awarded, "Contractor" in the Contract Documents in each case will mean the contractor who signs each separate contract.

6.2 MUTUAL RESPONSIBILITY

- A. 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.
- B. If any part of Contractor's Work depends upon the work of any separate contractor for proper performance or results, Contractor will inspect and promptly report to Architect any apparent discrepancies or defects in such work that render it unsuitable for

proper performance and results. Failure of Contractor to so inspect and report will constitute an acceptance of the work of the separate contractor as fit and proper to receive Contractor's Work, except as to defects not then reasonably discoverable.

- C. Contractor will promptly remedy damage caused by Contractor or any Subcontractor to the completed or partially completed work of other contractors or to the property of Owner or other contractors.

6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among Contractor and separate contractors as to the responsibility under their separate contracts for maintaining the Project free from waste materials and rubbish, Owner may clean the Project, allocate the cost among those responsible as Owner and Architect determine to be just, and withhold such cost from any amounts due or to become due to Contractor.

SECTION 7 - CHANGES IN THE WORK

7.1 CHANGES IN THE WORK RESULTING FROM AN INSTRUCTION BY OWNER OR ARCHITECT TO CONTRACTOR

- A. If Owner or Architect gives Contractor an instruction that modifies the requirements of the Contract Documents or delays Substantial Completion, Contractor may be entitled to an adjustment in the Contract Sum and/or the Contract Time. If compliance with the instruction affects the cost to Contractor to perform the Work, the Contract Sum will be adjusted to reflect the reasonable increase or decrease in cost subject to the conditions set forth in Section 7.1, Paragraphs B through G. If compliance with the instruction delays Substantial Completion, the Contract Time will be extended for a period of time commensurate with such delay subject to the conditions set forth in Section 7.1, Paragraphs B through G and Section 7.3, Paragraph A and Contractor will be paid liquidated damages for the delay as set forth in Section 7.3, Paragraph B.
- B. If Contractor receives an instruction from Owner or Architect that Contractor considers to be a Change in the Work, Contractor, before complying with the instruction, will notify Architect in writing that Contractor considers such instruction to constitute a Change in the Work. If Architect agrees that compliance with the instruction will constitute a Change in the Work, Contractor will furnish a proposal for a Modification in accordance with Section 7.1, Paragraphs C. and D. within ten (10) days.
- C. If Contractor claims that it is entitled to an adjustment in the Contract Sum (including without limitation costs related to a time extension) as a result of an instruction by Owner or Architect, Contractor will furnish a proposal for a Change Order containing a price breakdown itemized as required by Owner. The breakdown will be in sufficient detail to allow Owner to determine any increase or decrease in Direct Costs as a result of compliance with the instruction. Any amount claimed for subcontracts will be supported by a similar price breakdown and will itemize the Subcontractor's profit and overhead charges. Profit and overhead will be subject to the following limitations:
 - 1. The Subcontractor's profit and overhead will not exceed ten (10) percent of its Direct Costs on work performed. Subcontractor's profit and overhead will not exceed five (5) percent on work performed by its sub-subcontractors.
 - 2. Contractor's profit and overhead on work performed by its own crews will not exceed ten (10) percent of its Direct Costs.
 - 3. Contractor's profit and overhead mark up on work performed by its Subcontractors will not exceed five (5) percent of the Subcontractors' charges for such work.
 - 4. Amounts due Owner as a result of a credit change will be the actual net savings to Contractor from the Change in the Work as confirmed by Architect. On credit changes, profit and overhead on the originally estimated work will not be credited back to Owner. If both additions and credits are involved in a single Change in the Work, overhead and profit will be figured on the basis of net increase, if any, related to that Change in the Work.
- D. If Contractor claims that it is entitled to an adjustment in the Contract Time as a result of an instruction from Owner or Architect, Contractor will include in its proposal justification to support Contractor's claim that compliance with the instruction will delay Substantial Completion.
- E. Upon receipt of Contractor's proposal for Modification, Architect and Owner will determine whether to proceed with the Change in the Work. If Architect and Owner determine to proceed with the Change in the Work, they will issue a Change Order, a Construction Change Directive or a Field Change as appropriate.
- F. Contractor agrees that if it complies with an instruction from Owner or Architect without first giving written notice to Architect as provided in Section 7.1., Paragraph B, and receiving a Change Order, Construction Change Directive or Field Change, Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time as a result of the instruction and waives any claim therefor.
- G. If Contractor is instructed to perform work which it claims constitutes a Change in the Work but which Owner and Architect do not agree constitutes a Change in the Work, Contractor will comply with the instruction. Contractor may submit its claim for adjustment to the Contract Sum, the Contract Time, or both as a dispute pursuant to Section 13 within thirty (30) days after compliance with the instruction. Contractor agrees that if it fails to submit its claim for resolution pursuant to Section 13 within thirty (30) days after compliance with the instruction, then Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time as a result of the instruction and waives any claim therefor.
- H. Contractor agrees that it is responsible for submitting accurate cost and pricing data to support its Change Order Proposals. Owner will have the right to examine the Contractor's records to verify the accuracy and appropriateness of the pricing data used to price change order proposals.

7.2 CHANGE IN THE WORK RESULTING FROM AN EVENT OR CIRCUMSTANCE

- A. If an event or circumstance other than an instruction from Owner or Architect affects the cost to Contractor of performing the Work or delays Substantial Completion, Contractor may be entitled to an adjustment in the Contract Sum and/or the Contract Time. If the circumstance or event affects the cost to Contractor to perform the Work and is caused by a willful or negligent act or omission of Owner or Architect, the Contract Sum will be adjusted to reflect the reasonable increase or decrease in Contractor's cost to perform the Work resulting from the event or circumstance, subject to the conditions set forth in Section 7.2, Paragraphs B through F. If the event or circumstance delays Substantial Completion and is described in Section 7.3, Paragraph A, the Contract Time will be extended for a period of time commensurate with such delay subject to the conditions set forth in such section. If the circumstance or event delays Substantial Completion and is caused by a willful or negligent act or omission of Owner or Architect, then Contractor will be compensated for costs incident to the delay in accordance with Section 7.3, Paragraph B. Contractor will not be entitled to any adjustment to the Contract Sum or other damages from Owner as a result of any event or circumstance unless the event or circumstance results from a willful or negligent act or omission of Owner or Architect.
- B. If a Change in the Work results from any event or circumstance caused by the willful or negligent act or omission of Owner or Architect, Contractor will give Owner Written Notice of such event or circumstance within twenty-four (24) hours after commencement of the event or circumstance so that Owner can take such action as is necessary to mitigate the effect of the event or circumstance. Contractor will not be entitled to any adjustment in either the Contract Time or the Contract Sum based on any damages or delays resulting from such event or circumstance during a period more than twenty-four (24) hours prior to Contractor giving such Written Notice to Owner.
- C. Contractor will submit in writing any claims for an adjustment in the Contract Time and/or the Contract Sum resulting from an event or circumstance within the time limits set forth below. In the event that Contractor fails to submit its claim in writing within the time limits set forth below, then Contractor agrees it will not be entitled to any adjustment in the Contract Time or the Contract Sum or to any other damages from Owner due to the circumstance or event and waives any claim therefor.
 - 1. Claims for an adjustment in the Contract Time due to Adverse Weather will be made by the tenth (10th) of the month following the month in which the delay occurred.
 - 2. Claims for an adjustment in the Contract Time and/or the Contract Sum due to any other circumstance or event will be submitted within seven (7) days after the occurrence of the circumstance or event.
- D. If Contractor claims that it is entitled to an adjustment in the Contract Sum (including without limitation costs related to a time extension) because of an event or circumstance resulting from the willful or negligent act or omission of Owner or Architect, Contractor will furnish a proposal for a Change Order containing a price breakdown as described in Section 7.1, Paragraph C. Any amount claimed for increased labor costs as a result of the event or circumstance must be supported by a certified payroll. Any claim for rented equipment or additional material costs must be supported by invoices.
- E. If Contractor claims that it is entitled to an adjustment in the Contract Time as a result of an event or circumstance, Contractor will include with its claim copies of daily logs, letters, shipping orders, delivery tickets, Project schedules, and other supporting information necessary to justify Contractor's claim that the event or circumstance delayed Substantial Completion. If Contractor is entitled to an adjustment in the Contract Time as a result of an event or circumstance caused by the willful or negligent act or omission of Owner or Architect, Contractor will be compensated for all costs related to the delay in accordance with Section 7.3, Paragraph B.
- F. Within thirty (30) days after receipt of Contractor's claim, Architect will either deny the claim or recommend approval to Owner. If Owner approves the claim, the adjustment in the Contract Time and/or Contract Sum will be reflected in a Change Order pursuant to Section 7.5 or a Construction Change Directive pursuant to Section 7.6. If Owner or Architect denies Contractor's claim, Contractor may submit its claim as a dispute pursuant to Section 13 within thirty (30) days of receipt of the denial of the claim. If Contractor fails to submit its claim for resolution pursuant to Section 13 within the thirty (30) day time period, then Contractor agrees it is not entitled to any adjustment in the Contract Time and/or Contract Sum or any other damages as a result of the event or circumstance and waives any claim therefor.

7.3 EXTENSIONS OF TIME

- A. If Substantial Completion of the Project is delayed because of any of the following causes, then the Contract Time will be extended by Change Order for a period of time equal to such delay:
 - 1. Labor strikes or lock-outs;
 - 2. Adverse weather;
 - 3. Unusual delay in transportation;
 - 4. Unforeseen governmental requests or requirements;
 - 5. A Change in the Work resulting from an instruction by Owner or Architect to Contractor subject to the conditions set forth in Section 7.1; or
 - 6. Any other event or circumstance caused by the willful or negligent act or omission of Owner or Architect.
- B. Contractor will not be entitled to any compensation for delay described in Section 7.3, Paragraph A, subparagraphs 1, 2, 3 and 4. For each day of delay in Substantial Completion described in Section 7.3, Paragraph A, subparagraphs 5 and 6, Contractor will be paid liquidated damages in the amount per day set forth in the Supplementary Conditions to compensate Contractor for all damages resulting from any delay including but not limited to damages for general conditions costs, additional job site costs, additional home office overhead costs, disruption costs, acceleration costs, increase in labor costs, increase in subcontract costs, increase in materials costs, and any other costs incident to the delay. Contractor will be entitled to no other compensation relating to the delay.

- C. In no event will any time extension or cost adjustment be given on account of delay which reasonably should have been anticipated by the Contractor or in circumstances where performance of the Work is, was, or would have been, delayed by any other cause for which the Contractor is not entitled to an extension.

7.4 DOCUMENTATION OF CHANGES IN THE WORK

Every Change in the Work will be documented by a Change Order, a Construction Change Directive or a Field Change. If Owner, Architect and Contractor reach agreement regarding the adjustment in the Contract Sum, if any, and the adjustment in the Contract Time, if any, resulting from a Change in the Work, then the parties will execute a Change Order pursuant to Section 7.5. If Owner, Architect and Contractor cannot reach agreement regarding the adjustment in Contract Sum or the adjustment in Contract Time resulting from a Change in the Work, then Owner and Architect will issue a Construction Change Directive pursuant to Section 7.6. Field Changes require the agreement of Architect and Contractor only.

7.5 CHANGE ORDERS

Contractor's signature upon a Change Order is Contractor's acknowledgment that it is not entitled to any additional adjustment in the Contract Sum or the Contract Time or any other damages or compensation as a result of the Change in the Work other than that provided for in the Change Order, irrespective of whether a subsequent claim for additional compensation or time extensions relating to the Change in the Work is described as a change in the requirements of the Contract Documents, a delay, a disruption of the Work, an acceleration of the Work, an impact on the efficiency of performance of the Work, an equitable adjustment, or other claim and irrespective of whether the impact of the Change in the Work is considered singly or in conjunction with the impact of other Changes in the Work.

7.6 CONSTRUCTION CHANGE DIRECTIVES

- A. Contractor will promptly comply with all Construction Change Directives.
- B. Pending final resolution of any adjustment in the Contract Sum or Contract Time relating to a Construction Change Directive, the amounts proposed by Owner in the Construction Change Directive may be included in Contractor's payment requests once the work relating thereto is completed.
- C. If after the work described in the Construction Change Directive is completed, Owner, Architect, and Contractor reach agreement on adjustments in the Contract Sum, Contract Time, or both, such agreement will be reflected in an appropriate Change Order.
- D. If the parties do not reach agreement regarding an adjustment to the Contract Sum, Contract Time, or both relating to the Construction Change Directive within thirty (30) days of the completion of the work described therein, then Contractor may submit its claim for an adjustment pursuant to Section 13 within thirty (30) days of the completion of such work. Contractor agrees that if it fails to submit its claim for resolution pursuant to Section 13 within thirty (30) days of completion of the work described in the Construction Change Directive, then it will not be entitled to an adjustment in Contract Sum or Contract Time resulting from such work except as set forth in the Construction Change Directive and waives any claim therefor.

7.7 FIELD CHANGES

Architect and Contractor will sign a Field Change order listing the Change In The Work and the Contract Sum including markups before Contractor proceeds with the Field Change.

7.8 WAIVER OF CLAIMS

Except as set forth in Section 7, Contractor will not be entitled to any adjustment in the Contract Sum or the Contract Time or for any damages of any kind whatsoever resulting from an instruction from Owner or Architect, any event or circumstance, or any act or omission of Owner or Architect and Contractor expressly waives any and all claims therefor.

SECTION 8 - TIME

8.1 TIME IS OF THE ESSENCE

All time limits stated in the Contract Documents are of the essence. By executing the Agreement, Contractor confirms that the Contract Time is a reasonable period for performing the Work. Contractor will proceed expeditiously with adequate resources and will achieve Substantial Completion within the Contract Time.

8.2 COMMENCEMENT OF THE WORK

Contractor will not commence work on the Project site until the date set forth in the Written Notice to proceed. However, Contractor may enter into subcontracts and secure material for the Project after receipt of the Agreement with Owner's authorized signature. Owner will issue the Written Notice to proceed within forty-five (45) days after Owner receives acceptable bonds and evidence of insurance pursuant to Section 11 unless Owner earlier terminates the Agreement pursuant to Section 14.

8.3 DELAY IN COMPLETION OF THE WORK

- A. For each day after the expiration of the Contract Time that Contractor has not achieved Substantial Completion, Contractor will pay Owner the amount set forth in the Supplementary Conditions as liquidated damages for Owner's loss of use of the Project

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, attorney 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.

- B. At the time Architect certifies that Contractor has achieved Substantial Completion, Architect will identify the remaining items to be completed for final completion of the Work and will establish with Contractor a reasonable time for completion of those items. Architect will set forth the items to be completed and the time established for their completion in a Certificate of Substantial Completion. For each day that Contractor exceeds the time allowed for completion of the items set forth in the Certificate of Substantial Completion, Contractor will pay to Owner as liquidated damages for additional administrative expenses the amount set forth in the Supplementary Conditions. In addition, Contractor will reimburse Owner for any additional Architect's fees, attorney fees, expert fees, consultant fees, copy costs, and other expenses incurred by Owner as a result of the delay in completing such items.

SECTION 9 - PAYMENTS AND COMPLETION

9.1 SCHEDULE OF VALUES

Contractor will submit to Architect a schedule of values which allocates the Contract Sum to various portions of the Work. The schedule of values will be supported by such data to substantiate its accuracy as required by Architect. This schedule, when accepted by Owner and Architect, will be used as a basis for reviewing Contractor's payment requests.

9.2 PAYMENT REQUESTS

- A. Not more than once a month, Contractor will submit a payment request to Architect for Work completed, materials stored on the site, and for materials stored offsite as of the date of the payment request. The amount of the payment request will be based upon the schedule of values and will be equal to the value of the Work completed:
 1. Less retention;
 2. Less all prior amounts paid by Owner to Contractor as part of the Contract Sum; and
 3. Less allowable offsets.

The payment request may include Changes in the Work that have been performed by Contractor and authorized by Owner and/or Architect pursuant to Section 7. If a payment request includes materials stored offsite, Contractor will include with the payment request a list of the materials, the location where they are stored and the written request of Contractor and its performance bond surety that payment be made for such materials.

- B. Contractor warrants and guarantees that upon the receipt of payment for materials and equipment, whether incorporated in the Project or not, title to such materials and equipment will pass to Owner free and clear of all liens, claims, security interests, or encumbrances. Notwithstanding this payment and passage of title, Contractor will remain responsible for all such materials and equipment until actual delivery to the project site, incorporation into the Work, and final acceptance by Owner. Contractor further warrants that no material or equipment covered by a payment request is subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or any other person or entity.

9.3 PAYMENT REQUEST CERTIFICATION

- A. Architect will, within seven (7) days after receipt of Contractor's payment request, forward to Owner the payment request certified for such amount as Architect determines is properly due. If Architect certifies less than the full amount of the payment request, Architect will notify Contractor and Owner of Architect's reasons for withholding certification of the full amount requested.
- B. The certification of the payment request will constitute a representation by Architect to Owner based upon Architect's observations at the site and the data comprising the payment request, that the Work has progressed to the point indicated and that, to the best of Architect's knowledge, information, and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion, and to specific qualifications expressed by Architect. However, the certification of the payment request will not constitute a representation that Architect has:
 1. Conducted exhaustive or continuous on-site inspections to check the quantity or quality of the Work;
 2. Reviewed construction means, methods, techniques, sequences, or procedures;
 3. Reviewed copies of requisitions received from Subcontractors or other data requested by Owner to substantiate Contractor's right to payment; or
 4. Made examination to ascertain how or for what purpose Contractor has used money previously paid on account of the Contract Sum.
- C. In taking action on Contractor's payment request, Owner will be entitled to rely on the accuracy and completeness of the information furnished by Contractor.

9.4 DECISIONS TO WITHHOLD CERTIFICATION AND PAYMENT

- A. Architect may withhold certification of a payment request in whole or in part to the extent reasonably necessary to protect Owner if, in the opinion of Architect, the representations to Owner required by Section 9.3, Paragraph B cannot be accurately made. If

Architect is unable to certify payment in the amount of the payment request, Architect will notify Contractor and Owner as provided in Section 9.3, Paragraph A. If Contractor and Architect cannot agree on a revised amount, Architect will promptly certify a payment request for the amount for which Architect is able to make such representations to Owner. Architect may also decide not to certify payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a payment request previously certified, to such extent as may be necessary in Architect's opinion to protect Owner from loss because of:

1. Defective work not remedied;
2. Third-party claims filed or reasonable evidence indicating probable filing of such claims;
3. Failure of Contractor to make payments properly to Subcontractors for labor, materials, equipment, construction or services;
4. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
5. Damage to Owner or another contractor for which Contractor is responsible;
6. Reasonable evidence that the Work will not be completed within the Contract Time and that the unpaid balance will not be adequate to cover the cost of completing the Work and damages for the anticipated delay; or
7. Contractor's persistent failure to carry out the Work in accordance with the Contract Documents.

- B. Owner reserves the right to withhold payments to Contractor, subsequent to Architect's certification of any payment request, in order to protect Owner from loss due to any condition described in Section 9.4, Paragraph A, Subparagraphs 1 through 7. Upon satisfactory resolution of any such conditions, payments so withheld will be made.

9.5 PROGRESS PAYMENTS

- A. Owner will pay Contractor progress payments within the parameters of Section 9.2 within fifteen (15) days after Owner receives the certified payment request from Architect.
- B. Owner will make payments to Contractor by either placing the payments in the mail addressed to Contractor or by electronic transfer at Owner's discretion.
- C. 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.
- D. Contractor will maintain a copy of each payment request at the Project site for review by the Subcontractors.
- E. No payment made under the Contract Documents, either in whole or in part, will be construed to be an acceptance of defective or improper materials or workmanship.
- F. In addition and notwithstanding the foregoing, Owner will also withhold and retain 10% of payments made to Contractor.
- G. Owner will pay any unpaid retention less any amounts withheld pursuant to Section 9.4 within forty-five (45) days after Contractor achieves Substantial Completion, submits its payment request for retained funds, delivers to the Architect Owner's form entitled "Contractor's Substantial Completion Affidavit and Consent of Surety" fully executed by Contractor and its surety, obtains Waiver and Release documents executed by all subcontractors and suppliers having claim against the retained funds, and Owner receives a certificate of occupancy.

9.6 FINAL PAYMENT

- A. Owner will make full and final payment of the Contract Sum within thirty (30) days of the completion of all of the following requirements:
1. Contractor has submitted its final payment request;
 2. Architect has declared to Owner in writing that the Work is complete;
 3. Contractor has obtained waiver and release upon final payment documents executed by all of the subcontractors performing work and/or providing materials covered by the Contractor's final payment request; and
 4. Contractor has collected and provided to Owner all manufacturers' and other guaranties and warranties, properly signed and endorsed to Owner, that are required by the Contract Documents that extend for a period beyond one year after substantial completion. (Delivery of such guaranties and warranties will not relieve Contractor for any obligation assumed under any other provision of the Contract Documents.)
- B. Acceptance of final payment by Contractor or any Subcontractor will constitute a waiver of claims by the payee except for those claims previously made in writing pursuant to Section 7 and identified by Contractor in its affidavit as still pending.
- C. If the aggregate of previous payments made by Owner exceeds the amount due Contractor, Contractor will reimburse the difference to Owner.

SECTION 10 - PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

Contractor will be responsible to Owner for initiating and supervising all safety programs in connection with the performance of the Work.

10.2 SAFETY OF PERSONS AND PROPERTY

- A. Contractor will take reasonable precautions to prevent damage, injury, or loss to:

1. All persons on the site;
 2. The Work and materials and equipment to be incorporated into the Work; and
 3. Other property at the site or adjacent to it.
- B. Contractor will give notices and comply with applicable laws, ordinances, rules, regulations, and other lawful requirements of public authorities bearing on the safety or protection of persons and property. No work will be performed that may pose an undue safety hazard to Contractor, Contractor's employees, or any other person.
- C. Contractor will designate a responsible member of its organization at the site whose duty will be the prevention of accidents. This person will be Contractor's onsite representative unless otherwise designated in writing by Contractor to Owner and Architect.

10.3 EMERGENCIES

In case of an emergency endangering life or threatening the safety of any person or property, Contractor may, without waiting for specific authorization from Architect or Owner, act at its own discretion to safeguard persons or property. Contractor will immediately notify Architect of such emergency action and make a full written report to Architect within five (5) days after the event.

10.4 HAZARDOUS MATERIALS

In the event the Contractor encounters on the site material reasonably believed to be hazardous materials which have not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and Architect in writing. The Work in the affected area shall be resumed in the absence of hazardous materials, or when it has been rendered harmless, by written agreement of the Owner and Contractor.

SECTION 11 - INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

- A. Contractor will obtain the following insurance and provide evidence thereof as described below prior to commencement of the Work or within ten (10) days after signing the Agreement, whichever is earlier:
1. Workers Compensation Insurance.
 2. 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.
 3. 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:
 - a. Limits of the greater of Contractor's actual coverage amounts or the following:
 - 1) \$2,000,000 General Aggregate;
 - 2) \$2,000,000 Products - Comp/Ops Aggregate;
 - 3) \$1,000,000 Personal and Advertising Liability;
 - 4) \$1,000,000 Each Occurrence;
 - 5) \$50,000 Fire Damage to Rented Premises (Each Occurrence).
 - b. Endorsements attached to the General Liability policy including the following or their equivalent:
 - 1) 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.
 - 2) ISO Form CG 20 10 (07/04), Additional Insured -- Owners, Lessees, Or Contractors (Form B), naming Owner and Architect as additional insureds.
 4. Automobile Liability Insurance, with:
 - a. Combined Single Limit each accident in the amount of \$1,000,000 or Contractor's actual coverage, whichever is greater; and
 - b. Coverage applying to "Any Auto."
- B. Contractor will provide evidence of such insurance to Owner as follows:
1. Deliver to Owner a Certificate of Liability Insurance, on ACORD 25 (2010/05) Form, or equivalent:
 - a. Listing Owner and its consultants as the Certificate Holders and Additional Insured on the general liability and any excess liability policies;
 - b. Attaching the ISO or equivalent endorsements set forth above to the Certificate of Liability Insurance;
 - c. Identifying the Project;
 - d. 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 better. Companies which are not rated are not acceptable); and
 - e. 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.
- C. Contractor will maintain, from commencement of the Work, Insurance coverage required herein as follows:
1. Commercial General Liability Insurance through expiration of warranty period specified in Section 12.2, Paragraph B. including completion of any warranty repairs; and
 2. All other insurance through Final Payment.
- D. Owner reserves the right to reject any insurance company, policy, endorsement, or certificate of insurance with or without cause.

- E. Owner may, in writing and at its sole discretion, modify the insurance requirements.
- F. The cost of insurance as required above will be the obligation of Contractor. Contractor will be responsible for payment of all deductible amounts under all insurance.
- G. Owner will provide builders risk insurance for the cost of the Project. The policy will be written on an all risk basis with coverage for perils of wind, flood, earthquake, and terrorism, with exclusions standard for the insurance industry. The policy will be subject to a \$5,000 deductible per occurrence which will be the responsibility of Contractor and will not be a reimbursable expense. Owner will provide a copy of the terms and conditions of the builders risk policy to Contractor upon Contractor's request. Contractor will comply with terms, conditions, and deadlines of the builders risk policy. The terms, conditions, and deadlines of the builders risk policy shall govern coverage. In addition, when there is a loss which may be covered by the builders risk insurance policy, Contractor will comply with the following:
 1. Contractor will report the loss immediately to builders risk commercial insurer by calling 1-866-537-7475 and shall make such further written submissions as required and otherwise comply with all requirements of the builders risk policy.
 2. Contractor will report the loss immediately to the Owner.
 3. Contractor will immediately notify its general liability insurance carrier of the loss.
 4. Contractor will take all necessary and appropriate actions to protect the property and individuals from further loss, harm, and injury. In the event there are damages resulting from fire or water, restoration shall be performed only by a certified restoration contractor.
 5. To the extent possible, Contractor will preserve and not disturb the evidence of the loss until after the builders risk commercial insurer and all interested parties and their insurance carriers have had the opportunity to view and investigate the site and loss.
 6. Contractor will cooperate with Owner and the builders risk commercial insurer in the investigation, documentation, and settlement of loss claims, including without limitation promptly responding to all requests for information and documentation from the builders risk commercial insurer and/or Owner.

11.2 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

- A. Prior to commencement of the Work or within ten (10) days after signing the Agreement, whichever is earlier, Contractor will furnish to Owner a performance bond and a labor and material payment bond each in an amount equal to one hundred percent (100%) of the Contract Sum as security for all obligations arising under the Contract Documents. Such bonds will:
 1. Be written on Form AIA Document A312 (1984).
 2. Be issued by a surety company or companies licensed in the state in which the Project is located and holding valid certificates of authority under Sections 9304 to 9308, Title 31, of the United States Code as acceptable sureties or reinsurance companies on federal bonds.
 3. Have a penal sum obligation not exceeding the authorization shown in the current revision of Circular #570 as issued by the United States Treasury Department, i.e. "Treasury List".
 4. Be accompanied by a certified copy of the power of attorney stating the authority of the attorney-in-fact executing the bonds on behalf of the surety.
- B. Owner reserves the right to reject any surety company, performance bond, or labor and material payment bond with or without cause.
- C. The cost of the bonds as required above will be the obligation of Contractor.

SECTION 12 - UNCOVERING AND CORRECTION OF WORK

12.1 UNCOVERING OF WORK

Contractor will notify Architect at least twenty-four (24) hours in advance of performing work that would cover up work or otherwise make it difficult to perform inspections required by the Specifications or by applicable governing authorities. Should any such work be covered without proper notification having been given to Architect, Contractor will uncover that work for inspection at its own expense.

12.2 CORRECTION OF WORK

- A. Contractor will promptly correct any portion of the Work that is rejected by Architect or which fails to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed, or completed. Contractor will bear the cost of correcting such rejected Work, including additional testing and inspection costs, compensation for Architect's services, and any other expenses made necessary thereby.
- B. Contractor will remedy any defects due to faulty materials, equipment, or workmanship which appear within a period of one (1) year from the date of Substantial Completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents. Contractor will pay all costs of correcting faulty work, including without limitation additional Architect's fees, attorney fees, expert fees, consultant fees, copy costs, and other expenses when incurred.
- C. Nothing in the Contract Documents will be construed to establish a period of limitation within which Owner may enforce the obligation of Contractor to comply with the Contract Documents. The one-year period specified above has no relationship to the time within which compliance with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish Contractor's liability with respect to Contractor's obligations.

12.3 ACCEPTANCE OF NONCONFORMING WORK

- A. If Owner prefers to accept any portion of the Work not in conformance with the Contract Documents, Owner may do so instead of requiring removal and correction of the nonconforming Work. In that event, the Contract Sum will be reduced by an amount agreed upon by the parties that reflects the difference in value to Owner between the Work as specified and the nonconforming Work. Such adjustment may consider increased maintenance costs, early replacement costs, increased inefficiency of use, and the like and will be effective whether or not final payment has been made. Such adjustment will be reflected in a Change Order pursuant to Section 7.5.
- B. Temporary or trial usage by Owner or Architect of mechanical devices, machinery, apparatus, equipment, or other work or materials supplied under the Contract Documents prior to written acceptance by Architect, will not constitute Owner's acceptance.

SECTION 13 - RESOLUTION OF DISPUTES

13.1 SUBMITTAL OF DISPUTE

In the event there is any dispute arising under this Agreement which cannot be resolved by agreement between the parties, either party may submit the dispute with all documentation upon which it relies to the Director of Architecture, Engineering, and Construction, Meetinghouse Facilities Department, 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 and attorney fees incurred by that party in obtaining the dismissal, including without limitation copy costs, and expert and consultant fees and expenses.

13.2 CONTRACTOR TO PROCEED WITH DILIGENCE

Pending final resolution of a dispute hereunder, Contractor will proceed diligently with the performance of its obligations under this Agreement.

SECTION 14 - TERMINATION

14.1 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 the 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 under section 3.14 as well as all warranties in the specifications relative to Work provided through the date of termination survive a termination hereunder.

14.2 TERMINATION BY OWNER FOR CAUSE

Should Contractor fail to provide Owner with the bonds and certificates of insurance required by Section 11 within the time specified therein, 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 the 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. 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 under section 3.14 as well as all warranties in the specifications relative to Work provided through the date of termination survive a termination hereunder.

14.3 TERMINATION BY OWNER FOR CONVENIENCE

Notwithstanding any other provision contained in the Contract Documents, Owner may, without cause and in its absolute discretion, terminate the 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 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 profits 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 under section 3.14 as well as all warranties in the specifications relative to Work provided through the date of termination survive a termination hereunder.

SECTION 15 - MISCELLANEOUS PROVISIONS

15.1 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.

15.2 NO WAIVER

No action or failure to act by Owner, Architect, or Contractor will constitute a waiver of a right or duty afforded them under the Contract Documents, nor will such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

15.3 RULE OF CONSTRUCTION

Owner and Contractor agree that the Contract Documents will be deemed to have been drafted by both Owner and Contractor and will not be construed against either Owner or Contractor because of authorship.

15.4 ENFORCEMENT

In the event either party commences legal action to enforce or rescind any provision of the Contract Documents, the prevailing party will be entitled to recover its attorney fees and costs, 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.

15.5 TESTS AND INSPECTIONS

- A. Owner and Architect have the right to have tests made when they deem it necessary. Tests conducted by Owner or Architect will be paid for by Owner. Should a test reveal a failure of the Work to meet Contract Document requirements, the cost of the test as well as subsequent tests related to the failure necessary to determine compliance with the Contract Documents will be paid for by Owner, with the cost thereof deducted from the Contract Sum by Modification.
- B. Tests will be made in accordance with recognized standards by a competent, independent testing laboratory. Materials found defective or not in conformity with Contract Document requirements will be promptly replaced or repaired at the expense of Contractor.
- C. Owner and Architect have the right to obtain samples of materials to be used in the Work and to test samples for determining whether they meet Contract Document requirements. Samples required for testing will be furnished by Contractor and selected as directed by Architect. Samples may be required from the sample's source, point of manufacture, point of delivery, or point of installation at Architect's discretion. Samples not required as a Submittal in the Specifications will be paid for by Owner. Should tests reveal a failure of the Sample to meet the Contract Document requirements, Contractor will provide other Samples that comply with the requirements of the Contract Documents.

END OF DOCUMENT

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 dollars (\$100.00) 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 - STATE SPECIFIC SUPPLEMENTARY CONDITIONS

Utah

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 with Utah Code Ann. Section 14-2-1.

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

SECTION 01 1100**SUMMARY OF WORK****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements Summary of Work requirements.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Provisions contained in Division 01 apply to Sections of Divisions 02 through 49 of Specifications. Instructions contained in Specifications are directed to Contractor. Unless specifically provided otherwise, obligations set forth in Contract Documents are obligations of Contractor.
- B. Contractor shall furnish total labor, materials, equipment, and services necessary to perform The Work in accordance with Contract Documents.

1.3 WORK BY OWNER

- A. Owner will furnish and install some portions of The Work with its own forces. Contractor will be provided with schedule of when these items are to be performed.
1. General:
 - a. Complete work necessary to accommodate work to be performed by Owner before scheduled date for performance of such work. Contractor will be back charged for actual expenses incurred by Owner for failure to timely complete such work.
 - b. Store and protect completed work provided by Owner until date of Substantial Completion.
 2. Work furnished and installed by Owner include, but are not limited to, following:
 - a. High Security Cylinders and Cores:
 - b. Selected Commercial Toilet Accessories.
 - c. Carpet and Carpet Base.
 - d. Owner will terminate building telephone cables at terminal board.

PART 2 - PRODUCTS Not Used**PART 3 - EXECUTION Not Used****END OF SECTION**

SECTION 01 1200**MULTIPLE CONTRACT SUMMARY****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Multiple Contracts.

1.2 SUMMARY OF CONTRACTS

- A. Owner may issue separate contracts for operations scheduled to precede and be substantially completed before beginning of The Work under this Contract.
1. Contractor will be given written notice from such contractors of any revisions to scheduled completion of their work at least 30 days in advance. Owner will reimburse Contractor for expenses incurred by Contractor by failure to be properly notified.
- B. Owner has issued or will issue separate contracts for operations scheduled to be completed between Notice to Proceed and Substantial Completion.
1. General:
 - a. Schedule performance of work covered by such separate contracts in Contractor's Construction Schedule so as to avoid delays in Substantial Completion. Give written notice to such contractors and to Owner of any revisions to scheduled delivery and work dates at least 90 days in advance.
 - b. Complete work necessary to accommodate items provided under such separate contracts before scheduled date for performance of such work. Contractor will be back charged for actual expenses incurred by Owner for failure to timely complete such work including, but not limited to, cost of crews during downtime or for call backs and costs to correct substrate deficiencies.
 - c. Store and protect completed work provided under separate contracts until date of Substantial Completion.
 7. Sheet Carpeting. See Section 09 6816.
- C. Owner has issued or will issue separate contracts for operations normally scheduled to follow Substantial Completion.
1. General:
 - a. Give written notice to such contractors and to Owner of any revisions of scheduled date of Substantial Completion at least 90 days in advance. Contractor will be back charged for actual expenses incurred by Owner for failure to accurately report date of Substantial Completion.
 - b. Complete work necessary to accommodate items provided under such separate contracts before Substantial Completion. Contractor will be back charged for actual expenses incurred by Owner for failure to complete such work before Substantial Completion.

PART 2 - PRODUCTS Not Used**PART 3 - EXECUTION Not Used****END OF SECTION**

SECTION 01 1400**WORK RESTRICTIONS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Work Restrictions.

1.2 PROJECT CONDITIONS

- A. During construction period, Contractor will have use of premises for construction operations. Contractor will ensure that Contractor, its employees, subcontractors, and their employees comply with following requirements:
1. Confine operations to areas within Contract limits shown on Drawings. Do not disturb portions of site beyond Contract limits.
 2. Do not allow alcoholic beverages, illegal drugs, or persons under their influence on Project site.
 3. Do not allow use of tobacco in any form on Project Site.
 4. Do not allow pornographic or other indecent materials on site.
 5. Do not allow work on Project site on Sundays except for emergency work.
 6. Refrain from using profanity or being discourteous or uncivil to others on Project Site or while performing The Work.
 7. Wear shirts with sleeves, wear shoes, and refrain from wearing immodest, offensive, or obnoxious clothing, while on Project Site.
 8. Do not allow playing of obnoxious and loud music on Project Site. Do not allow playing of any music within existing facilities.
 9. Do not build fires on Project Site.
 10. Do not allow weapons on Project Site, except those carried by law enforcement officers or other uniformed security personnel who have been retained by Owner or Contractor to provide security services.
- B. Existing Facilities:
1. Reasonably accommodate use of existing facilities by Owner.
- C. Do not load or permit any part of the structure to be loaded with a weight that will endanger its safety. Questions of structural loading as part of construction means and methods shall be addressed by a licensed structural engineer engaged by Contractor, subject to the review by Architect.

PART 2 - PRODUCTS Not Used**PART 3 - EXECUTION Not Used****END OF SECTION**

SECTION 01 2900**PAYMENT PROCEDURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements to prepare and process Applications for Payments.

1.2 PAYMENT REQUESTS

- A. Use Payment Request forms provided by Owner.
- B. Each Payment Request will be consistent with previous requests and payments certified by Architect and paid for by Owner.
- C. Request Preparation:
1. Complete every entry on Payment Request form.
 2. Entries will match data on approved schedule of values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.
 3. Submit signed Payment Request to Architect with current Construction Schedule.
- D. Provide following submittals before or with submittal of Initial Payment Request:
1. List of Subcontractors.
 2. Initial progress report.
 3. Contractor's Construction Schedule.
 4. Submittal Schedule.
- E. Provide Affidavit of Contractor and Consent of Surety with Payment Request following Substantial Completion.

1.3 SCHEDULE OF VALUES

- A. Submit schedule of values on Owner's standard form to Architect 20 days minimum before submission of Initial Payment Request as a necessary condition before payment will be processed. Coordinate preparation of schedule of values with preparation of Contractor's Construction Schedule. Correlate line items in Schedule of Values with other required administrative schedules and forms, including:
1. Contractor's Construction Schedule.
 2. Payment Request form.
 3. Schedule of Allowances.
 4. Schedule of Alternates.

PART 2 - PRODUCTS Not Used**PART 3 - EXECUTION Not Used****END OF SECTION**

SECTION 01 3100**PROJECT MANAGEMENT AND COORDINATION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
 - 1. Administrative and procedural requirements for Project Management and Coordination on Projects.

1.2 PROJECT COORDINATION

- A. This Project designation will be included on documents generated for Project by Contractor and Subcontractors, or be present on a cover letter accompanying such documents.
- B. Project designation for this Project is LDS 503-3195-23-0, Ogden Utah Lorin Farr Stake.
- C. This Project designation will be included on documents generated for Project by Contractor and Subcontractors, or be present on a cover letter accompanying such documents.

1.3 MULTIPLE CONTRACT COORDINATION

- A. Contractor shall be responsible for accurately maintaining and reporting schedule of The Work from Notice to Proceed to date of Substantial Completion.
- B. Contractor shall be responsible for providing Temporary Facilities And Controls for those who perform work on Project from Notice to Proceed to date of Substantial Completion.
- C. Contractor shall be responsible for providing Construction Waste Management And Disposal services for those who perform work on Project from Notice to Proceed to date of Substantial Completion.
- D. Contractor shall be responsible for Final Cleaning for entire Project.

1.4 PROJECT MEETINGS AND CONFERENCES

- A. Preconstruction Conference:
 - 1. Attend preconstruction conference and organizational meeting scheduled by Architect 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.
 - b. Critical Work sequencing.
 - c. Current problems.
 - d. Designation of responsible personnel.
 - e. Distribution of Contract Documents.
 - f. Equipment deliveries and priorities.
 - g. General schedule of inspections by Architect and its consultants.
 - h. General inspection of tests.
 - i. Office, work, and storage areas.
 - j. Preparation of record documents and O & M manuals.
 - k. Procedures for processing interpretations and Modifications.
 - l. Procedures for processing Payment Requests.

- m. Project cleanup.
 - n. Security.
 - o. Status of permits.
 - p. Submittal of Product Data, Shop Drawings, Samples, Quality Assurance / Control submittals.
 - q. Use of the premises.
 - r. Work restrictions.
 - s. Working hours.
3. Architect will record minutes of meetings and distribute copies to Owner and Contractor within three (3) working days.
- B. Progress Meetings:
- 1. Attend progress meetings at Project site at regularly scheduled intervals determined by Architect, at least once a month.
 - 2. Progress meetings will be open to Owner, Architect, Subcontractors, and anyone invited by Owner, Architect, and Contractor.
 - 3. Be prepared to discuss items of significance that could affect progress, including following:
 - a. Progress since last meeting.
 - b. Whether Contractor is on schedule.
 - c. Activities required to complete Project within Contract Time.
 - d. Labor and materials provided under separate contracts.
 - e. Off-site fabrication problems.
 - f. Access.
 - g. Site use.
 - h. Temporary facilities and services.
 - i. Hours of work.
 - j. Hazards and risks.
 - k. Project cleanup.
 - l. Quality and Work standards.
 - m. Status of pending modifications.
 - n. Documentation of information for Payment Requests.
 - o. Maintenance of Project records.
 - 4. Architect will prepare minutes of progress meetings and distribute copies of minutes to Owner and Contractor within three (3) working days.
- C. Pre-Installation Conferences:
- 1. Attend pre-installation conferences specified in Contract Document.
 - a. If possible, schedule these conferences on same day as regularly scheduled Progress Meetings. If this is not possible, coordinate scheduling with Architect.
 - b. Request input from attendees in preparing agenda.
 - 2. Be prepared to discuss following items:
 - a. Requirements of Contract Documents.
 - b. Completed work necessary for installation of items or systems.
 - c. Conditions not in compliance with installation requirements.
 - d. Installation and inspection schedule.
 - e. Coordination between trades.
 - f. Space and access limitations.
 - g. Testing.
 - 3. Architect will prepare meeting minutes and distribute minutes to Owner and Contractor within three (3) working days.

PART 2 - PRODUCTS Not Used**PART 3 - EXECUTION Not Used****END OF SECTION**

SECTION 01 3200**CONSTRUCTION PROGRESS DOCUMENTATION****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes But is Not Limited To:**

1. Administrative and procedural requirements for documenting the progress of construction during performance of the Work.

1.2 SCHEDULING OF WORK**A. Bar Chart Schedule:**

1. Submit horizontal bar chart schedule before Preconstruction Conference. Provide separate time bar for each construction activity listed on Owner's payment request form. Within each time bar, show estimated completion percentage. Provide continuous vertical line to identify first working day of each week. Show each activity in chronological sequence. Show graphically sequences necessary for completion of related portions of The Work. As The Work progresses, place contrasting mark in each bar to indicate actual completion.
2. Provide copies of schedule for Architect and Owner and post copy in field office.
3. Revise schedule monthly. Send copy of revised schedule to Owner and Architect and post copy in field office.
4. Project Management Software Programs:
 - a. Any software project management program capable of Bar Chart Scheduling for projects of equal size and complexity is approved by Contractor and approved by Owner's Project Manager.
2. Schedule Requirements:
 - a. CPM schedule will clearly show sequential interdependencies, with activity duration and float clearly represented. Sequence(s) of activities with no float will be clearly identified as Critical Path(s).
 - b. Scheduling system will be capable of baseline comparison analysis. Upon development and acceptance of schedule, 'freeze' initial schedule as baseline schedule. As work progresses, provide graphics displaying actual progress bars versus baseline or target bars.
 - c. Activity durations will be in workdays.
 - d. Activity Content:
 - 1) CPM schedule will include but not be limited to following activities as they apply to Project.
 - a) Construction tasks (Maximum 20 day duration for any activity).
 - b) Shop drawings submittal and approval process.
 - c) Ordering, fabrication, and delivery of major materials and equipment.
 - d) Checkout, start-up, and test and balance of major equipment.
 - e) Submittals of record drawings and maintenance manuals.
 - f) Cleanup and punch out tasks.
 - g) Critical coordination activities required to insure timely support and inspections.
 - h) Owner purchased/installed items and Owner's separate contract work.
 - i) Pre-final, final inspections and substantial completion.
 - j) Final payment.
 - k) Owner occupancy.
 - 2) Schedule submittal activities to allow sufficient time for work to be procured and installed, even if submittal is unacceptable and re-submittal is required.
3. Submittals:
 - a. Submit initial submittal, complete revisions, and periodic reports in three hard copies, one reproducible and two prints or plots, and one copy on CD or removable drive.

- b. Submit completed network program consisting of PERT, GANTT, and mathematical analysis prior to preconstruction meeting.
 - c. Review development status of network CPM schedule with Owner and Architect during preparation period.
4. Report Formats:
- a. Standard set of reports submitted each month including initial submittals will consist of following:
 - 1) Graphics:
 - a) GANTT chart of entire project. Progress bar chart will include target or baseline comparison bars. Bar positions will be early start / early finish with float clearly defined.
 - b) Time-scaled logic diagram or time-scaled network, also called PERT chart, with critical path clearly defined.
 - c) PERT and GANTT charts will include tabulation of each activity. Furnish following information for each activity on PERT and GANTT charts. Sequencing of columns on GANTT chart will match following:
 - d) GANTT Chart Column Layout:
 - (1) Activity / Task Description.
 - (2) Estimated duration of activity / task.
 - (3) Start status.
 - (4) Status.
 - (5) Start date by calendar date.
 - (6) End date by calendar date.
 - (7) Latest start date by calendar date.
 - (8) Latest end date by calendar date.
 - (9) Total slack or float time in calendar days.
 - (10) Percentage of activity achieved.
 - e) Program or means used in making mathematical computation will compile total value of completed and partially completed activities. Program will also accept revised completion dates as modified by Change Order time adjustments and accompanying recomputations of float dates.
 - f) PERT Chart Box Layout:
 - (1) Task / Activity Name.
 - (2) Duration.
 - (3) Start Date.
 - (4) End Date.
 - (5) Status (critical task).
 - b. Graphics outlined above will comply with following criteria unless noted otherwise:
 - 1) Sheet size of diagram will be 24 by 36 inches minimum and time scaled in weeks unless approved otherwise.
 - 2) On each page include title block containing as minimum following information:
 - a) Project Title.
 - b) Project Number.
 - c) Contractor's Business Name.
 - d) Date of Submittal and/or Revision.
 - e) Progress Computation Date.
 - f) Legend of Symbols and Abbreviations as applicable.
 - 3) Prepare and submit to Architect upon request additional charts, reports, and current copy on disk of Project program.
5. CPM Schedule Implementation And Monitoring:
- a. Where Contractor is shown to be behind schedule, provide accompanying written summary, cause, and explanation of planned remedial action.
 - 1) CPM schedules will reflect those instances, Modifications or other alterations to schedule, which have impact on final completion or interim target dates within schedule.
 - 2) Owner may withhold payments or portions of payments upon failure to maintain scheduled progress of the Work as shown on accepted CPM schedule.
 - b. Float time belongs to Project, not to Contractor or to Owner, and may be utilized by both parties.
6. Schedule Changes And Updates:

- a. Update CPM Schedule prior to each submittal to Owner and Architect. Correlate Schedule of Values graphically with CPM schedule for evaluation of monthly Payment Request.
 - b. Include additional activities added to CPM schedule by Contractor submitted schedule charts. It is Owner's intent that Project be managed and operated by CPM schedule.
- C. Daily Construction Reports:
1. Prepare daily reports of operations at Project including at least following information:
 - a. List of Subcontractors at site.
 - b. Approximate count of personnel at site by trade.
 - c. High and low temperatures, general weather conditions.
 - d. Major items of equipment on site.
 - e. Materials, equipment, or Owner-furnished items arriving at or leaving site.
 - f. Accidents and unusual events.
 - g. Site or structure damage by water, frost, wind, or other causes.
 - h. Meetings, conferences, and significant decisions.
 - i. Visitors to the job including meeting attendees.
 - j. Stoppages, delays, shortages, losses.
 - k. Any tests made and their result if known.
 - l. Meter readings and similar recordings.
 - m. Emergency procedures.
 - n. Orders and requests of governing authorities.
 - o. Modifications received, carried out.
 - p. Services connected, disconnected.
 - q. Equipment or system tests and start-ups.
 - r. Brief summary of work accomplished that day.
 - s. Signature of person preparing report.
 2. Submit daily reports to Architect at least weekly.
 3. Maintain copies of daily reports at field office.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 3300**SUBMITTAL PROCEDURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
 - 1. Administrative and procedural requirements for Submittal Procedures.
- B. Related Requirements:
 - 1. Section 01 7800: 'Closeout Submittals' for administrative and procedural requirements for closeout submittals.

1.2 SUBMITTAL SCHEDULE

- A. Furnish submittal schedule within 20 days after receipt of Notice to Proceed, listing items specified to be furnished for review to Architect including product data, shop drawings, samples, and Informational submittals.
 - 1. Coordinate submittal schedule with Contractor's construction schedule.
 - 2. Enclose the following information for each item:
 - a. Scheduled date for first submittal.
 - b. Related Section number.
 - c. Submittal category.
 - d. Name of Subcontractor.
 - e. Description of part of the Work covered.
 - f. Scheduled date for resubmittal.
 - g. Scheduled date for Architect's final release or approval.
- B. Print and distribute copies to Architect and Owner and post copy in field office. When revisions are made, distribute to same parties and post in same location.
- C. Revise schedule monthly. Send copy of revised schedule to Owner and Architect and post copy in field office.

1.3 SUBMITTAL PROCEDURES

- A. Coordination:
 - 1. Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently before performance of related construction activities to avoid delay.
 - a. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - b. Coordinate transmittal of different types of submittals required for related elements of The Work so processing will not be delayed by need to review submittals concurrently for coordination. Architect reserves right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
 - 2. Processing Time:
 - a. Allow sufficient review time so installation will not be delayed by time required to process submittals, including time for resubmittals.
 - 1) Allow 21 days for initial review. Allow additional time if processing must be delayed allowing coordination with subsequent submittals. Architect will promptly advise Contractor when submittal being processed must be delayed for coordination.

- 2) If an intermediate submittal is necessary, process same as initial submittal.
 - 3) Allow 10 days for reprocessing each submittal.
 - 4) No extension of Contract Time will be authorized because of failure to transmit submittals to Architect in sufficient time before work is to be performed to allow processing.
3. Identification:
- a. Place permanent label or title block on each submittal for identification. Include name of entity that prepared each submittal on label or title block.
 - 1) Provide space approximately 4 by 5 inches on label or beside title block on Shop Drawings to record Contractor's review and approval markings and action taken.
 - 2) Include following information on label for processing and recording action taken:
 - a) Project name.
 - b) Date.
 - c) Name and address of Architect.
 - d) Name and address of Contractor.
 - e) Name and address of Subcontractor.
 - f) Name and address of supplier.
 - g) Name of manufacturer.
 - h) Number and title of appropriate Specification Section.
 - i) Drawing number and detail references, as appropriate.
4. Transmittal:
- a. Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Architect using transmittal letter. On transmittal, record relevant information and requests for data. 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.
 - b. Submittals received from sources other than Contractor or not marked with Contractor's approval will be returned without action.

1.4 ACTION SUBMITTALS

- A. Product Data:
1. Submit Product Data, as required by individual Sections of Specifications.
 2. Mark each copy of each set of submittals to show choices and options used on Project. Where printed Product Data includes information on products that are not required for Project, mark copies to indicate information relating to Project.
 3. Certify that proposed product complies with requirements of Contract Documents. List any deviations from those requirements on form or separate sheet.
 4. Submit five copies of each required submittal unless otherwise required. Architect will return three copies marked with action taken and with corrections or modifications required.
 5. Submit electronic files PDF: Architect will return a PDF copy marked with action taken and with corrections or modifications required.
- B. Shop Drawings:
1. Submit newly prepared graphic data to accurate scale. Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 36 by 48 inches (915 by 1 200 mm). Highlight, encircle, or otherwise show deviations from Contract Documents. Include following information as a minimum:
 - a. Dimensions.
 - b. Identification of products and materials included.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 2. Do not reproduce Contract Documents or copy standard information as basis of Shop Drawings. Standard printed information prepared without specific reference to Project is not acceptable as Shop Drawings.
 3. Review and designate (stamp) approval of shop drawings. Unless otherwise specified, submit to Architect six copies of shop drawings required by Contract Documents. Shop drawings not

required by Contract Documents, but requested by Contractor or supplied by Subcontractor, need not be submitted to Architect for review.

C. Samples:

1. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
 - a. Mount, display, or package Samples to ease review of qualities specified. Prepare Samples to match samples provided by Architect, if applicable. Include following:
 - 1) Generic description of Sample.
 - 2) Sample source.
 - 3) Product name or name of manufacturer.
 - 4) Compliance with recognized standards.
 - 5) Availability and delivery time.
2. Submit Samples for review of kind, color, pattern, and texture, for final check of these characteristics with other elements, and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
 - a. Where variations in color, pattern, texture or other characteristics are inherent in material or product represented, submit set of three samples minimum that show approximate limits of variations.
 - b. Refer to other specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
 - c. Refer to other Sections for Samples to be returned to Contractor for incorporation into The Work. Such Samples shall be undamaged at time of use. On transmittal, indicate special requests regarding disposition of Sample submittals.
3. Where Samples are for selection of color, pattern, texture, or similar characteristics from a range of standard choices, submit full set of choices for material or product. Preliminary submittals will be reviewed and returned with Architect's mark indicating selection and other action.
4. Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit three sets. One will be returned marked with action taken.
5. Samples, as accepted and returned by Architect, will be used for quality comparisons throughout course of construction.
 - a. Unless noncompliance with Contract Documents is observed, submittal may serve as final submittal.
 - b. Sample sets may be used to obtain final acceptance of construction associated with each set.

1.5 INFORMATIONAL SUBMITTALS

- A. 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. Submit five copies of each required submittal unless otherwise required. Architect will return three copies marked with action taken and with corrections or modifications required. [or] Submit electronic files: PDF. Architect will return a PDF copy marked with action taken and with corrections or modifications required.
1. Certificates: Describe certificates intended to document affirmations by Contractor or others that the work is in accordance with the Contract Documents, but do not repeat provisions of Parts 2 or 3.
 2. Delegated Design Submittals / Design Data: Describe submittals intended to demonstrate design work prepared by Contractor's licensed professionals.
 3. Test And Evaluation Reports: Describe submittal of test reports or evaluation service reports intended to document required tests.
 4. Manufacturer Instructions: Describe submittals intended to document manufacturer instructions.
 5. Source Quality Control Submittals: Describe submittal of source quality control documentation.
 6. Field Quality Control Submittals: Describe submittal of field quality control documentation.

7. Manufacturer Reports: Describe submittal of Manufacturer reports as documentation of manufacturer activities.
8. Special Procedure Submittals: Describe submittals intended to document special procedures. An example would be construction staging or phasing for remodeling an existing facility while keeping it in operation. While the Contractor would normally be responsible for managing this, submittal of his plan as documentation could be specified.
9. Qualification Statements: Describe submittals intended to document qualifications of entities employed by Contractor.

1.6 CLOSEOUT SUBMITTALS

- A. This title groups submittals that occur during project closeout. Coordinate with section 01 7800 Closeout Submittals.
 1. As Built Record Drawings as defined in the Agreement.
 2. Project Manual: Complete Project Manual including Addenda and Modifications as defined in General Conditions.
 3. Maintenance Contracts: Describe submittal of the maintenance contract specific to the Section.
 4. Operations & Maintenance Data: Describe submittal of operation and maintenance data necessary for products of the Section.
 5. Warranty Documentation: Describe submittal of final executed warranty document specific to the Section.
 6. Record Documentation: Describe submittal of record documentation specific to the Section.
 7. Software: Describe submittal system software and programming software specific to the Section.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. This title groups maintenance material required submittals specific to the Section. Items may be provided at completion of Work or submitted with section 01 7800 Closeout Submittals:
 1. Spare Parts: Describe spare parts necessary for Owner's use in facility operation and maintenance. 'Parts' are generally understood to be items such as filters, motor drive belts, lamps, and other similar manufactured items that require only simple replacement.
 2. Extra Stock Materials: Describe extra stock materials to be provided for Owner's use in facility operation and maintenance. Extra stock materials are generally understood to be items such as ceiling tiles, flooring, paint etc.
 3. Tools:
 - a. Describe tools to be provided for Owner's use in facility operation and maintenance. Tools are generally understood to be wrenches, gauges, circuit setters, etc, required for proper operation or maintenance of a system.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 3500**SPECIAL PROCEDURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Special Procedures.

1.2 REFERENCES

- A. Association Publications:
1. U.S. Department of Labor, Occupational Safety and Health Administration:
 - a. 29 CFR 1926 OSHA, 'Construction Industry Regulations' (January 2014 or latest version).
 - 1) 29 CFR 1926.20, 'General Safety And Health Provisions'.
 - 2) 29 CFR 1926.64, 'Hot Work Permit'.
 - 3) 29 CFR 1926.352, 'Fire Prevention'.
 - 4) 29 CFR 1926.500, 'Fall Protection'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Acceleration of Work:
1. Complete The Work in accordance with Construction Schedule. If Contractor falls behind schedule, take such actions as are necessary, at no additional expense to Owner, to bring progress of The Work back in accordance with schedule.
 2. Owner may request proposal for completion of The Work at date earlier than expiration of Contract Time:
 - a. Promptly provide requested proposal showing cost of such acceleration of The Work. Consult with Owner and Architect regarding possible options to decrease cost of such acceleration.
 - b. If Owner determines to order acceleration of The Work, change in Contract Sum and Contract Time resulting from acceleration will be included in a Change Order.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
1. Meet regulations of 29 CFR 1926 OSHA, 'Construction Industry Regulations'.
 2. Owner's Safety Requirements:
 - a. Personal Protection:
 - 1) Contractor shall ensure:
 - a) Positive means of fall protection, such as guardrails system, safety net system, personal fall arrest system, etc, is provided to employees whenever exposed to a fall **6 feet (1.80 m)** or more above a lower level.
 - b) Personnel working on Project shall wear hard hats and safety glasses as required by regulation and hazard.
 - c) Personnel working on Project shall wear long or short sleeve shirts, long pants, and hard-toed boots or other sturdy shoes appropriate to type and phase of work being performed.
 - b. Contractor Tools And Equipment:
 - 1) Contractor shall ensure:

- a) Tools and equipment are in good working condition, well maintained, and have necessary guards in place.
 - b) Ground Fault Circuit Interrupters (GFCI) is utilized on power cords and tools.
 - c) Scaffolding and man lifts are in good working condition, erected and maintained as required by governmental regulations.
 - d) Ladders are in good condition, well maintained, used as specified by Manufacturer, and secured as required.
- c. Miscellaneous:
- 1) Contractor shall ensure:
 - a) Protection is provided on protruding rebar and other similar objects.
 - b) General Contractor Superintendent has completed the OSHA 10-hour construction outreach training course or equivalent.
 - c) Implementation and administration of safety program on Project.
 - d) Material Safety Data Sheets (MSDS) are provided for substances or materials for which an MSDS is required by governmental regulations before bringing on site.
 - e) Consistent safety training is provided to employees on Project.
 - f) Implement and coordinate Lockout / Tagout procedures with Owner's Representative as required.
 - 2) Report accidents involving injury to employees on Project that require off-site medical treatment to Owner's designated representative.
- d. Hot Work Permit:
- 1) Permit shall document that fire prevention and protection requirements in 29 CFR 1926.352, 'Fire Prevention' have been implemented prior to beginning hot work operations.
 - 2) Required for doing hot work involving open flames or producing heat or sparks such as:
 - a) Brazing.
 - b) Cutting.
 - c) Grinding.
 - d) Soldering.
 - e) Thawing pipe.
 - f) Torch applied roofing.
 - g) Welding.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 4000**QUALITY REQUIREMENTS****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Related Requirements:
1. Section 01 3100: 'Project Management and Coordination' for Pre-Installation Conferences for testing and inspection.
 2. Section 01 3200: 'Construction Progress Documentation' for developing a schedule of required tests and inspections.
 3. Section 01 3300: 'Submittal Procedures'.
 4. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
 5. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
 6. Section 01 7300: 'Executions' for cutting and patching for repair and restoration of construction disturbed by testing and inspecting activities.
 7. Divisions 01 thru 49 establish responsibility for providing specific testing and inspections.

1.3 REFERENCES

- A. Definitions:
1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
 2. Approved: To authorize, endorse, validate, confirm, or agree to.
 3. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with requirements indicated; and having complied with requirements of authorities having jurisdiction.
 4. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a construction operation, including installation, erection, application, and similar operations.
 - a. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of corresponding generic name.
 5. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish standard by which the Work will be judged.

6. 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.
 7. Preconstruction Testing: Tests and inspections that are performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
 8. 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.
 9. Service Provider: Agency or firm qualified to perform required tests and inspections.
 10. Source Quality Control Testing: Tests and inspections that are performed at source, i.e., plant, mill, factory, or shop.
 11. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
 12. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.
 13. Verification: Act of reviewing, inspecting, testing, etc. to establish and document that product, service, or system meets regulatory, standard, or specification requirements.
- B. Reference Standards:
1. International Code Council (IBC) (2015 or most recent edition adopted by AHJ):
 - a. IBC Chapter 17, 'Structural Tests and Special Inspections'.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Conflicting Requirements:
1. General:
 - 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.
 - b. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
 2. Minimum Quantity or Quality Levels:
 - a. Quantity or quality level shown or specified shall be minimum provided or performed.
 - b. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits.
 - c. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for context of requirements.
 - d. Refer uncertainties to Architect for decision before proceeding.
- B. Coordination:
1. Coordinate sequence of activities to accommodate required quality assurance and quality control services with minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
- C. Scheduling:
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.5 QUALITY ASSURANCE

- A. 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.
1. Specific quality assurance and quality control requirements for individual construction activities are specified in Sections that specify those activities and Section 01 4523. Requirements in those Sections may also cover production of standard products.

2. Specified tests, inspections, and related actions do not limit Contractor's other quality control procedures that facilitate compliance with Contract Document requirements.
 3. Requirements for Contractor to provide quality assurance and quality control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- B. Quality Assurance Services:
1. 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.
 2. Owner or Owner's designated representative(s) will perform quality assurance to verify compliance with Contract Documents.
- C. Activities performed by Owner's Quality Assurance Testing Agency include, but are not limited to following:
1. Individual Sections in Division 01 through Division 49:
 - a. Pre-Installation Conference agenda review items for:
 - 1) Schedule requirements.
 - 2) Testing and inspection requirements:
 - 3) Requirements and frequency of testing and inspections.
 - 4) Mock-up or sample requirements.
 - 5) Submittals requirements.
 - b. Quality Assurance personal qualifications.
 - 1) Qualification documentation including certificates if required.
 - c. Non-Conforming Work:
 - 1) Prepare non-compliance log to track non-compliant testing or inspections.
 2. Weekly Activities:
 - a. Summarize and track any non-compliance issues.
 - b. Provide summary report of previous week's performed Work.
 - c. Visit contractors periodically to find out if they have any concerns with Quality Assurance inspectors and check on any schedule changes.
 - d. Visit Owner's Representatives periodically to find out if they have any concerns with how project is progressing.
- D. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with following requirements, using materials indicated for completed Work:
1. Coordinate with individual section in Division 01 through Division 49 if there are any additional requirements or modification to these requirements:
 - a. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 - b. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 - c. Demonstrate proposed range of aesthetic effects and workmanship.
 - d. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - 1) Allow seven days for initial review and each re-review of each mockup.
 - e. Maintain mockups during construction in undisturbed condition as standard for judging completed Work.
 - 1) Demolish and remove mockups when directed, unless otherwise indicated.

1.6 QUALITY CONTROL

- A. Quality Control Services:
1. Quality Control will be sole responsibility of Contractor.
 - a. 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:
 - 1) They do not include inspections, tests or related actions performed by Architect, Owner, governing authorities or independent agencies hired by Owner or Architect.
 - 2) Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.

- b. Where services are indicated as Contractor's responsibility, engage a qualified Testing Agency to perform these quality control services.
 - 1) Contractor shall not employ same testing entity engaged by Owner, without Owner's written approval.

- B. Manufacturer's Field Services: Where indicated, engage factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 3300: 'Submittal Procedures'.

- C. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality control services, and provide reasonable auxiliary services as requested. Notify Testing Agency sufficiently in advance of operations to permit assignment of personnel. Provide following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist Testing Agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Delivery of samples to testing agencies.
 - 6. Preliminary design mix proposed for use for material mixes that require quality control by Testing Agency.
 - 7. Security and protection for samples and for testing and inspecting equipment at Project site.

- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections:
 - 1. Civil And Structural Testing:
 - a. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services'. Quality Control is sole responsibility of Contractor:
 - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
 - a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
 - 2) Contractor bears full responsible for compliance with all contract requirements and quality control on project and will be responsible for quality of asphalt mixture and asphalt installation.
 - b. Weekly Activities:
 - 1) Ensure that non-compliance log is current.
 - 2) Provide summary reports of performed Work.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
 - 2. Comply with Contract Document requirements for Section 01 7300 'Execution' for cutting and patching.

- B. Protect construction exposed by or for Quality Assurance and Quality Control activities.

- C. Repair and protection are Contractor's responsibility, regardless of assignment of responsibility for Quality Assurance and Quality Control Services.

END OF SECTION

SECTION 01 4200**REFERENCES****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes But is Not Limited To:**

1. Reference standards, definitions, specification format, and industry standards.

1.2 REFERENCES**A. Definitions:**

1. **Approved:** The term "approved," when used to convey Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
2. **Directed:** The term "directed" is a command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," and "permitted" have the same meaning as "directed."
3. **Experienced:** The term "experienced," when used with an entity, means having successfully completed a minimum often previous projects similar in size and scope to this Project; being familiar with the special requirements indicated, and having complied with requirements of authority having jurisdiction.
4. **Furnish:** The term "furnish" means supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
5. **General:** Basic Contract definitions are included in the Conditions of the Contract.
6. **Indicated:** The term "indicated" refers to requirements expressed by graphic representations, or in written form on Drawings, in Specifications, and in other Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
7. **Install:** The term "install" describes operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
8. **Installer:** An "Installer" is the Contractor, or another entity engaged by the Contractor, as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
9. **Project Site:** The term "Project site" means the space available for performing construction activities. The extent of the Project site is shown on the Drawings and mayor may not be identical with the description of the land on which the Project is to be built.
10. **Provide:** The term "provide" means to furnish and install, complete and ready for the intended use.
11. **Regulations:** The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
12. **Submitted:** The terms "submitted," "reported," "satisfactory" and similar words and phrases means submitted to Architect, reported to Architect and similar phrases.
13. **Testing Agencies:** A "testing agency" is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, or to report on and, if required, to interpret results of those inspections or tests.
14. **Trades:** Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

B. References Standards:

1. Specification Format: Specifications will follow MasterFormat™ 2004 for organizing numbers and titles. (The Construction Specifications Institute, Project Resource Manual/CSI Manual of Practice, 5th Edition. New York, McGraw-Hill, 2005).
 - a. Specification Identifications:
 - 1) The Specifications use section numbers and titles to help cross referencing in the Contract Documents.
 - 2) Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.
 - b. Specification Language:
 - 1) Specifications should be prepared, with concern and respect for their legal status. Specifications should be Clear, Concise, Correct and Complete.
 - 2) Streamlining: Streamlining is used to list products, materials, reference standards, and other itemized specifications. This technique places the subject first and provides keywords for quick reference
 - c. Sentence Structure:
 - 1) Specifications to be written in the “Imperative Mood”.
 - a) The verb that clearly defines the action becomes the first word in the sentence.
 - b) The imperative sentence is concise and readily understandable.
 - 2) Streamlining is used to list products, materials, reference standards, and other itemized specifications. This technique places the subject first and provides keywords for quick reference.
 - d. Abbreviated Language:
 - 1) Abbreviations should be used only on drawings and schedules where space is limited.
 - 2) Abbreviations with multiple meanings should be avoided, unless used in different disciplines where their meaning is clear from the context in which they are used.
 - 3) Abbreviations should be limited to five or fewer letters
 - a) The verb that clearly defines the action becomes the first word in the sentence.
 - e. Symbols:
 - 1) Caution should apply to symbols substituted for words or terms.
 - f. Numbers:
 - 1) The use of Arabic numerals rather than words for numbers is recommended.

C. Industry Standards:

1. Except where Contract Documents specify otherwise, construction industry standards will apply and are made a part of Contract Documents by reference.
2. Where compliance with two or more standards is specified and standards apparently establish different or conflicting requirements for minimum quantities or quality levels, refer to Architect for decision before proceeding. Quantity or quality level shown or specified will be minimum provided or performed. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for context of requirements. Refer uncertainties to Architect for decision before proceeding.
3. Each entity engaged in construction on Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with Contract Documents. Where copies of standards are needed for performance of a required construction activity, Contractor will obtain copies directly from publication source.
4. Trade Association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in Contract Documents, are defined to mean association names. Names and addresses are subject to change and are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.

AABC	Associated Air Balance Council	Washington	DC	(202) 737-0202	www.aabchq.com
AAMA	American Architectural Manufacturers Association	Schaumburg	IL	(847) 303-5664	www.aamanet.org
AASHTO	American Association of State Highway & Transportation Officials	Washington	DC	(202) 624-5800	www.aashto.org

AAMA	American Architectural Manufacturers Association	Schamamburg	IL	(847) 303-5774	www.aamanet.org
AASHTO	American association of State Highways and Transportation Officials	Washington	DC		www.transportation.org www.aashto.org
ACI	American Concrete Institute International	Farmington Hills	MI	(248) 848-3700	www.aci-int.org
AGA	American Gas Association	Washington	DC	(202) 824-7000	www.aga.org
AHRI	Air Conditioning Heating & Refrigeration Institute	Arlington	VA	(703) 524-8800	www.ari.org
AIA	American Institution of Architects	Washington	DC	(202) 626-7300	www.aia.org
AISC	American Institute of Steel Construction	Chicago	IL	(312) 670-2400	www.aisc.org
AISI	American Iron & Steel Institute	Washington	DC	(202) 452-7100	www.steel.org
AITC	American Institution of Timber Construction	Englewood	CO	(303) 792-9559	www.aitc-glulam.org
AMCA	Air Movement & Control Association International	Arlington Heights	IL	(847) 394-0150	www.amca.org
ANSI	American National Standards Institute	New York	NY	(212) 642-4900	www.ansi.org
APA	APA-Engineered Wood Association	Tacoma	WA	(253) 565-6600	www.apawood.org
API	American Petroleum Institute	Washington	DC	(202) 682-8000	www.api.org
AQMD	South Coast Air Quality Management District	Diamond Bar	CA	(909) 396-2000	www.aqmd.gov
ASHRAE	American Society of Heating, Refrigerating, & Air-Conditioning Engineers	Atlanta	GA	(404) 636-8400	www.ashrae.org
ASME	American Society of Mechanical Engineers International	New York	NY	(800) 843-2763	www.asme.org
ASTM	ASTM International	West Conshohocken	PA	(610) 832-9500	www.astm.org
AWI	Architectural Woodwork Institute	Potomac Falls	VA	(571) 323-3636	www.awinet.org
AWPA	American Wood Protection Association	Birmingham	AL	(205) 733-4077	www.awpa.com
AWS	American Welding Society	Miami	FL	(800) 443-9353	www.aws.org
AWWA	American Water Works Assoc	Denver	CO	(303) 794-7711	www.awwa.org
BHMA	Builders Hardware Manufacturers Association	New York	NY	(212) 297-2122	www.buildershardware.com
BIA	Brick Industry Association	Reston	VA	(703) 620-0010	www.bia.org
CFI	International Certified Floorcovering Installers, Inc.	Kansas City	MO	(816) 231-4646	www.cfi-installers.org
CRI	Carpet & Rug Institution	Dalton	GA	(706) 278-3176	www.carpet-rug.com
CRSI	Concrete Reinforcing Steel Institute	Schaumburg	IL	(847) 517-1200	www.crsi.org
CISPI	Cast Iron Soil Pipe Institute	Chattanooga	TN	(423) 892-0137	www.cispi.org
DHI	Door & Hardware Institute	Chantilly	VA	(703) 222-2010	www.dhi.org
DIPRA	Ductile Iron Pipe Research Association.	Birmingham	AL	(205) 402-8700	www.dipra.org
EIMA	EIFS Industry Members Association	Morrow	GA	(800) 294-3462	www.eima.com
FM	FM Global	Johnston	RI	(401) 275-3000	www.fmglobal.com

FSC	Forest Stewardship Council	Bonn, Germany		+49 (0) 228 367 66 0	www.fsc.org
GA	Gypsum Association	Hyattsville	MD	(301) 277-8686	www.gypsum.org
GS	Green Seal	Washington	DC	(202) 872-6400	www.greenseal.org
HPVA	Hardwood Plywood & Veneer Association	Reston	VA	(703) 435-2900	www.hpva.org
ICC	International Code Council	Washington	DC	(888) 422-7233	www.iccsafe.org
ICC-ES	ICC Evaluation Service	Whittier	CA	(562) 699-0543	www.icc-es.org
ICBO	International Conference of Building Officials				(See ICC)
ISO	International Organization for Standardization	Geneva, Switzerland			www.iso.org
ISSA	International Slurry Surfacing Association	Annapolis	MD	(410) 267-0023	www.slurry.org
KCMA	Kitchen Cabinet Manufactures Association	Reston	VA	(703) 264-1690	www.kcma.org
LPI	Lightning Protection Institute	Maryville	MO	(800) 488-6864	www.lightning.org
MFMA	Maple Flooring Manufacturers' Association	Deerfield	IL	(888) 480-9138	www.maplefloor.org
MSS	Manufacturer's Standardization Society of The Valve and Fittings Industry	Vienna	VA	(703) 281-6613	www.mss-hq.com
NAAMM	National Association of Architectural Metal Manufacturers	Glen Ellyn	IL	(630) 942-6591	www.naamm.org
NEC	National Electric Code	(from NFPA).			
NEMA	National Electrical Manufacturer's Association	Rosslyn	VA	(703) 841-3200	www.nema.org
NFPA	National Fire Protection Association	Quincy	MA	(800) 344-3555	www.nfpa.org
NFRC	National Fenestration Rating Council	Greenbelt	MD	(301) 589-1776	www.nfrc.org
NSF	NSF International	Ann Arbor	MI	(734) 769-8010	www.nsf.org
PCA	Portland Cement Association	Skokie	IL	(847) 966-6200	www.cement.org
PCI	Precast / Prestressed Concrete Institute	Chicago	IL	(312) 786-0300	www.pci.org
PEI	Porcelain Enamel Institute	Norcross	GA	(770) 676-9366	www.porcelainenamel.com
RFCI	Resilient Floor Covering Institute	LaGrange	GA	(706) 882-3833	www.rfci.com
SCTE	Society of Cable Telecommunications Engineers	Exton	PA	(800) 542-5040	www.scte.org
SDI	Steel Deck Institute	Fox River Grove	IL	(847) 458-4647	www.sdi.org
SDI	Steel Door Institute	Westlake	OH	(440) 899-0010	www.steeldoor.org
SIGMA	Sealed Insulating Glass Manufacturer's Association	Chicago	IL	(312) 644-6610	www.arcata.com
SJI	Steel Joist Institute	Myrtle Beach	SC	(843) 293-1995	www.steeljoist.org
SMACNA	Sheet Metal & Air Conditioning Contractors National Association	Chantilly	VA	(703) 803-2980	www.smacna.org
SPIB	Southern Pine Inspection Bureau	Pensacola	FL	(850) 434-2611	www.spib.org
SSMA	Steel Stud Manufacturer's Association	Glen Ellyn	IL	(630) 942-6592	www.ssma.com

TCNA	Tile Council of North America	Anderson	SC	(864) 646-8453	www.tileusa.com
TPI	Truss Plate Institute	Alexandria	VA	(703) 683-1010	www.tpinst.org
TPI	Turfgrass Producers International (formally American Sod Producers Association)	East Dundee	IL	(847) 649-5555	www.turfgrasssod.org
UL	Underwriters Laboratories	Camas	WA	(877) 854-3577	www.ul.com
WDMA	Window and Door Manufacturer's Association	Chicago	IL	(312) 321-6802	www.nwwda.org
WWPA	Western Wood Products Association	Portland	OR	(503) 224-3930	www.wwpa.org

D. Federal Government Agencies:

- Names and titles of federal government standard or specification producing agencies are often abbreviated. Following acronyms or abbreviations referenced in Contract Documents represent names of standard or specification producing agencies of federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.

CS	Commercial Standard (U S Department of Commerce)	Washington	DC	(202) 512-0000	www.doc.gov
EPA	Environmental Protection Agency	Washington	DC	(202) 272-0167	www.epa.gov
FCC	Federal Communications Commission	Washington	DC	(888) 225-5322	www.fcc.gov
FS	Federal Specifications Unit (Available from GSA)	Washington	DC	(202) 619-8925	www.gsa.gov
MIL	Military Standardization Documents (U S Department of Defense)	Philadelphia	PA	(215) 697-2179	www.dod.gov
NIST	National Institute of Standards and Technology, technology Administration (US Department of Commerce)	Gaithersburg	MD	(301) 975-4500	www.ts.nist.gov
OSHA	Occupational Safety & Health Administration (U S Department of Labor)	Washington	DC	202) 219-8148	www.osha.gov
PS	Product Standard of NBS (U S Department of Commerce)	Washington	DC	(202) 512-1800	www.doc.gov

E. Governing Regulations / Authorities:

- Contact authorities having jurisdiction directly for information and decisions having a bearing on the Work.
- Obtain copies of regulations required to be retained at Project Site, available for reference by parties who have a reasonable need for such reference.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 4301**QUALITY ASSURANCE - QUALIFICATIONS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Related Documents:
 - 1. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.
- B. Related Requirements:
 - 1. Section 01 4000: 'Quality Requirements' includes administrative and procedural requirements for quality assurance and quality control.
 - 2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.

1.2 REFERENCES

- A. Definitions:
 - 1. Accreditation: Process in which certification of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
 - 2. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
 - 3. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
 - 4. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.
- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM E329-18, 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.'

1.3 QUALIFICATIONS

- A. Qualifications: Qualifications paragraphs in this Article establish minimum qualification levels required; individual Specification Sections specify additional requirements:
 - 1. Manufacturers / Distributors / Fabricator / Suppliers / Installers Qualifications: 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.
 - a. Owner established Relationships:
 - 1) Where heading 'Category One, Two, or Three Approved' *Manufacturers / Suppliers / Distributors / Installers* is used to identify list Owner established Relationships, Owner has established relationships that extend beyond requirements of this Project.
 - 2) No other *Manufacturers / Suppliers / Distributors / Installers* will be acceptable.
 - 3) Follow specified procedures to preserve relationships between Owner and specified *Manufacturers / Suppliers / Distributors / Installers* and advantages that accrue to Owner from those relationships.
 - 4) Following areas of the Work have restrictions on sub-bids by Contractor:

- a) Aluminum-Framed Entrances And Storefronts, Section 08 4113: Category Three Approved, no other Manufacturer / Installers accepted.
 - b) Architectural Woodwork, Section 06 4001: Category Three Approved, no other Fabricator accepted except approved Alternate Fabricator.
 - d) Common Finish Hardware Requirements, Section 08 7101: Category Three Approved, no other Supplier accepted:
 - (1) Accessories, Section 08 7109.
 - (2) Accessories for Pairs of Doors, Section 08 7105.
 - (3) Closing Devices, Section 08 7106.
 - (4) Hanging Devices, Section 08 7102.
 - (5) Operating Trim, Section 08 7104.
 - (6) Protective Plates and Trim, Section 08 7107.
 - (7) Securing Devices, Section 08 7103.
 - (8) Stops and Holders, Section 08 7108.
 - g) Flush Wood Doors: Factory Finished, Clear, Section 08 1429: Category Three Approved, no other Supplier accepted.
 - h) Hollow Metal Frames, Section 08 1213: Category Three Approved, no other Supplier accepted.
 - i) Hollow Metal Doors, Section 08 1313: Category Three Approved, no other Supplier accepted.
 - j) Pews, Section 12 6713: Category One Approved, no other Manufacturer / Installers accepted.
 - l) Sheet Carpeting, Section 09 6816: Category One Approved, no other Manufacturer / Installers accepted.
 - n) Tile Carpeting, Section 09 6813: Category One Approved, no other Manufacturer / Installers accepted.
 - p) Wood Framing, Division 06 'Wood', Category Three Approved, no other Supplier accepted for USA Projects Only except approved Supplier:
 - (1) Glue-Laminated Construction, Section 06 1800.
 - (2) Structural Composite Lumber, Section 06 1712.
 - (3) Wood Framing, Section 06 1100.
 - (4) Wood 'I' Joists, Section 06 1733.
 - (5) Wood-Panel Product Sheathing, Section 06 1636.
- b. Approved:
- 1) Where heading '*Approved Suppliers / Distributors / Installers / Applicators / Fabricators*' is used to identify list of specified suppliers / distributors / installers / applicators / fabricators, use only listed suppliers / installers / fabricators.
 - 2) No substitutions will be allowed.
 - 3) Following areas of the Work have restrictions on sub-bids by which may be accepted by Contractor:
 - a) Architectural Woodwork, Sections 06 4001: Alternate Fabricator approved by Architect before bidding.
 - b) Audio Systems, Section 27 5117: Alternate Installers approved by Owner before bidding.
 - c) Ceramic Tiling, Section 09 3013: No other Suppliers accepted.
 - e) Rough Carpentry, Sections 06 1100, 06 1636, 06 1712, 06 1733, and 06 1800: Alternate Supplier approved by Architect before bidding.
 - f) Sound, Division 27: Installers approved by Architect before bidding.
 - g) Video Systems, Section 27 4117: Alternate Installers approved by Owner before bidding.
- c. Acceptable Suppliers / Installers:
- 1) Where heading '*Acceptable Suppliers / Installers / Fabricators*' is used, qualifications as specified in Quality Assurance in Part 1 of individual sections will be used to determine requirements of those that will be acceptable to be used on Project. Lists for acceptable installers can include additional installers that may be approved before bidding or by addendum.
 - a) Underground Sprinklers, Section 32 8423: Acceptable Landscape Installers approved by Landscape Architect before bidding. Equal Landscape Installers to be approved by Architect before bidding.
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 a 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 a 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. 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 shall be performed by entities who are recognized experts in those operations.
 - b. Specialists shall satisfy qualification requirements indicated and shall be engaged for activities indicated.
 - c. Requirement for specialists shall 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.
 - 1) Testing Laboratory:
 - a) AASHTO Materials Reference Laboratory (AMRL) Accreditation Program.
 - b) Cement and Concrete Reference Laboratory (CCRL).
 - c) Nationally Recognized Testing Laboratory (NRTL): Nationally recognized testing laboratory according to 29 CFR 1910.7.
 - d) 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.

PART 2 - PRODUCTS Not Used**PART 3 - EXECUTION Not Used****END OF SECTION**

SECTION 01 4523**TESTING AND INSPECTING SERVICES****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section

1.2 SUMMARY

- A. This Section includes testing, inspections, special testing, special inspections, and testing laboratory services for materials, products, and construction methods as specified hereafter for the Work.
- B. Specified tests, inspections, and related actions do not limit Contractor's quality control procedures to fully comply with Contract Document requirements in all regards.
- C. Costs: Costs of initial services for testing and inspection personnel will be paid by Owner unless otherwise noted.
 - 1. If initial tests indicate non-compliance with contract document requirements, any subsequent testing will be performed by same personnel and paid for by Contractor.
- D. Related Requirements:
 - 1. Section 01 4000: 'Quality Requirements' includes administrative and procedural requirements for quality assurance and quality control.
 - 2. Section 01 4301: 'Quality Assurance – Qualifications' establishes minimum qualification levels required.
 - 3. Division 01 through Division 49 establish responsibility for providing specific testing and inspections and Field Tests and Inspections.

1.3 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).
 - 2. International Code Council (IBC):
 - a. IBC Chapter 17, 'Structural Tests and Special Inspections'.
- B. Definitions:
 - 1. Accreditation: Process in which **certification** of competency, authority, or credibility is presented. Verify that laboratories have an appropriate quality management system and can properly perform certain test methods (e.g., ANSI, ASTM, and ISO test methods) and calibration parameters according to their scopes of accreditation.
 - 2. Approved: To authorize, endorse, validate, confirm, or agree to.
 - 3. Field Quality Control: Testing, Inspections, Special Testing and Special Inspections to assure compliance to Contract Documents.
 - 4. Inspection/Special Inspection:
 - a. Inspection: Not required by code provisions but may be required by Contract Documents.
 - b. Special Inspection: Inspection required of materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance

- with approved construction documents and reference standards (required by code provisions and by Contract Documents).
- c. Special 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. Special 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.
5. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation. They are not samples. Approved mockups establish standard by which the Work will be judged.
 6. 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.
 7. Preconstruction Testing: Tests and inspections that are performed specifically for Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
 8. Quality Assurance: Testing, Inspections, Special Testing and Special Inspections provided for by Owner.
 9. Quality Control: Testing, Inspections, Special Testing and Special Inspections provided for by Contractor.
 10. Special Inspection: See Inspection.
 11. Special Inspector: Certified individual or firm that implements special inspection program for project.
 12. Special Test: See Test.
 13. Test/Special Test: Field or laboratory tests to determine characteristics and quality of building materials and workmanship:
 - a. Test: Not required by code provisions but may be required by Contract Documents.
 - b. Special Test: Required by code provisions and by Contract Documents.
 14. Testing Agency: Entity engaged to perform specific tests, inspections, or both.
 15. Testing Agency Laboratory: Agency or firm qualified to perform field and laboratory tests to determine characteristics and quality of materials and workmanship.
 16. 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. ASTM International:
 - a. ASTM A898/A898M-17, 'Standard Specification for Straight Beam Ultrasonic Examination of Rolled Steel Structural Shapes'.
 - b. ASTM C42/C42M-18, 'Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete'.
 - c. ASTM C138/C138M-17a, 'Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete'.
 - d. ASTM C597-16, 'Standard Test Method for Pulse Velocity Through Concrete'.
 - e. ASTM C803/C803M-18, 'Standard Test Method for Penetration Resistance of Hardened Concrete'.
 - f. ASTM C805/C805M-13a, 'Standard Test Method for Rebound Number of Hardened Concrete'.
 - g. ASTM C1019-18, 'Standard Test Method for Sampling and Testing Grout'.
 - h. ASTM C1021-08(2014), 'Standard Practice for Laboratories Engaged in Testing of Building Sealants'.
 - i. ASTM C1077-17, 'Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation'.
 - j. ASTM C1093-15a, 'Standard Practice for Accreditation of Testing Agencies for Masonry'.
 - k. ASTM D3666-16, 'Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials'.

- l. ASTM D3740-12a, 'Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction'.
 - m. ASTM E114-15, 'Standard Practice for Ultrasonic Pulse-Echo Straight-Beam Examination by the Contact Method'.
 - n. ASTM E164-13, 'Standard Practice for Contact Ultrasonic Testing of Weldments'.
 - o. ASTM E329-18: 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing'.
 - p. ASTM E488-18, 'Standard Test Methods for Strength of Anchors in Concrete Elements'.
 - q. ASTM E543-15, 'Standard Specification for Agencies Performing Nondestructive Testing'.
 - r. ASTM E587-15, 'Standard Practice for Ultrasonic Angle-Beam Examination by the Contact Method'.
 - s. ASTM E709-15, 'Standard Guide for Magnetic Particle Testing'.
 - t. ASTM E1212-17, 'Standard Practice for Quality Management Systems for Nondestructive Testing Agencies'.
 - u. ASTM F710-17, 'Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring'.
 - v. ASTM F2170-18, 'Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes'.
2. Code of Federal Regulations:
 - a. 29 CFR 1910, Subpart A, Section 1910.7, 'Definition and Requirements for a Nationally Recognized Testing Laboratory'.
 3. International Code Council Code (IBC) (2018 or most recent edition adopted by AHJ):
 - a. IBC Chapter 17, 'Special Inspections And Tests'.
 - 1) Section 1704, 'Special Inspections And Tests, Contractor Responsibility And Structural Observations'.
 - 2) Section 1705, 'Required Special Inspection And Tests'.
 - a) Section 1705.2, 'Steel Construction'.

1.4 SUBMITTALS

- A. Informational Submittals:
 1. General: Additional submittal requirements are specified in Individual Sections in Division 01 through Division 50.
 2. Certificates:
 - a. Testing Agency will submit certified written report of each inspection, test, or similar service.
 3. 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 (or electronic record) distributed as follows:
 - 1) 1 copy to Owner's Representative.
 - 2) 1 copy to Architect.
 - 3) 1 copy to Consulting Engineers (Engineer of Record).
 - 4) 1 copy to General Contractor.
 - 5) 1 copy to Authorities Having Jurisdiction (if required).
 - b. Other tests, certificates, and similar documents will be obtained by Contractor and delivered to Owner's Representative and Architect in such time as not to delay progress of the Work or final payment therefore.
 - c. Submittal Format:
 - 1) Schedule of Tests and Inspections: Prepare in tabular form and include following:
 - a) Specification Section number and title.
 - b) Description of test and inspection.
 - c) Identification of applicable standards.
 - d) Identification of test and inspection methods.
 - e) Number of tests and inspections required.
 - f) Time schedule or time span for tests and inspections.
 - g) Entity responsible for performing tests and inspections.
 - h) Requirements for obtaining samples.
 - 2) Certified written reports of each inspection, test, or similar service will include, but not be limited:

- a) Date of issue.
 - b) Project title and number.
 - c) Name, address, and telephone number of Testing Agency.
 - d) Dates and locations of samples and tests or inspections.
 - e) Names of individuals making tests and inspections.
 - f) Description of the Work and test and inspection method.
 - g) Identification of product and Specification Section.
 - h) Complete test or inspection data.
 - i) Test and inspection results and an interpretation of test results.
 - j) Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - k) Comments or professional opinion on whether tested or inspected Work complies with Contract Document requirements.
 - l) Name and signature of laboratory inspector.
 - m) Recommendations on retesting and re-inspecting.
4. Source Quality Control Submittals:
- a. Testing Agency will submit following prior to commencing the Work:
 - 1) Qualifications of Testing Agency management and personnel designated to project.
 - 2) Testing Agency 'Written Practice for Quality Assurance'.
 - 3) Qualification records for Inspector and non-destructive testing technicians designated for project.
 - 4) Testing Agency non-destructive testing procedures, equipment calibration records, and personnel training records.
 - 5) Testing Agency Quality Control Plan for monitoring and control of testing operations.
 - 6) Welding Inspection Procedures (Structural Steel testing).
 - 7) Bolting Inspection Procedures (Structural Steel testing).
 - 8) Shear Connector Stud Inspection Procedures (Structural Steel testing).
 - 9) Seismic Connections Inspection Procedures (Structural Steel testing).

1.5 QUALITY ASSURANCE

- A. 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.
- B. Owner will employ independent Testing Agencies to perform certain specified testing, as Owner deems necessary.
- C. Certification:
 - 1. 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.
 - 2. 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.
- D. Written Practice for Quality Assurance:
 - 1. 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.
 - 2. Written practice will describe testing agency procedures for determining acceptability of structure in accordance with applicable codes, standards, and specifications.
 - 3. Written practice will describe Testing Agency inspection procedures, including general inspection, material controls, visual welding inspection, and bolting inspection.

1.6 QUALITY CONTROL

- A. Quality Control will be sole responsibility of Contractor. Contractor will be responsible for testing and inspections, 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.
- B. Contractor will assign one (1) employee to be responsible for Quality Control. This individual may have other responsibilities and may be Contractor's Project superintendent or Contractor's Project Manager.
- C. Notify results of all Testing and Inspection performed by Contractor's independent Testing Agencies to Architect and Owner's Representative within twenty four (24) hours of test or inspection having been performed.
 1. Testing and Inspection Reports will be distributed as follows:
 - a. 1 copy to Owner's Representative.
 - b. 1 copy to Architect.
 - c. 1 copy to Consulting Engineer(s) (Engineer of Record).
 - d. 1 copy to Authorities Having Jurisdiction (if required).
- D. Contractor's Responsibility:
 1. 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.
 2. Tests and inspections that are not explicitly assigned to Owner are responsibility of Contractor.
 3. 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:
 - a. 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.
 - b. Taking adequate quantities of representative samples of materials that require testing or helping Testing Agency in taking samples.
 - c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
 - d. Providing Testing Agency with preliminary design mix proposed for use for materials mixes that require control by Testing Agency.
 4. Contractor will integrate Owner's independent Testing Agency services within Baseline Project Schedule and with other Project activities.
 5. For any requested inspection, Contractor will complete prior inspections to ensure that items are ready for inspection.
 6. All Work is subject to testing and inspection and verification of correct operation prior to 100% payment to Contractor of line item(s) pertaining to that aspect of the Work.
 7. For Mechanical Equipment, inspection and documented approval of individual equipment and/or system(s) must be accomplished prior to requesting Substantial Completion Inspection for any area affected by said equipment and/or system:
 - a. Contractor will perform thorough checkout of operations with manufacturer's representatives prior to requesting formal inspection by Owner.
 - b. Contractor must notify Owner's Representative, in advance, as to when manufacturer's representative is scheduled to arrive at Site.
 8. Comply:
 - a. 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.
 - b. Comply with Contract Documents in making such repairs.
 9. Data: Furnish records, drawings, certificates, and similar data as may be required by testing and inspection personnel to assure compliance with Contract Documents.
 10. Defective Work (Non-Conforming Work): Non-conforming Work as covered in General Conditions applies, but is not limited to following requirements:

- a. 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.
 - b. Where testing personnel take cores or cut-outs to verify compliance, repair prior to acceptance.
 - c. Contractor responsible for any and all costs incurred resulting from inspection that was scheduled prematurely or retesting due to failed tests.
 - d. Remove and replace any Work found defective or not complying with contract document requirements at no additional cost to Owner.
 - e. 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.
11. Protection:
- a. Protect construction exposed by or for quality assurance and quality control service activities, and protect repaired construction.
12. Scheduling: Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities:
- a. Schedule testing and inspections in advance so as not to delay the Work and to eliminate any need to uncover Work for testing or inspection.
 - b. Notify Testing Agency and Architect as noted in Sections in Division 01 through Division 50 prior to any time required for such services.
 - c. Incorporate adequate time for performance of all inspections and correction of noted deficiencies.
 - d. Schedule sequence of activities to accommodate required services with minimum of delay.
 - e. Schedule sequence of activities to avoid necessity of removing and replacing construction to accommodate testing and inspections
13. Test and Inspection Log:
- a. Provide system of tracking all field reports, describing items noted, and resolution of each item. Prepare record of tests and inspections. Include following:
 - 1) Date test or inspection was conducted.
 - 2) Description of the Work tested or inspected.
 - 3) Date test or inspection results were transmitted to Architect.
 - 4) Identification of Testing Agency or inspector conducting test or inspection.
 - b. Maintain log at Project site:
 - 1) Post changes and modifications as they occur.
 - 2) Provide access to test and inspection log for Architect's reference during normal working hours.

1.7 TESTING AND INSPECTIONS - GENERAL

- A. Testing specifically identified to be conducted by Owner, will be performed by an independent entity and will be arranged and paid for by Owner.
- B. Individual Sections in Division 01 through Division 49 indicate if Owner will provide testing and inspection of the Work of that Section.
- C. 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 49.
- D. Owner may engage additional consultants for testing, air balancing, commissioning, or other special services:
 1. 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.
 2. Contractor must cooperate with persons and firms engaged in these activities.
- E. Taking Specimens:
 1. Except as may be specifically otherwise approved by Architect, only testing laboratory shall secure, handle, transport, or store any samples and specimens for testing.

- F. Scheduling Testing Agency:
 - 1. Contractor will coordinate the Work and facilitate timeliness of such testing and inspecting services so as not to delay the Work.
 - 2. Contractor will notify Testing Agency and Architect to schedule tests and / or inspections.
- G. For 'building-wide' and/or life safety systems, such as emergency lighting, emergency power uninterruptible power supply systems, fire alarm, fire sprinkler systems, smoke evacuation systems, toxic gas monitoring, capturer exhaust systems, etc. formal start-up inspection will be completed prior to requesting Substantial Completion Inspection for any area of Project:
 - 1. Manufacturer's representatives and installing contractor will demonstrate both operation and compliance to Owner's agents and consultants. If coordinated and scheduled appropriately by Contractor, these equipment and/or systems inspections may also serve to provide required Owner training, if approved in advance by Owner.
 - 2. Contractor responsible for requesting that Architect arrange for inspection of materials, equipment, and work prior to assembly or enclosure that would make materials, equipment, or work inaccessible for inspection and at other times as may be required.

1.8 TESTING AGENCY SERVICES AND RESPONSIBILITIES

- A. Testing Agency, including independent testing laboratories, will be licensed and authorized to operate in jurisdiction in which Project is located.
 - 1. Approved Testing Agency Qualifications: Requirements of Section 01 4301 apply.
- B. Testing and Inspection Services:
 - 1. Testing Agency will not release, revoke, alter, or increase Contract Document requirements or approve or accept any portion of the Work.
 - 2. Testing Agency will not give direction or instruction to Contractor.
 - 3. 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.
 - 4. Testing Agency will not provide additional testing and inspection services beyond scope of Work without prior approval of Owner's Representative and / or Architect.
- C. Excavation Support and Protection:
 - 1. Anchor tie-back System:
 - a. Observe and record proof tests.
 - 2. Soil Nail Systems:
 - a. Observe and record proof tests.
 - b. Observe drilling for changes in soil type, hole diameter, length, and cleanliness.
 - c. Periodically observe placement of drainage materials, reinforcing, and shotcrete.
 - d. Review compressive strength test results of grout and shotcrete.
- D. Testing Agency Duties:
 - 1. Independent Testing Agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual specification Sections will cooperate with Architect and Contractor in performance of its duties and will provide qualified personnel to perform required inspections and tests.
 - 2. Testing Agency will test or obtain certificates of tests of materials and methods of construction, as described herein or elsewhere in technical specification.
 - 3. Testing Agency will provide management, personnel, equipment, and services necessary to perform testing functions as outlined in this section.
 - 4. 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.
 - 5. 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.
 - 6. 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.

7. Welding Procedure Review: Testing Agency will provide review and approval or rejection of all welding procedures to be used and will verify compliance with all reference standard requirements.

E. Testing and Inspection Reports:

1. Conduct and interpret tests and inspections and state in each report whether tested and inspected the Work complies with or deviates from requirements.
2. Laboratory Reports: Testing Agency will furnish reports of materials and construction as required, including:
 - a. Description of method of test.
 - b. Identification of sample and portion of the Work tested.
 - 1) Description of location in the Work of sample.
 - 2) Time and date when sample was obtained.
 - 3) Weather and climatic conditions at time when sample was obtained.
 - c. Evaluation of results of tests including recommendations for action.
3. Inspection Reports:
 - a. Testing Agency will furnish 'Inspection at Site' reports for each site visit documenting activities, observations, and inspections.
 - b. 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.
4. Reporting Testing and Inspection (Conforming Work):
 - a. Submit testing and inspection reports as required within twenty four (24) hours of test or inspection having been performed.
5. Reporting Testing and Inspection Defective Work (Non-Conforming Work):
 - a. 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:
 - 1) 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).
 - 2) Submit written inspection report and test results as required within twenty four (24) hours of test or inspection having been performed.
 - b. Prepare non-compliance log to track non-compliant testing or inspections.
6. Final Report:
 - a. Submit final report of tests and inspections at Substantial Completion, which identify unresolved deficiencies.

1.9 ARCHITECT'S RESPONSIBILITIES

- A. Architect Duties:
1. Notify Owner's Representative before each test and/or inspection.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Field Tests And Inspections:
1. Field Tests and Inspections requirements are described in 'Field Quality Control' of individual Sections in Division 01 through Division 49.

END OF SECTION

SECTION 01 5100**TEMPORARY UTILITIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Temporary Utilities.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Where necessary, engage appropriate local utility companies to install temporary service or connect to existing service. Where utility company provides only part of service, provide remainder with matching, compatible materials and equipment. Comply with utility company's recommendations.
1. Comply with industry standards and applicable laws and regulations of authorities having jurisdiction.
 2. Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.
 3. Arrange with utility company and existing users for time when service can be interrupted, where necessary, to make connections for temporary services.
 4. Provide adequate capacity at each stage of construction. Before temporary utility availability, provide trucked-in services.
 5. Obtain construction easements necessary to bring temporary and/or permanent utilities to site.
 6. Use qualified personnel for installation and maintenance of temporary facilities. Locate temporary utilities where they will serve Project adequately and result in minimum interference with the Work of Owner or other Contractors on Project Site. Relocate and modify temporary utilities as required.
 7. Pay cost and use charges for temporary and permanent utilities until Substantial Completion has been granted by Owner.
- B. Prepare schedule indicating dates for implementation and termination of each temporary utility. At earliest feasible time, change over from use of temporary service to use of permanent service.
- C. Keep temporary utilities clean and neat in appearance. Operate in safe and efficient manner. Take necessary fire prevention measures. Do not overload utilities, or allow them to interfere with progress of The Work. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on Project site.
- D. Limit availability of temporary utilities to essential and intended uses to reduce waste and abuse.
- E. Maintain temporary utilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on 24-hour day basis where required to achieve indicated results and to avoid possibility of damage.
 2. Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- F. Remove each temporary utility and control when need has ended, or when replaced by permanent utility, but not later than Substantial Completion. Complete permanent construction that may have been delayed because of interference with temporary utility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that make up temporary utilities are property of Contractor.

2. By Substantial Completion, clean and renovate permanent utilities used during construction period, including but not limited to:
 - a. Replace air filters and clean inside of ductwork and housings.
 - b. Replace significantly worn parts and parts subjected to unusual operating conditions.
 - c. Replace lamps that are burned out or noticeably dimmed by substantial hours of use.

1.3 TEMPORARY ELECTRIC POWER

- A. Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period.

1.4 TEMPORARY FIRE PROTECTION

- A. Install and maintain temporary fire protection facilities of types needed to protect against predictable and controllable fire losses. At a minimum, provide and maintain in working order two Standard UL Labeled ABC all-purpose 10 lb fire extinguishers. Do not incorporate these extinguishers into final Project.
 2. Store combustible materials in containers in fire-safe locations.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways, and other access routes for fighting fires.

1.5 HEATING, COOLING, AND VENTILATING:

- A. Install and operate temporary heating, cooling, and ventilating units including fuel, temporary piping, fittings, wiring, and connections necessary to provide environmental conditions specified for various portions of the Work. Coordinate ventilation requirements to produce ambient conditions required and reduce consumption of energy.
- B. Repair damage to building and contents caused by cold, heat, dampness, and/or heating, cooling, and ventilating equipment. Select equipment that will not have harmful effect on completed installations or on elements being installed.
- C. Maintain safe conditions for use of temporary heating, cooling, and ventilating systems including, but not limited to, following requirements:
 1. Operate equipment according to equipment manufacturer's instructions.
 2. Provide fresh air ventilation required by equipment manufacturer.
 3. Keep temperature of fuel containers stabilized.
 4. Secure fuel containers from overturning.
 5. Operate equipment away from combustible materials.
- D. Permanent mechanical system may be operated subject to following conditions:
 1. Do not operate system when work causing air-borne dust is occurring or when dust caused by such work is present without installation of temporary filtering system approved by Architect.
 2. Operate system at no cost to Owner, including cost of fuel.
 3. Assume all responsibility and risk for operation of system.
 4. Return permanent mechanical equipment to 'like-new' condition for Substantial Completion Inspection.

1.6 TEMPORARY LIGHTING

- A. Install and operate temporary lighting that will provide adequate illumination for construction operations and traffic conditions.

1.7 TEMPORARY TELEPHONES

- A. Provide temporary telephone service for all personnel engaged in construction activities, throughout construction period.
- B. Contractor will pay for Local calls. Party making call will pay for long-distance and toll calls.
- C. At each telephone, post list of important telephone numbers.

1.8 TEMPORARY WATER SERVICE

- A. Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.

PART 2 - PRODUCTS Not Used**PART 3 - EXECUTION Not Used**

END OF SECTION

SECTION 01 5200**CONSTRUCTION FACILITIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Construction Facilities.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Prepare schedule indicating dates for implementation and termination of each temporary facility.
- B. Keep temporary facilities clean and neat in appearance. Operate in safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or allow them to interfere with progress of The Work. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on Project site.
- C. Maintain facilities in good operating condition until removal.
- D. Remove each temporary facility when need has ended, or when replaced by authorized use of permanent facility, or by Substantial Completion. Complete permanent construction that may have been delayed because of interference with temporary facility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that make up temporary facilities are property of Contractor.
 2. By Substantial Completion, clean and renovate permanent facilities used during construction period.

1.3 FIELD OFFICES

- A. Provide and maintain insulated, weather tight temporary office of sufficient size to accommodate Contractor's personnel at Project site and for use by Owner, Architect and Subcontractors.
1. Keep office clean and orderly.
 2. Heat and cool office as needed.
 3. Furnish office with locking door, light(s), table(s), bench(es), rack(s) for drawings, telephone, and FAX machine.
 4. Make office available for progress meetings.
 5. Provide an operable fire extinguisher in facility.
 6. Provide hardhats for Owner's Representatives for site visits.
- B. If Owner agrees to permit removal of temporary office before Substantial Completion, Contractor may use a room as an office after temporary office is removed. Equip room as specified above and restore to 'like-new' condition before Substantial Completion.

1.4 SANITARY FACILITIES

- A. Provide temporary sanitary toilet. Service and maintain temporary toilet in a clean, sanitary condition.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 5400
CONSTRUCTION AIDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Construction Aids.

1.2 SCAFFOLDING, PLATFORMS, STAIRS, ETC

- A. Furnish and maintain equipment such as temporary stairs, ladders, ramps, platforms, scaffolds, hoists, runways, derricks, chutes, and elevators as required for proper execution of The Work.
- B. Apparatus, equipment, and construction shall meet requirements of applicable laws and safety regulations.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 5600

TEMPORARY BARRIERS AND ENCLOSURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes But is Not Limited To:
 1. Administrative and procedural requirements for Temporary Barriers and Enclosures.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Protection Of Existing Improvements: Protect streets, private roads, and sidewalks, including overhead protection where required. Repair damage to existing improvements caused by construction activities.
- B. Protection Of Adjacent Property: Provide necessary protection for adjacent property and lateral support thereof.
- C. 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:
 1. 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.
 2. 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').
 3. 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.
 4. 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.
 5. 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.

1.3 TEMPORARY AIR BARRIERS

- A.

1.4 TEMPORARY DUST BARRIERS

- A.

1.5 TEMPORARY NOISE BARRIERS

A.

1.6 TEMPORARY BARRICADES

- A. Comply with standards and code requirements in erecting barricades, warning signs, and lights.
- B. Take necessary precautions to protect persons, including members of the public, from injury or harm.

1.7 TEMPORARY FENCING

- A. Before construction begins, install 6 foot high enclosure fence with lockable entrance gates. Locate where shown on Drawings. If not shown on Drawings, enclose entire site or portion sufficient to accommodate construction operations.

1.8 TEMPORARY SECURITY BARRIERS

- A. Install temporary enclosures of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and other violations of security.
- B. Secure materials and equipment stored on site.
- C. Secure building at the end of each work day.
- D. Maintain exterior building security until Substantial Completion.

1.9 TEMPORARY TREE AND PLANT PROTECTION

- A. Protection:
 - 1. Before commencing site work, build and maintain protective fencing around existing trees and vegetation as shown on the drawings.
 - 2. Individual trees will have protective fencing built beyond drip line.
 - 3. Build protective fencing around groups of trees and other vegetation as indicated on Drawings.
 - 4. Keep areas within protective fencing undisturbed and do not use for any purpose.
- B. Maintenance:
 - 1. Maintain existing tree, shrubs, and vegetation as indicated in Contract Documents:
 - a. Remove and replace vegetation that dies or is damaged beyond repair due to construction activities.
 - b. Damage to any tree, shrub, or vegetation that has been indicated to remain and be protected, will have a cost associated with it. This includes branches, trunk and root systems:
 - 1) Trees: \$1,000.00.
 - 2) Shrubs: \$ 100.00.
 - 3) Vegetation: \$ 50.00.
- C. Pruning:
 - 1. Provide a qualified Tree Service Firm if pruning is required:
 - a. Coordinate with authorities having jurisdiction.
 - b. Coordinate with Owner and Architect on site before pruning is to begin.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 5700
TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Temporary Controls.

1.2 TEMPORARY EROSION AND SEDIMENT CONTROL

- A. Take precautions necessary to prevent erosion and transportation of soil downstream, to adjacent properties, and into on-site or off-site drainage systems.
- B. Develop, install, and maintain an erosion control plan if required by law.
- C. Repair and correct damage caused by erosion.

1.3 TEMPORARY ENVIRONMENTAL CONTROLS

- A. 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:
1. Avoid use of tools and equipment that produce harmful noise.
 2. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near site.
- B. Provide protection against weather (rain, winds, storms, frost, or heat) to maintain all work, materials, apparatus, and fixtures free from injury or damage.
- C. Protect excavation, trenches, and building from damage from rain water, spring water, ground water, backing up of drains or sewers, and all other water:
1. For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with requirements of applicable local regulations. Where feasible, use permanent facilities.
 2. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways before discharge.
- D. Comply with governing ordinances relating to weed control and removal.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 5800**PROJECT IDENTIFICATION****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes But is Not Limited To:**

1. Administrative and procedural requirements for Project Identification.

1.2 TEMPORARY PROJECT SIGNAGE**C. Provide a temporary project Identification sign:**

1. Sign may be free-standing or attached to temporary field office or storage shed.
2. No other signs or advertisements are allowed on building site.
3. Sign will be no larger than **4 feet by 8 feet (1 200 mm by 2 450 mm)** and include following information:
 - a. Project Name as shown in Contract Documents.
 - b. Contractor's name.
 - c. Architectural firm name.
4. Owner reserves the right to remove and/or take possession of any project identification sign.

PART 2 - PRODUCTS Not Used**PART 3 - EXECUTION Not Used****END OF SECTION**

SECTION 01 6100**COMMON PRODUCT REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Common Product Requirements.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Provide products that comply with Contract Documents, that are undamaged, and, unless otherwise indicated, 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.
- B. Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on surfaces of products that will be exposed to view in occupied spaces or on building exterior.
1. Locate required product labels and stamps on concealed surface or, where required for observation after installation, on accessible surface that is not conspicuous.
 2. Provide permanent nameplates on items of service-connected or power-operated equipment. Locate on easily accessible surface that is inconspicuous in occupied spaces. Nameplate will contain following information and other essential operating data:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.
- C. Where specifications describe a product or assembly by specifying exact characteristics required, with or without use of brand or trade name, provide product or assembly that provides specified characteristics and otherwise complies with Contract requirements.
- D. Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by manufacturer for application described. General overall performance of product is implied where product is specified for specific application. Manufacturer's recommendations may be contained in published product literature, or by manufacturer's certification of performance.
- E. Where specifications only require compliance with an imposed code, standard, or regulation, select product that complies with standards, codes or regulations specified.
- F. Where Specifications require matching an established Sample, Architect's decision will be final on whether proposed product matches satisfactorily. Where no product available within specified category matches satisfactorily nor complies with other specified requirements, refer to Architect.
- G. Where specified product requirements include phrase ` . . . *as selected from manufacturer's standard colors, patterns, textures* . . . ' or similar phrase, select product and manufacturer that comply with other specified requirements. Architect will select color, pattern, and texture from product line selected.

- H. Refer to individual Specification Sections and Allowance provisions in Division 01 for allowances that control product selection, and for procedures required for processing such selections.
- I. Remove and replace products and materials not specified in Contract Documents but installed in the Work with specified products and materials at no additional cost to Owner and for no increase in Contract time.
- J. Informational Submittals:
 - 1. Sustainable Design Submittals:
 - a. Submit five copies of each required submittal unless otherwise required. Architect will return three copies marked with action taken and with corrections or modifications required.
 - b. Submit electronic files: PDF. Architect will return a PDF copy marked with action taken and with corrections or modifications required.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 6200
PRODUCT OPTIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Product Options.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Product Selection:
1. When option of selecting between two or more products is given, product selected will be compatible with products previously selected, even if previously selected products were also options.
 - a. Regional materials.
- B. Non-Conforming Work:
1. Non-conforming work as covered in Article 12.3 of General Conditions applies, but is not limited, to use of non-specified products or manufacturers.
- C. 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 the Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.
 - b. Approved Products / Manufacturers / Suppliers / Distributors / Fabricators / Installers:
 - 1) Category One:
 - a) Owner has established 'Relationships' that extend beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
 - b) Specification Sections specify Owner Furnished and Owner Installed Manufacturers or Products.
 - c) 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 'Relationships' that contain provisions extending beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
 - b) Specification Sections specify Owner Furnished and Contractor Installed Manufacturers, Suppliers, Distributors or Products.
 - c) 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) Owner has established 'Relationships' that contain provisions extending beyond requirements of this Project. Use these products to preserve advantages that accrue to Owner from those programs. No substitutions or equal products will be allowed on this Project.
 - b) Specification Sections specify Contractor Furnished and Contractor Installed Manufacturers, Suppliers, Distributors, Fabricators or Products.
 - 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 a convenience to Contractor as a 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 by Addendum.
 - 2) Type Two: Use specified products / manufacturers unless approval to use other products and manufacturers has been obtained from Architect 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 shall conform to Contract Document requirements.

PART 2 - PRODUCTS Not Used**PART 3 - EXECUTION Not Used****END OF SECTION**

SECTION 01 6600

PRODUCT DELIVERY, STORAGE, AND HANDLING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes But is Not Limited To:
 - 1. Administrative and procedural requirements for Product Delivery, Storage, and Handling Requirements.

1.2 ADMINISTRATIVE 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.

1.3 DELIVERY AND ACCEPTANCE REQUIREMENTS

- A. Schedule delivery to reduce long-term storage at site and to prevent overcrowding of construction spaces.
- 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.

1.4 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 weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 7300**EXECUTION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for governing Execution of the Work.

1.2 COMMON INSTALLATION PROVISIONS

- A. Manufacturer's Instructions: Comply with Manufacturer's installation instructions and recommendations to extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents. Notify Architect of conflicts between Manufacturer's installation instructions and Contract Document requirements.
- B. Provide attachment and connection devices and methods necessary for securing Work. Secure work true to line and level. Anchor each product securely in place, accurately located, and aligned with other Work. Allow for expansion and building movement.
- C. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain best visual effect. Refer questionable choices to Architect for final decision.
- D. Install each component during weather conditions and Project status that will ensure best possible results. Isolate each part of completed construction from incompatible material as necessary to prevent deterioration.
- E. Coordinate temporary enclosures with required inspections and tests, to reduce necessity of uncovering completed construction for that purpose.
- F. Mounting Heights: Where mounting heights are not shown, install individual components at standard mounting heights recognized within the industry or local codes for that application. Refer questionable mounting height decisions to Architect for final decision.

PART 2 - PRODUCTS Not Used**PART 3 - EXECUTION Not Used****END OF SECTION**

SECTION 01 7400**CLEANING AND WASTE MANAGEMENT****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Administrative and procedural requirements for Cleaning and Waste Management as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 01 1200: Coordination of responsibilities for waste management.
 - 2. Section 01 6400: Waste removal of Owner furnished products.
 - 3. In addition to standards described in this section, comply with all requirements for cleaning-up as described in various other Sections of these Specifications.

1.2 REFERENCES

- A. Definitions:
 - 1. Asphalt Pavement, Brick, and Concrete (ABC) Rubble: Rubble that contains only weathered (cured) asphalt pavement, clay bricks and attached mortar normally used in construction, or concrete that may contain rebar. The rubble shall not be mixed with, or contaminated by, another waster or debris.
 - 2. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
 - 3. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
 - 4. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
 - 5. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
 - 6. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
 - 7. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

PART 2 - PRODUCTS: Not Used**PART 3 - EXECUTION****3.1 PROGRESS CLEANING**

- A. Comply with regulations of authorities having jurisdiction and safety standards for cleaning.
- B. Keep premises broom clean during progress of the Work.
- C. Keep site and adjoining streets reasonably clean. If necessary, sprinkle rubbish and debris with water to suppress dust.
- D. 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.

- E. Clean and maintain completed construction as frequently as necessary throughout construction period. Adjust and lubricate operable components to ensure ability to operate without damaging effects.
- G. Supervise construction activities to ensure that no part of construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.
- H. Before and during application of painting materials, clear area where such work is in progress of debris, rubbish, and building materials that may cause dust. Sweep floors and vacuum as required and take all possible steps to keep area dust free.
- I. Clean exposed surfaces and protect as necessary to avoid damage and deterioration.
- J. Place extra materials of value remaining after completion of associated work have become Owner's property as directed by Owner or Architect.
- K. Construction Waste Management And Disposal:
 - 1. Remove waste materials and rubbish caused by employees, Subcontractors, and contractors under separate contract with Owner and dispose of legally. Remove unsuitable or damaged materials and debris from building and from property.
 - a. Provide adequate waste receptacles and dispose of materials when full.
 - b. Properly store volatile waste and remove daily.
 - c. Do not deposit waste into storm drains, sanitary sewers, streams, or waterways. Do not discharge volatile, harmful, or dangerous materials into drainage systems.
 - 2. Do not burn waste materials or build fires on site. Do not bury debris or excess materials on Owner's property.

3.2 FINAL CLEANING

- A. Immediately before Substantial Completion, thoroughly clean building and area where The Work was performed. Remove all rubbish from under and about building, landscaped areas and parking lot and leave building and Project Site ready for occupancy by Owner.
- B. Comply with individual manufacturer's cleaning instructions.
- C. Clean each surface or unit to condition expected in normal, commercial building cleaning and maintenance program, including but not limited to:
 - 1. Interior Cleaning:
 - a. Clean inside glazing, exercising care not to scratch glass.
 - b. Remove marks, stains, fingerprints and dirt.
 - c. Clean and polish woodwork and finish hardware.
 - d. Remove labels that are not permanent labels.
 - e. Clean plumbing fixtures and tile work. Remove spots, soil or paint.
 - f. Clean surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean light fixtures and lamps.
 - g. Clean other fixtures and equipment and remove stains, paint, dirt, and dust.
 - h. Remove temporary floor protection and clean floors.
 - 2. Exterior Cleaning:
 - a. Clean outside glazing, exercising care not to scratch glass.
 - b. Remove marks, stains, and dirt from exterior surfaces.
 - c. Clean and polish finish hardware.
 - d. Remove temporary protection systems.
 - e. Clean dirt, mud, and other foreign material from paving, sidewalks, and gutters.
 - f. Clean drop inlets, through-curb drains, and other drainage structures.
 - g. Remove trash, debris, and foreign material from landscaped areas.

END OF SECTION

SECTION 01 7700
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes But is Not Limited To:
1. Administrative and procedural requirements for Closeout Procedures.

1.2 GENERAL

- A. 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.
- B. 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.
- C. Date of Substantial Completion shall not occur until completion of construction work, unless agreed to by Architect and included on Certificate of Substantial Completion.

1.3 PRELIMINARY CLOSEOUT REVIEW

- A. 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.
- B. 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.
- C. Architect and his appropriate consultants, together with Contractor and mechanical, plumbing, fire protection, and electrical sub-contractors shall conduct a space by space and exterior inspection to review materials and workmanship and to demonstrate that systems and equipment are operational.
1. Punch list of items requiring completion and correction will be created.
 2. Time frame for completion of punch list items will be established, and date for Substantial Completion Inspection shall be set.

1.4 SUBSTANTIAL COMPLETION INSPECTION

- A. 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.
- B. 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.
- C. 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:
1. Date of Substantial Completion.

2. Punch List Work not yet completed, including seasonal and long lead items.
 3. Amount to be withheld for completion of Punch List Work.
 4. Time period for completion of Punch List Work.
 5. 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.
- D. 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.

1.5 FINAL ACCEPTANCE MEETING

- A. 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.
- B. Owner, Architect and Contractor execute Owner's Project Closeout - Final Acceptance form, and verify:
1. 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.
 2. Owner's maintenance personnel have been instructed on all system operation and maintenance as required by the Contract Documents.
 3. Final cleaning requirements have been completed.
- C. 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.
- D. When Owner and Architect confirm that The Work is satisfactorily completed, Architect will authorize final payment.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 01 7800**CLOSEOUT SUBMITTALS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes But is Not Limited To:
 - 1. Administrative and procedural requirements for Closeout Submittals.
- B. Related Requirements:
 - 1. Section 01 3300: 'Submittal Procedures' for administrative and procedural requirements for submittal procedures.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Project Record Documents:
 - 1. Do not use record documents for construction purposes:
 - a. Protect from deterioration and loss in secure, fire-resistive location.
 - b. Provide access to record documents for Architect's reference during normal working hours.
 - 2. Maintain clean, undamaged set of Drawings:
 - a. Mark set to show actual installation where installation varies from the Work as originally shown.
 - b. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
 - c. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
 - d. Mark new information that is important to Owner, but was not shown on Drawings.
 - e. Note related Change Order numbers where applicable.
- B. As Built Record Drawings:
 - 1. As required in agreement with the Owner:
 - a. Architect will provide two full-size sets of prints of the As Built Record Drawings to the 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.
 - b. Architect will submit following:
 - 1) Updated AutoCAD as built record drawing files with associated plot style tables or Revit as built record model files, as specified by Owner.
 - 2) Revit Model O&M lifecycle requirements to be tracked by Facility Manager.

1.3 CLOSEOUT SUBMITTALS

- A. Operations And Maintenance Manual:
 - 1. General:
 - a. Include closeout submittal documentation as required by Contract Documentation.
 - b. Include workmanship bonds, final certifications, equipment check-out sheets, and similar documents.
 - c. Releases enabling Owner unrestricted use of The Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

- d. Include Project photographs, damage or settlement survey, and similar record information required by Contract Documents.
- e. Submittal Format:
 - 1) Digital copies unless otherwise noted, required for each individual specification section that include 'Closeout Submittals'.
 - 2) Include only closeout submittals as defined in individual specification section as required in Contract Documents.
- 2. Project Manual:
 - a. 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:
 - a. Digital format only.
- 4. Operations and Maintenance Data:
 - a. Digital format only:
 - 1) Cleaning instructions.
 - 2) Maintenance instructions.
 - 3) Operations instructions.
 - 4) Equipment list.
 - 5) Parts list.
- 5. Warranty Documentation:
 - a. Digital format of final, executed warranties.
- 6. Record Documentation:
 - a. Digital format only.
 - 1) Certifications.
 - 2) Color and pattern selections.
 - 3) Design Data.
 - 4) Geotechnical Evaluation Reports (soils reports).
 - 5) Manufacture Reports.
 - 6) Manufacturer's literature or cut sheets.
 - 7) Shop Drawings.
 - 8) Source Quality Control.
 - 9) Special Procedures.
 - 10) Testing and Inspection Agency Reports.
 - 11) Testing and Inspection Reports.
- 7. Software:
 - a. Audio and Video System software, programming and set-files.
- 8. Irrigation Plan.
 - a. Laminated and un-laminated reduced sized hard copies.
- 9. Landscape Management Plan (LMP):
 - a. Irrigation Section:
 - 1) Submittal Format: Digital format and hard copy of each.
 - 2) Documentation required by sections under 32 8000 Heading: 'Irrigation'.
 - b. Landscaping Section:
 - 1) Submittal Format: Digital format and hard copy of each.
 - 2) Documentation required by sections under 32 9000 Heading: 'Planting'.

B. Revit Model O&M Requirements:

- 1. Architect to include all information for each instance that occurs from below list within associated family in Revit model (ie. serial numbers, warranty information, manufacturer, etc):
 - a. Revit Model Items:

Item	Inventory Name	Categories
230	Elevator, Passenger	Building Equipment

277	Escalator	Building Equipment
231	Wheelchair Lift	Building Equipment
735	Internet Connection Equipment	Computer Equipment
535	Generator, Fixed	Electrical Distribution & Fixtures
1058	UPS System	Electrical Distribution & Fixtures
14	Floor, Carpet	Floors
213	Air Handler, With Coils	HVAC Distribution System
212	Air Handler, Without Coils	HVAC Distribution System
199	Boiler, Hot Water	HVAC Distribution System
200	Boiler, Steam	HVAC Distribution System
456	Boiler, Steam, Power Generating	HVAC Distribution System
215	Chiller, Water	HVAC Distribution System
641	Coils, Evaporator (A Coil)	HVAC Distribution System
214	Condensing Unit	HVAC Distribution System
217	Cooler, Evaporative (Swamp)	HVAC Distribution System
216	Cooling Tower	HVAC Distribution System
622	Dehumidifier System	HVAC Distribution System
209	Fan Coil Unit	HVAC Distribution System
202	Furnace, Duct	HVAC Distribution System
201	Furnace, Forced Air	HVAC Distribution System
208	Heat Pump	HVAC Distribution System
207	Heat Pump, Mini Split, Exterior	HVAC Distribution System
206	Heat Pump, Mini Split, Interior	HVAC Distribution System
205	Heat Pump, Room, Thru Wall	HVAC Distribution System
448	Heater, Radiant Tube	HVAC Distribution System
253	Heater, Wall Mounted, Gas	HVAC Distribution System
621	Humidifier System	HVAC Distribution System
204	HVAC Package Unit (Roof Top)	HVAC Distribution System
1056	Outside Air Tempering Unit	HVAC Distribution System
295	Chemical, Treatment & Filtration System	HVAC Distribution System
1050	Cooling Tower Water Filter	HVAC Distribution System
501	Tank, Motor Fuel, Underground	HVAC Distribution System
497	Tank, Water Storage	HVAC Distribution System
73	Organ Pipe	Musical Instruments
962	Heater, Unit Steam/Hot Water	Plumbing Distribution & Fixtures
988	Water Filter System, Water Main	Plumbing Distribution & Fixtures
779	Backflow Preventer	Plumbing Distribution & Fixtures
138	Tank, Fuel Storage, Above Ground	Plumbing Distribution & Fixtures
137	Tank, Fuel Storage, Underground	Plumbing Distribution & Fixtures
502	Tank, Motor Fuel, Above Ground	Plumbing Distribution & Fixtures
620	Water Cistern and Associated Filtration	Plumbing Distribution & Fixtures
136	Water Well System	Plumbing Distribution & Fixtures
151	Roofing, Asphalt Shingles	Roofing
152-A	Roofing, Metal Shingles: Stone Coated	Roofing
152-B	Roofing, Metal Shingles: Aluminum	Roofing
152-C	Roofing, Metal Shingles: Copper	Roofing
154	Roofing, Concrete Roof Tiles	Roofing
155	Roofing, Standing Seam Sheet Metal	Roofing
156	Roofing, Built Up Asphalt or Bitumen Membrane	Roofing
157-A	Roofing, Single Ply Membrane (EPDM)	Roofing
157-B	Roofing, Single Ply Membrane (PVC)	Roofing
157-C	Roofing, Single Ply Membrane (TPO)	Roofing
158	Roofing, Vegetated Protected Membrane	Roofing
281	Satellite Receiver (IRD)	Sound, Satellite, Security, & Fire Systems

717	Glycol System	Sound, Satellite, Security, & Fire Systems
676	Fire Alarm System, Active	Sound, Satellite, Security, & Fire Systems
1033	Sign, Exit Illuminated Tritium (nuclear)	Sound, Satellite, Security, & Fire Systems

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Submit item(s) required by Section 01 3300 'Submittal Procedures' and as defined in individual specification section if required in Contract Documents. Items may be provided at completion of Work or with Closeout Submittals.

1.5 WARRANTIES

- A. 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.
- B. Delivery of guarantees and warranties will not relieve Contractor from obligations assumed under other provisions of Contract Documents.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION

SECTION 02 4116
STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Demolition and removal of existing structures as described in Contract Documents.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 PREPARATION

- A. Removal:
 - 1. Arrange for removal of wires running to and on property.
 - 2. Remove pipes and sewers in accordance with instructions of Owner.

3.2 PERFORMANCE

- A. Protect and maintain conduits, drains, sewers, pipes, and wires that are to remain on property.
- B. Execute work in an orderly and careful manner, with due consideration for neighbors and the public.
- C. Promptly remove materials, rubbish, and debris from building and from site.

END OF SECTION

SECTION 03 1113
STRUCTURAL CAST-IN-PLACE CONCRETE FORMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 1. Design, construction, and safety of formwork.
 2. Furnish and install required formwork ready for placing of concrete.
 3. Strip and dispose of formwork.

- B. Related Requirements:
 1. Section 03 3111: 'Cast-In-Place Structural Concrete' for:
 - a. Tolerances for placing structural concrete.
 - b. Pre-installation conference held jointly with other concrete related sections.

1.2 REFERENCES

- A. Reference Standards:
 1. American Concrete Institute:
 - a. ACI 318-14, 'Building Code Requirements for Structural Concrete and Commentary'.

1.3 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 Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
 - 1) Review requirements and frequency of testing and inspections.
- B. Scheduling:
 1. Notify Testing Agency and Architect as directed in Section 03 3111.

1.4 SUBMITTALS

- A. Informational Submittals:
 1. Manufacturer Instructions:
 - a. Printed application instructions for form release agents.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Forms: Wood, metal, or plastic as arranged by Contractor:
 1. Forming material shall be compatible with specified form release agents and with finish requirements for concrete to be left exposed or to receive a smooth rubbed finish.

2.2 ACCESSORIES

- A. Form Release Agents:
 1. Unexposed Surfaces Only: Contractor's option.
- B. Expansion / Contraction Joints:
 1. 1/2 inch thick.
 2. Manufactured commercial fiber type:
 - a. Meet requirements of ASTM D1751.
 - b. Type Two Acceptable Products:
 - 1) Conflex by Knight-Celotex, Northfield, IL www.aknightcompany.com.
 - 2) Sealtight by W R Meadows Inc, Hampshire, IL www.wrmeadows.com.
 - 3) Equal as approved by Architect before installation. See Section 01 6200.
 3. Recycled Vinyl:
 - a. Light gray color.
 - b. Type Two Acceptable Products:
 - 1) Proflex by Oscoda Plastics Inc, Oscoda, MI www.oscodaplastics.com.
 - 2) Equal as approved by Architect before Installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Forms:
 1. Assemble forms so forms are sufficiently tight to prevent leakage.
 2. Properly brace and tie forms.
 3. Make proper form adjustments before, during, and after concreting.
 4. Use new forms, or used forms that have been cleaned of loose concrete and other debris from previous concreting and repaired to proper condition. Use APA Plyform B-B Class I, or APA HDO Plyform B-B Class I, on exposed to view concrete that do not receive a smooth rubbed finish.
- B. Accessories:

1. General:
 - a. Provide for installation of inserts, templates, fastening devices, sleeves, and other accessories to be set in concrete before placing.
 - b. Position anchor bolts for hold-down anchors and columns and securely tie in place before placing concrete.
 2. Form Release / Finish Agents:
 - a. Film thickness shall be no thicker than as recommended by Manufacturer.
 - b. Allow no release / finish agent on reinforcing steel or footings.
 3. Expansion Joints:
 - a. Install at joints between floor slab and foundation wall where shown on Drawings.
- C. Form Removal (Slab on Grade):
1. Removal of forms can usually be accomplished in twelve (12) to twenty-four (24) hours.
 2. If temperature is below 50 deg F or if concrete (stairs, beams, etc) depends on forms for structural support, leave forms intact for sufficient period for concrete to reach adequate strength.
 3. For exposed to view surfaces that receive a smooth rubbed finish, remove forms while concrete is still "green".
 4. Metal bars or prys should not be used. Use wood wedges, tapping gradually when necessary.

3.2 FIELD QUALITY CONTROL

- A. Field Tests and Inspections:
1. Concrete Formwork:
 - a. Inspections are not required and will be performed at discretion of Architect.

END OF SECTION

SECTION 03 1511

CONCRETE ANCHORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Products Furnished But Not Installed Under This Section:
 1. Cast-in place and post-installed concrete anchors including:
 - a. Adhesive anchors for concrete.
 - b. Expansion anchors for concrete.
 - c. Screw anchors for concrete.
 - d. Concrete anchors and inserts not specified elsewhere.
 2. Installer responsible when inspection results of concrete anchors require corrective actions.

- B. Related Requirements:
 1. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
 2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
 3. Section 03 3111: 'Cast-In-Place Structural Concrete' for installation and inspection of cast-in-place anchors.
 4. Section 06 1100: 'Wood Framing' for installation of drilled in anchors.

1.2 REFERENCES

- A. Reference Standards:
 - 1. American Concrete Institute:
 - a. ACI 355.4-11, 'Qualification of Post-Installed Adhesive Anchors in Concrete and Commentary'.
 - b. ACI 548.12-12, 'Specification for Bonding Hardened Concrete and Steel to Hardened Concrete with an Epoxy Adhesive'.
 - 2. American National Standards Institute / American Welding Society (Following are specifically referenced for Structural Steel testing):
 - a. ANSI/AWS D1.1/D1.1M:2015, 'Structural Welding Code - Steel'.
 - 3. ASTM International:
 - a. ASTM A307-14, 'Standard Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength'.
 - b. ASTM A563-15, 'Standard Specification for Carbon and Alloy Steel Nuts'.
 - c. ASTM A706/A706M-16, 'Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement'.
 - d. ASTM F1554-18, 'Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength'.
 - e. ASTM F3125/F3125-15a, 'Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions'.
 - 4. International Code Council (IBC) (2018 or most recent edition adopted by AHJ):
 - a. IBC Chapter 17, 'Structural Tests and Special Inspections'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Scheduling:
 - 1. Inspection shall be performed according IBC requirements.
 - 2. Notify Testing Agency and Architect one week before installing anchors so inspection may be scheduled.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's product literature for each item.
- B. Informational Submittals:
 - 1. Certificates:
 - a. Adhesive Anchors:
 - 1) Installer to provide current ACI/CRSI certification to Architect prior to installation of anchors.
 - 2. Test And Evaluation Reports:
 - a. Provide ESR for products used indicating conformance with current applicable ESR Acceptance Criteria.
 - 3. Manufacturer's Instructions:
 - a. Manufacturer's published installation recommendations for each item.
 - 4. Qualification Statements:
 - a. All concrete anchors except Adhesive Anchors:
 - 1) Installer to provide record of installer installation training showing dates and those trained for all installed products when required when by Architect.
- C. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Record Documentation:

- 1) Testing and Inspection Reports:
 - a) Testing Agency inspection reports of all inspected anchors.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 1. Manufacturer:
 - a. Having sufficient capacity to produce and deliver required materials without causing delay in work.
 2. Installer:
 - a. Acceptable to Manufacturer, experienced in performing work of this section and has specialized in installation of work similar to that required for this project.
 - b. Adhesive Anchors:
 - 1) Adhesive Anchors installed in horizontal to vertical overhead orientation to support sustained tension loads shall be installed by Certified Adhesive Anchor Installer (AAI) as certified through ACI/CRSI:
 - a) Refer to most current version of ACI 318 for certification requirements.
 - b) Proof of current certification shall be submitted to the Architect for approval prior to commencement of installation.
 - c. All other Concrete Anchors:
 - 1) Arrange for manufacturer's field representative to provide installation training for all products to be used, prior to commencement of work:
 - a) Provide installation training when required by Architect.- B. Field Inspection:
 1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
 2. Owner will provide Inspection for post-installed concrete anchors:
 - a. Owner will employ testing agency to perform inspection for post-installed concrete anchors as specified in Field Quality Control in Part 3 of this specification:
 - 1) 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 and perform contractor testing and inspection.
 - 2) See Section 01 1200: 'Multiple Contract Summary'.

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. Store materials protected from exposure to harmful weather conditions and as directed by Manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete Anchors:
 1. General:
 - a. Use hot-dipped galvanized or stainless steel with matching nuts and washers in exterior and moist interior applications unless indicated otherwise on Contract Drawings.

- b. Install hot-dipped or stainless-steel anchor bolts to attach wood sill plates to foundation with 1/4 inch by 3-inch x 3-inch minimum adjustable plate washers and standard cut washers between wood sill plates and nuts.
- c. Nut: Conform to requirements of ASTM A563, Grade A, Hex.
- d. Conform to requirements of ASTM F3125/F3125 for chemical, physical and mechanical requirements for quenched and tempered bolts manufactured from steel and alloy steel.
2. Threaded rod for adhesive anchors and cast-in anchors:
 - a. Conform to requirements of ASTM A307, Grade A or ASTM F1554 Grade 36 unless indicated otherwise on Contract Drawings.
3. Cast-In-Place Anchor Bolts:
 - a. J-Bolts:
 - 1) Non-headed type threaded 2 inches minimum conforming to requirements of ASTM F1554, Grade A.
 - 2) Anchor hook to project 2 inches minimum including bolt diameter.
 - b. Headed Bolts:
 - 1) Headed type threaded 2 inches minimum conforming to requirements of ASTM F1554, Grade A.
4. Reinforcing Bars:
 - a. Composed of deformed carbon steel meeting requirements of ASTM A615/A615M, Grade 60.
5. Adhesive Anchors:
 - a. Products shall have current ESR conforming to current ICC Acceptance Criteria AC308 for concrete.
 - b. Rod diameter and embedment length as indicated on Contract Drawings.
 - c. Type Two Acceptable Products:
 - 1) HIT-RE 500V3 with SafeSet Epoxy Adhesive by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
 - 2) Pure 110+ by Powers Fasteners Inc., Brewster NY www.powers.com.
 - 3) SET-XP Epoxy by Simpson Strong-Tie Co., Pleasanton, CA www.simpsonanchors.com.
 - 4) Equal as approved by Architect before installation. See Section 01 6200.
6. Expansion Anchors:
 - a. Products shall have current ESR conforming to current ICC Acceptance Criteria AC193 for concrete.
 - b. Type Two Acceptable Products:
 - 1) KWIK Bolt TZ Expansion Anchor by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
 - 2) Power-Stud +SD2 by Powers Fasteners Inc., Brewster NY www.powers.com.
 - 3) Strong-Bolt by Simpson Strong-Tie Co., Pleasanton, CA www.simpsonanchors.com.
 - 4) Equal as approved by Architect before installation. See Section 01 6200.
7. Screw Anchors:
 - a. Provide anchors with length identification markings conforming to ICC Acceptance Criteria AC 193 for concrete.
 - b. Type Two Acceptable Products:
 - 1) KWIK HUS-EZ by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
 - 2) Wedge-Bolt+ by Powers Fasteners Inc., Brewster NY www.powers.com.
 - 3) Titen HD by Simpson Strong Tie Co, Pleasanton, CA www.simpsonanchors.com.
 - 4) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 1. Embedded Items:

- a. Identify position of reinforcing steel and other embedded items before drilling holes for anchors:
 - 1) Exercise care in coring or drilling to avoid damaging existing reinforcing or embedded items.
 - 2) Take precautions as necessary to avoid damaging pre-stressing tendons, electrical and telecommunications conduit, and gas lines.
 - b. Notify Engineer if reinforcing steel or other embedded items are encountered during drilling.
2. Base Material Strength:
- a. Unless otherwise specified, do not drill holes in concrete until:
 - 1) Concrete has minimum age of 21 days at time of anchor installation.
 - 2) Concrete has achieved full design strength for load achievement.

3.2 PREPARATION

A. Surface Preparation:

1. Clean surfaces prior to installation.
2. Prepare surface in accordance with Manufacturer's written recommendations.

3.3 INSTALLATION

A. Post-Installed Anchors:

1. General:
 - a. Drill holes with rotary impact hammer drills using carbide-tipped bits.
 - b. Unless otherwise shown on Drawings, drill holes perpendicular to concrete surface.
 - c. Perform anchor installation in accordance with Manufacturer's published instructions.
2. Adhesive Anchors:
 - a. Clean holes in accordance with Manufacturer's published instructions before installation of adhesive:
 - 1) Follow Manufacturer's recommendations to ensure proper mixing of adhesive components.
 - b. Adhesive:
 - 1) Inject adhesive into holes proceeding from bottom of hole and progressing toward surface so as to avoid introduction of air pockets into adhesive.
 - 2) Inject sufficient adhesive into hole to ensure that annular gap is filled to surface.
 - 3) Remove excess adhesive from surface and threads of anchor as necessary.
 - c. Shim anchors with suitable device to center anchor in hole. Do not disturb or load anchors before Manufacturer's specified cure time has elapsed.
 - d. Temperature:
 - 1) Observe Manufacturer's recommendations with respect to installation temperatures for adhesive anchors.
 - 2) Base material temperatures must be maintained above minimum temperatures allowed by Manufacturer for full required epoxy cure time.
3. Expansion Anchors:
 - a. Protect threads from damage during anchor installation and prior to use.
 - b. Set anchors to Manufacturer's recommended torque, using a torque wrench. Following attainment of ten (10) percent of specified torque, one hundred (100) percent of specified torque shall be reached within 7 or fewer complete turns of nut. If specified torque is not achieved within required number of turns, remove and replace anchor, unless otherwise directed by Architect.
4. Screw Anchors:
 - a. Protect threads from damage during anchor installation and prior to use.
 - b. Set anchor flush, collared.
 - c. Do not exceed Manufacturer's maximum allowed torque when seating anchor.

3.4 FIELD QUALITY CONTROL

A. Field And Inspections:

1. Civil and structural field inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing and Inspection Services':
 - a. Quality Control is sole responsibility of Contractor.
 - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
 - a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
 2. Expansion Anchors / Adhesive Anchors / Screw Anchors:
 - a. Certified Inspector from Testing Agency shall verify procedures used for installation of all concrete anchors and monitor their installation for compliance with Manufacturer's requirements.
 - b. Inspections:
 - 1) Inspections shall include required verification and inspection of anchors as referenced in IBC Table 1704.4 and in accordance with most current version of ACI 318 or ACI 318M and applicable ASTM material standards that:
 - a) The correct rod/anchor is used; size and type.
 - b) The correct hole size is used and prepared per Manufacturer's instructions.
 - c) That climactic conditions, and concrete temperature, allow for the anchors' installation and use.
 - d) Proper hole cleaning equipment, per Manufacturer's instructions, is used.
 - e) Torque applied to anchors does not exceed Manufacturer's allowable limits.
 - f) Torque applied to anchors is per Manufacturer's instructions.

B. Non-Conforming Work:

1. Contractor is to immediately notify Architect of incorrectly placed, misplaced or malfunctioning anchors and request instructions for corrective actions.

3.5 CLEANING

A. Waste Management:

1. Disposal of rubbish, debris, and packaging materials.

3.6 PROTECTION

A. General:

1. Protect installed products from damage during construction.

END OF SECTION

SECTION 03 2100

REINFORCEMENT BARS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install concrete reinforcement bars as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
 - 2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
 - 3. Section 03 1113: Structural Cast-In-Place Concrete Forming'.
 - 4. Section 03 2116: 'Epoxy-Coated Reinforcement Bars'.
 - 5. Section 03 3111: 'Cast-In-Place Structural Concrete' for:
 - a. Reinforcement installed in concrete.
 - b. Pre-installation conference held jointly with other concrete related sections.

1.2 REFERENCES

- A. Association Publications:
 - 1. American Concrete Institute:
 - a. ACI 'Detailing Manual' (2004 Edition).
 - 2. Concrete Reinforcing Steel Institute (CRSI):
 - a. CRSI, 'Manual of Standard Practice' (2009 28th Edition).

- B. Reference Standards:
 - 1. American Concrete Institute:
 - a. ACI 117-10: 'Specifications for Tolerances for Concrete Construction and Materials and Commentary' (Reapproved 2015).
 - b. ACI 318-14, 'Building Code Requirements for Structural Concrete and Commentary'.
 - 2. ASTM International (Following are specifically referenced for reinforcement bars testing):
 - a. ASTM A615/A615M-18, 'Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
 - 1. Participate in pre-installation conference as specified in Section 03 3111.
 - 2. In addition to agenda items specified in Section 01 3100, and Section 03 3111, review following:
 - a. Installation scheduling and reinforcing placement.
 - b. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
 - 1) Review requirements and frequency of testing and inspections.
- B. Scheduling:
 - 1. Notify Testing Agency and Architect as directed in Section 03 3053 and Section 03 3111.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings:
 - a. Reinforcing placement drawings.
- B. Informational Submittals:
 - 1. Certificates:
 - a. Mill certificates for mill tests for reinforcing in accordance with ASTM A615/A615M.
- C. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Record Documentation:
 - 1) Testing and Inspection Reports:
 - a) Testing Agency Inspection Reports of reinforcement bars.

1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Comply with provisions of following codes and standards except where more stringent requirements are shown or specified:
 - a. American Concrete Institute:
 - 1) ACI 318, 'Building Code Requirements for Structural Concrete and Commentary'.
 - b. Concrete Reinforcing Steel Institute:
 - 1) CRSI, 'Manual of Standard Practice'.
- B. Qualifications:
 - 1. Throughout progress of the work of this section, provide at least one (1) person who shall be thoroughly familiar with Construction Documents and other applicable specified requirements, completely trained and experienced in necessary skills, and who shall be present at site and shall direct all work performed under this Section:
 - a. In actual installation of the work of this Section, use adequate numbers of skilled workmen to ensure installation in strict accordance with approved design.

- b. In acceptance or rejection of work performed under this Section, no allowance will be made for lack of skill on part of workmen.
- C. Testing And Inspection:
 1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
 2. Owner will provide Testing and Inspection for inspection of reinforcement bars:
 - a. Owner will employ testing agencies to perform testing and inspection for inspection of reinforcement bars as specified in Field Quality Control in Part 3 of this specification:
 - 1) 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 and perform contractor testing and inspection.
 - 2) See Section 01 1200: 'Multiple Contract Summary'.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 1. Deliver bars separated by size and tagged with manufacturer's heat or test identification number.
 2. Reinforcement bars shall be free of heavy rust scales and flakes, or other coating at time of delivery and placing.
- B. Storage And Handling Requirements:
 1. Properly protect rebar on site after delivery.

PART 2 - PRODUCTS

2.1 MATERIAL

- A. Reinforcement Bars:
 1. Bars shall have grade identification marks and conform to ASTM A615/A615M:
 - a. Grade 60 minimum, except dowels that are to be field bent, Grade 40 minimum.
 2. Bars shall be deformed type.
 3. Bars shall be free of heavy rust scales and flakes, or other bond-reducing coatings.

2.2 ACCESSORIES

- A. Bar Supports:
 1. Concrete masonry units or bricks are not acceptable.
 2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).
 3. Type Two Acceptable Products:
 - a. Concrete 'dobies' or blocks wired to reinforcing.
 - b. Manufactured chairs with 4 sq inch bearing surface on sub-grade, or other feature to prevent chair from being pushed into sub-grade or damaging vapor retarder under slabs on grade.
 - c. Equals as approved by Architect before installation. See Section 01 6200.

2.3 FABRICATION

- A. Fabricate reinforcement bars according to the Concrete Reinforcing Steel Institute (CRSI) 'Manual of Standard Practice' and details on Contract Documents.

PART 3 - EXECUTION**3.1 INSTALLATION****A. General:**

1. Avoid cutting or puncturing vapor retarder during reinforcement placement and concrete operations.
2. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
3. Blowtorch shall not be used to facilitate field cutting or bending or any other reinforcing work.
4. Reinforcement shall not be bent after partially embedded in hardened concrete.

B. Placing Reinforcement:

1. Comply with Concrete Reinforcing Steel Institute CRSI 'Manual of Standard Practice' recommended practice for 'Placing Reinforcing Bars' for details and methods of reinforcement placement and supports. and as herein specified.
2. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations:
 - a. Locate and support reinforcing by chairs, runners, bolsters, bar supports, spacers, or hangers, as required as recommended by 'ACI Detailing Manual, except slab on grade work.
 - b. Support bars in slabs on grade and footings with specified bar supports around perimeter and at 4-1/2 feet on center each way maximum to maintain specified concrete cover.
 - c. Install bar supports at bar intersections.
3. Bend bars cold.
4. Dowel vertical reinforcement for formed concrete columns or walls out of footing or structure below with rebar of same size and spacing required above.
5. Securely anchor and tie reinforcement bars and dowels before placing concrete. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

C. Splices:

1. Non-Concrete Structural System:
 - a. Avoid splices of reinforcement bars at points of maximum stress. Lap bars 60 bar diameters minimum unless dimensioned otherwise on Drawings. Run reinforcement bars continuous through cold joints.
2. Concrete Structural System:
 - a. In beams, slabs, and walls, avoid splices of reinforcement bars at points of maximum stress.
 - b. Lap bars as follows:
 - 1) Compression Splices: 45 bar diameters minimum.
 - 2) Tension Splices: In accordance with ACI 318 Class B requirements.
 - 3) No splice shall be less than 20 inches.
 - 4) For epoxy coated rebar, increase lap-splice lengths by 1.5 times those listed above.
 - c. In columns, splices in vertical bars are permitted only at floor levels or points of lateral support and shall consist of 45 bar diameter laps.
 - d. Run reinforcement bars continuous through cold joints.

D. Tolerances:

1. Provide following minimum concrete cover for reinforcement as per ACI 318 or ACI 318M. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations:
 - a. Concrete cast against and permanently exposed to earth:
 - 1) Interior Slabs on Grade: 1 inch clear from top of slab at 4 inch slabs, 2 inches clear at 6 inch slabs.
 - 2) Sections other than Slabs: 3 inches.
 - b. Concrete Exposed to Earth or Weather:
 - 1) No. 6 and Larger Bars: 2 inches.
 - 2) No. 5 and Smaller Bars, W31 and D31 Wire: 1-1/2 inches.
 - c. Concrete not exposed to weather or in contact with ground:
 - 1) Slabs, walls, and joists:
 - a) No. 14 and No. 18 bars: 1-1/2 inches.

- b) No. 11 bars and smaller: 3/4 inches.
- 2) Beams and Columns:
 - a) Primary reinforcement, ties, stirrups and spirals: 1-1/2 inches.
- 3) Shells, folded plate members:
 - a) No. 6 bars and larger: 3/4 inch.
 - b) No. 5 bar, W31 or D31 wire, and smaller: 1/2 inch.

3.2 FIELD QUALITY CONTROL

A. Field Tests and Inspections:

- 1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
 - a. Quality Control is sole responsibility of Contractor.
 - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
 - a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
- 2. Reinforcement Bars:
 - a. Testing Agency shall provide inspection for Reinforcement Bars. See Section 03 3111 for Testing and Inspection requirements.

END OF SECTION

SECTION 03 2116

EPOXY - COATED REINFORCEMENT STEEL BARS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install epoxy coated reinforcement steel bars as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.
 - 2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
 - 3. Section 03 1113: 'Structural Cast-In-Place Concrete Forming'.
 - 4. Section 03 2100: 'Reinforcement Bars'.
 - 5. Section 03 3111: 'Cast-In-Place Structural Concrete' for:
 - a. Reinforcement installed in concrete.
 - b. Pre-installation conference held jointly with other concrete related sections.

1.2 REFERENCES

- A. Association Publications:
 - 1. American Concrete Institute:
 - a. ACI 'Detailing Manual' (2004 Edition).
 - 2. Concrete Reinforcing Steel Institute (CRSI):
 - a. CRSI, 'Manual of Standard Practice' (2009 28th Edition).
- B. Reference Standards:
 - 1. American Concrete Institute:

- a. ACI 117-10: 'Specifications for Tolerances for Concrete Construction and Materials and Commentary' (Reapproved 2015).
- b. ACI 318-14, 'Building Code Requirements for Structural Concrete and Commentary'.
2. ASTM International (Following are specifically referenced for reinforcement bars testing):
 - a. ASTM A615/A615M-18, 'Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement'.
 - b. ASTM A775/A775M-17, 'Standard Specification for Epoxy-Coated Reinforcing Bars'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conferences:
 1. Participate in pre-installation conference as specified in Section 03 3111.
 2. In addition to agenda items specified in Section 01 3100, and Section 03 3111, review following:
 - a. Installation scheduling and reinforcing placement.
 - b. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
 - 1) Review requirements and frequency of testing and inspections.
- B. Scheduling:
 1. Notify Testing Agency and Architect as directed in Section 03 3111.

1.4 SUBMITTALS

- A. Action Submittals:
 1. Shop Drawings:
 - a. Reinforcing placement drawings.
- B. Informational Submittals:
 1. Certificates:
 - a. Mill certificates certifying mill tests for reinforcing in accordance with ASTM A775/A775M.
 - 1) Mill test is to be approved before fabrication begins.
- C. Closeout Submittals:
 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Record Documentation:
 - 1) Testing and Inspection Reports:
 - a) Testing Agency Inspection Reports of reinforcement bars.

1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 1. Comply with provisions of following codes and standards except where more stringent requirements are shown or specified:
 - a. American Concrete Institute:
 - 1) ACI 318, 'Building Code Requirements for Structural Concrete and Commentary'.
 - b. Concrete Reinforcing Steel Institute:
 - 1) CRSI, 'Manual of Standard Practice'.
- B. Qualifications:
 1. Throughout progress of the work of this section, provide at least one (1) person who shall be thoroughly familiar with Construction Documents and other applicable specified requirements, completely trained and experienced in necessary skills, and who shall be present at site and shall direct all work performed under this Section:
 - a. In actual installation of the work of this Section, use adequate numbers of skilled workmen to ensure installation in strict accordance with approved design.

- b. In acceptance or rejection of work performed under this Section, no allowance will be made for lack of skill on part of workmen.
- C. Testing and Inspection:
 1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
 2. Owner will provide Testing and Inspection for reinforcement bars:
 - a. Owner will employ testing agencies to perform testing and inspection for reinforcement bars as specified in Field Quality Control in Part 3 of this specification:
 - 1) 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 and perform contractor testing and inspection.
 - 2) See Section 01 1200: 'Multiple Contract Summary'.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 1. Deliver bars separated by size and tagged with manufacturer's heat or test identification number.
 2. Reinforcement steel bars shall be free of abrasions or other penetrations of epoxy-coating at time of delivery and placing.
- B. Storage And Handling Requirements:
 1. Properly protect rebar on site after delivery.

PART 2 - PRODUCTS

2.1 MATERIAL

- A. Epoxy Coated Reinforcement Steel Bars:
 1. Bars shall have grade identification marks and conform to ASTM A615/A615M with coating conforming to ASTM A775/A775M and comply with requirements of ACI 318.21.2.5:
 - a. Bar supports shall be completely coated with epoxy or vinyl, compatible with both concrete and epoxy coating on bars. Coating shall be at least 1/8 inch thick at tips.
 - b. Tie wire shall be nylon coated.
 2. Actual yield strength based on mill tests does not exceed specified yield strength by more than 18,000 psi and Ratio of actual ultimate stress (at breaking point) to actual tensile yield stress shall not be less than 1.25.
 - a. Grade 60 minimum, except dowels that are to be field bent, Grade 40 minimum.
 3. Bars shall be deformed type.
 4. Bars shall be free of heavy rust scales and flakes, or other bond-reducing coatings.

2.2 FABRICATION

- A. Fabricate reinforcement bars according to the Concrete Reinforcing Steel Institute (CRSI) 'Manual of Standard Practice' and details on Contract Documents.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 1. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

2. Blowtorch shall not be used to facilitate field cutting or bending or any other reinforcing work.
3. Reinforcement shall not be bent after partially embedded in hardened concrete.

B. Placing Reinforcement:

1. Comply with Concrete Reinforcing Steel Institute CRSI 'Manual of Standard Practice' recommended practice for 'Placing Reinforcing Bars' for details and methods of reinforcement placement and supports. and as herein specified.
2. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations:
 - a. Locate and support reinforcing by chairs, runners, bolsters, bar supports, spacers, or hangers, as required as recommended by 'ACI Detailing Manual, except slab on grade work.
 - b. Support bars in slabs on grade and footings with specified bar supports around perimeter and at 4-1/2 feet on center each way maximum to maintain specified concrete cover.
 - c. Install bar supports at bar intersections.
3. Bend bars cold.
4. Dowel vertical reinforcement for formed concrete columns or walls out of footing or structure below with rebar of same size and spacing required above.
5. Securely anchor and tie reinforcement bars and dowels before placing concrete. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

C. Splices:

1. Non-Concrete Structural System:
 - a. Avoid splices of reinforcement bars at points of maximum stress. Lap bars 60 bar diameters minimum unless dimensioned otherwise on Drawings. Run reinforcement bars continuous through cold joints.
2. Concrete Structural System:
 - a. In beams, slabs, and walls, avoid splices of reinforcement bars at points of maximum stress.
 - b. Lap bars as follows:
 - 1) Compression Splices: 45 bar diameters minimum.
 - 2) Tension Splices: In accordance with ACI 318 Class B requirements.
 - 3) No splice shall be less than 20 inches.
 - 4) For epoxy coated rebar, increase lap-splice lengths by 1.5 times those listed above.
 - c. In columns, splices in vertical bars are permitted only at floor levels or points of lateral support and shall consist of 45 bar diameter laps.
 - d. Run reinforcement bars continuous through cold joints.

D. Tolerances:

1. Provide following minimum concrete cover for reinforcement as per ACI 318 or ACI 318M. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations:
 - a. Concrete cast against and permanently exposed to earth:
 - 1) Exterior Slabs on Grade (where shown): 2 inches.
 - 2) Sections other than Slabs: 3 inches.
 - b. Concrete Exposed to Earth or Weather:
 - 1) No. 6 and Larger Bars: 2 inches.
 - 2) No. 5 and Smaller Bars, W31 and D31 Wire: 1-1/2 inches.

3.2 FIELD QUALITY CONTROL

A. Field Tests and Inspections:

1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing and Inspection Services':
 - a. Quality Control is sole responsibility of Contractor.
 - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
 - a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
2. Reinforcement Bars:

- a. Testing Agency shall provide inspection for Reinforcement Bars. See Section 03 3111 for Testing and Inspection requirements.

END OF SECTION

SECTION 03 3111

CAST-IN-PLACE STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:

1. Furnish and install concrete work as described in Contract Documents including:
 - a. Quality of concrete used on Project but furnished under other Sections.
 - b. Concrete mix information and use of admixtures.
 - c. Field Quality Control Testing and Inspection requirements for concrete.
 - d. Pre-installation conference held jointly with other concrete related sections.
 - e. Sealants and curing compounds used with concrete.
 - f. Compact aggregate base for miscellaneous cast-in-place concrete.
 - g. Miscellaneous cast-in-place concrete and equipment pads.

B. Products Installed But Not Furnished Under This Section:

1. Concrete accessories.
2. Folding Panel Partition floor guide track.
3. Inserts, bolts, boxes, templates, and fastening devices for other work, including those for bases only for Mechanical and Electrical.
4. Light pole base anchors.
5. Membrane Concrete Curing.
6. Pipe bollards.

C. Related Requirements:

1. Section 01 1200: 'Multiple Contract Summary' for Owner Furnished Testing and Inspecting Services.

2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
3. Section 03 1113: 'Structural Cast-In-Place Concrete Forming'.
4. Section 03 1511: 'Concrete Anchors and Inserts'.
5. Section 03 2100: 'Reinforcement Bars'.
6. Section 03 2116: 'Epoxy-Coated Reinforcement Steel Bars'.
7. Section 03 3517: 'Concrete Sealer Finishing' for application of concrete sealers.
8. Section 03 3923: 'Membrane Concrete Curing' for quality of curing materials used.
9. Section 05 1223: 'Structural Steel For Buildings' for:
 - a. Furnishing of pipe for pipe bollards.
10. Section 07 9213: 'Elastomeric Joint Sealant' for quality of sealants.
11. Section 10 2239: 'Folding Panel Partitions' for floor guide track.
12. Section 26 5600: 'Exterior Lighting' for furnishing of light pole base anchors.
13. Section 31 0501: 'Common Earthwork Requirements' for:
 - a. General procedures and requirements for earthwork.
 - b. Pre-installation conference held jointly with other common earthwork related sections.
14. Section 31 1123: 'Aggregate Base' for aggregate base under miscellaneous cast-in-place concrete and exterior slabs, under interior slabs-on-grade concrete, and asphalt paving.
15. concrete and exterior slabs, under interior slabs-on-grade concrete, asphalt paving, and concrete paving.
16. Section 31 2213: 'Rough Grading' for rough grading and preparation of natural soil subgrades below fill and aggregate base materials.
17. Section 31 2216: 'Fine Grading' for grading of subgrade below aggregate base and topsoil.
18. Section 31 2323: 'Fill' for compaction procedures and tolerances.
19. Section 32 8423: 'Underground Sprinklers' for sleeves for underground irrigation system.
20. Section 32 9121: 'Topsoil Grading' for grading of subgrade below topsoil.
21. Divisions 22, 23, And 26: Mechanical and electrical devices including boxes, conduits, pipes, hangers, inserts, and other work to be embedded in concrete work before placing.
22. Furnishing of items to be embedded in concrete specified in Section involved.
23. Owner will provide concrete leveling compounds and patching compounds required for carpet installation.

1.2 REFERENCES

A. Association Publications:

1. American Concrete Institute, Farmington Hills, MI www.concrete.org. Abstracts of ACI Periodicals and Publications.
 - a. ACI 117.1R-14: 'Guide for Tolerance Compatibility in Concrete Construction'.
 - b. Certifications:
 - 1) ACI CP-1(16), '*Technical Workbook for ACI Certification of Concrete Field Testing Technician-Grade 1*'.
 - 2) ACI CP-10(10), '*Craftsman Workbook for ACI Certification of Concrete Flatwork Technician/Finisher*'.
 - 3) ACI CP-19(16), '*Technical Workbook for ACI Certification of Concrete Strength Testing Technician*'.

B. Definitions:

1. Cold Weather, as referred to in this Section, is four (4) hours with ambient temperature below 40 deg F in twenty-four (24) hour period.
2. Floor Flatness (F_F): Rate of change in elevation of floor over 12 inches section.
3. Floor Levelness (F_L): Measures difference in elevation between two points which are 10 feet apart.
4. Hot Weather, as referred to in this Section, is ambient air temperature above 100 deg F or ambient air temperature above 90 deg F with wind velocity 8 mph or greater.

C. Reference Standards:

1. American Association of State and Highway Transportation Officials:
 - a. AASHTO M 153-06 (2016), 'Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction'.

2. American Concrete Institute
 - a. ACI 117-10 (R2015): 'Specifications for Tolerances for Concrete Construction and Materials and Commentary'.
 - b. ACI 305.1-14, 'Specification for Hot Weather Concreting'.
 - c. ACI 306.1-90 (R2002), 'Standard Specification for Cold Weather Concreting'.
 - d. ACI 318-14, 'Building Code Requirements for Structural Concrete' (ACI 318) and 'Commentary on Building Code Requirements for Structural Concrete' (ACI 318R).
3. ASTM International:
 - a. ASTM C31/C31M-19, 'Standard Practice for Making and Curing Concrete Test Specimens in the Field'.
 - b. ASTM C33/C33M-18, 'Standard Specification for Concrete Aggregates'.
 - c. ASTM C39/C39M-18, 'Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens'.
 - d. ASTM C94/C94M-17a, 'Standard Specification for Ready-Mixed Concrete'.
 - e. ASTM C140/C140M-18a, 'Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units'.
 - f. ASTM C143/C143M-15a, 'Standard Test Method for Slump of Hydraulic-Cement Concrete'.
 - g. ASTM C150/C150M-18, 'Standard Specification for Portland Cement'.
 - h. ASTM C172/C172M-17, 'Standard Practice for Sampling Freshly Mixed Concrete'.
 - i. ASTM C173/C173M-16, 'Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method'.
 - j. ASTM C192/C192M-18, 'Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory'.
 - k. ASTM C231/C231M-17a, 'Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method'.
 - l. ASTM C260/C260M-10a(2016), 'Standard Specification for Air-Entraining Admixtures for Concrete'.
 - m. ASTM C330/C330M-17a, 'Standard Specification for Lightweight Aggregates for Structural Concrete'.
 - n. ASTM C494/C494M-17, 'Standard Specification for Chemical Admixtures for Concrete'.
 - o. ASTM C496/C496M-17, 'Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens'.
 - p. ASTM C567/C567M-14, 'Standard Test Method for Determining Density of Structural Lightweight Concrete'.
 - q. ASTM C595/C595M-18, 'Standard Specification for Blended Hydraulic Cements'.
 - r. ASTM C618-19, 'Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete'.
 - s. ASTM C1077-17, 'Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation'.
 - t. ASTM C1157/C1157M-17, 'Standard Performance Specification for Hydraulic Cement'.
 - u. ASTM D1751-18, 'Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)'.
 - v. ASTM E329-18: 'Standard Specification for Agencies Engaged in Construction Inspection and/or Testing'.
 - w. ASTM E1155-14, 'Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers'.
4. International Code Council (IBC) (2018 or latest approved edition):
 - a. IBC Chapter 17, 'Special Inspections and Tests'.
 - 1) Section 1704, 'Special Inspections and Tests, Contractor Responsibility and Structural Observations'.
 - 2) Section 1705, 'Required Special Inspection and Tests'.
 - a) Section 1705.2, 'Steel Construction'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 1. Participate in MANDATORY pre-installation conference as specified in Section 01 3100 and held jointly with following sections:
 - a. Section 03 1113: 'Structural Cast-In-Place Concrete Forming'.

- b. Section 03 2100: 'Reinforcement Bars'.
 - c. Section 03 2116: 'Epoxy-Coated Reinforcement Steel Bars'.
 - d. Section 26 0526: 'Grounding and Bonding for Electrical Systems'.
 - e. Section 33 1119: 'Fire Suppression Utility Distribution Piping'.
 - f. Section 33 3313: 'Sanitary Utility Sewerage'.
2. Schedule pre-installation conference prior to placing of footings, installation of foundation forms and reinforcing steel, and installation of anchors, dowels, inserts, and block outs in foundation walls and slabs.
3. In addition to agenda items specified in Section 01 3100, review following:
- a. Set up concrete placement pour card system and verify that all relevant trades have signed off prior to concrete placement.
 - b. Obtaining trade sign-offs on each pour card will be responsibility of General Contractor's foreman or whoever is in charge of ordering concrete.
 - c. Pour cards will be turned in to Quality Assurance representative after the work has been completed so that they can be reviewed and filed.
 - d. Review installation scheduling, coordination, placement of building concrete, and placement of items installed in and under concrete.
 - e. Review installation scheduling, coordination and placement of site concrete and of items installed in concrete.
 - f. Review 'Verification of Conditions' requirements.
 - g. Review requirements for preparation of subgrade and aggregate base requirements.
 - h. Review formwork requirements.
 - i. Review approved mix design requirements, mix designs and use of admixtures.
 - j. Review reinforcing bar submittals.
 - k. Review installation schedule and placement of reinforcing bars.
 - l. Review placement, finishing, and curing of concrete, including cold and hot weather requirements.
 - m. Review joint layout plan for control and expansion joints, fillers for sidewalks, curbs, and gutters:
 - 1) Review jointing requirements.
 - n. Review smooth rubbed concrete finish procedures and requirements (applied immediately after removing concrete formwork while concrete is 'green').
 - o. Review concrete slab tolerances and corrective measures if tolerances not met.
 - p. Review safety issues.
 - q. Review Section 01 4523 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
 - 1) Review requirements and frequency of testing and inspections.
- B. Scheduling:
- 1. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing concrete.

1.4 SUBMITTALS

- A. Action Submittals:
- 1. Joint layout plan for control and expansion joints for sidewalks, curbs, and gutters for written approval before starting work on this Section.
 - 2. Shop Drawings:
 - a. Show dimensioned locations of anchor bolts for hold-down anchors and columns.
 - b. Show reinforcement and all necessary bending diagrams and reinforcing steel list, and construction joint locations.
 - c. Provide bar schedules and bending details.
 - d. Reinforced concrete walls shall be shown in scale elevation (scale at least one quarter inch to one foot). Details shall be in accordance with ACI rules.
 - e. Show all formwork for concrete surfaces which are to remain exposed in the finished work.
- B. Informational Submittals:
- 1. Certificates:
 - a. Installers:
 - 1) Certification for National Ready Mixed Concrete Association (NRMCA).

- 2) Certification for ACI-certified Flatwork Finishers and Technicians.
2. Design Data:
 - a. Mix Design:
 - 1) Furnish proposed mix design to Architect for review prior to commencement of Work.
 - a) Include density (unit weight) and void content determined per ASTM C1688/C1688M for fresh mixed properties and per ASTM C140/C140M for hardened concrete properties.
 - b) Mix design shall show proposed admixture, amount, usage instructions, and justification for proposed use.
 - b. Ready-Mix Supplier:
 - 1) Require mix plant to furnish delivery ticket for each batch of concrete. Keep delivery tickets at job-site for use of Owner or his representatives. Tickets shall show following:
 - a) Name of ready-mix batch plant.
 - b) Serial number of ticket.
 - c) Date and truck number.
 - d) Name of Contractor.
 - e) Name and location of Project.
 - f) Specific class or designation of concrete conforming to that used in Contract Documents.
 - g) Amount of concrete.
 - h) Amount and type of cement.
 - i) Total water content allowed by mix design.
 - j) Amount of water added at plant.
 - k) Sizes and weights of sand and aggregate.
 - l) Time loaded.
 - m) Type, name, manufacturer, and amount of admixtures used.
 - n) Design Data.
 - 2) Provide certificates with supporting testing reports verifying compliance with Contract Document requirements and that materials provided are from single source for following:
 - a) Cement.
 - b) Aggregate.
 - c) Fly Ash.
3. Source Quality Control Submittals:
 - a. Concrete mix design: Submit mix designs to meet following requirements:
 - 1) Mix Type A:
 - a) General purpose concrete type mix used for footings and for exterior concrete (excluding concrete paving) where not subject to freeze/thaw cycles and deicing or where higher strength is needed due to soil conditions.
 - b) 3000 psi minimum at twenty-eight (28) days.
 - c) Water / Cementitious Material: 0.45 to 0.50 by weight.
 - 2) Mix Type B:
 - a) Unexposed interior concrete slabs on grade.
 - b) 3500 psi minimum at twenty-eight (28) days.
 - c) Water / Cementitious Material: 0.45 maximum by weight.
 - 3) Mix Type D:
 - a) For exterior concrete paving, curbs, gutters, and waterways not exposed to freeze/thaw cycles and deicing salts.
 - b) 4000 psi minimum at twenty-eight (28) days.
 - c) Water / Cementitious Material: 0.45 maximum by weight.
 - d) For concrete paving, use mix design based upon use of 1-1/2 inches coarse aggregate (about 15 percent).
 - 4) Mix Type E:
 - a) Exterior concrete exposed to freeze/thaw cycles and deicing salts or where soils are 'corrosive'.
 - b) 4500 psi minimum at twenty-eight (28) days.
 - c) Water / Cementitious Material: 0.40 maximum by weight.
 - d) Use twenty-five (25) percent Class F fly ash as part of cementitious material.
 - e) Mix Type F should be used for all exterior concrete exposed to freeze/thaw cycles and deicing salts, unless dictated otherwise by site conditions.

- f) For concrete paving, use mix design based upon use of 1-1/2 inches coarse aggregate (about 15 percent).
 - 5) Mix Type F - Self-Consolidating Concrete (SCC):
 - a) Rarely used optional mix type.
 - b) Self-consolidating concrete may be used for all architectural concrete, heavily reinforced concrete, concrete for structural repairs, and other members as described in contract documents.
 - c) 4000 psi minimum at twenty-eight (28) days.
 - d) All self-consolidating concrete shall contain high-range water-reducing admixture and viscosity-modifying admixture where required.
 - e) Minimum flow of 20 inches – 30 inches or as required by successful test placement.
 - f) Workability, pump ability, finish ability, and setting time of mix design shall be verified with successful test placement onsite.
 - g) Viscosity Modifying Admixture (VMA) shall be used to optimize viscosity of Self-Consolidating Concrete (SCC) at dosage rates per manufacturer's recommendation.
 - 6) Air Entrainment: Six (6) percent, plus or minus 1-1/2 percent for exterior concrete and foundation walls exposed to freeze/thaw cycles.
 - 7) Do not add water any time during mixing cycle above amount required to meet specified water / cement ratio. No reduction in amount of cementitious material is allowed.
 - b. Slump:
 - 1) 4-inch slump maximum before addition of high range water reducer.
 - 2) 8-inch slump maximum with use of high range water reducer.
 - 3) Slump not required for Mix Type G.
 - c. Admixtures:
 - 1) Mix design shall show proposed admixture, amount, usage instructions, and justification for proposed use. Do not use any admixture without Architect's written approval.
 - 2) Fly ash: Amount of specified Class F (or Class C where Class F is not available) fly ash not to exceed twenty-five (25) percent of weight of cementations materials may used.
 - 3) Chemical:
 - a) Specified accelerator or retarder may be used if necessary, to meet environmental conditions.
 - b) Special additives to promote rapid drying concrete, or moisture vapor reduction (MVRA), may be used in interior concrete slabs on grade and elevated concrete decks that will receive flooring if necessary, to meet construction schedules.
- C. Closeout Submittals:
- 1. Include following in Operations and Maintenance Manual specified in Section 01 7800:
 - a. Record Documentation:
 - 1) Pour Reports:
 - a) Provide report that records following information:
 - b) Date and time of start of pour, Date and time of end of pour, and Date and time of end of finishing procedures.
 - c) Temperature at start of pour, Temperature at end of Pour, and Maximum temperature during performance of finishing procedures.
 - d) Wind speed at start of pour, Wind speed at end of pour, and Maximum wind speed during performance of finishing procedures.
 - e) Humidity at start of pour, Humidity at end of pour, and High and low humidity during performance of finishing procedures.
 - f) Cloud cover at start of pour, Cloud cover at end of pour, and High and low cloud cover during performance of finishing procedures.
 - g) Screeding method and equipment used.
 - h) Saw cut method and equipment used.
 - 2) Testing and Inspection Reports:
 - a) Testing Agency Testing and Inspecting Reports of concrete.
 - 3) Warranty. Submit rapid concrete drying or MVRA manufacturer warranties for concrete moisture vapor emission induced flooring failure and adhesion; ensure both have been completed in project's name and registered with manufacturer.

- a) Provide warranty to cover cost of flooring failures due to moisture migration from slabs for life of concrete. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.
- b) Provide stand-alone adhesion warranty matching duration of flooring adhesive or primer manufacturer's material defect warranty.

1.5 QUALITY ASSURANCE

- A. Qualifications: Requirements of Section 01 4301 applies, but is not limited to following:
 1. Installers and Installation Supervisor:
 - a. ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
 2. Ready-Mix Supplier:
 - a. Comply with ASTM C94/C94M requirements and be certified according to NRMCA's 'Certification of Ready Mixed Concrete Production Facilities'.
 3. Testing Agencies:
 - a. Independent agency qualified according to ASTM C1077 and ASTM E329.
 - 1) Personnel conducting field tests shall be qualified as ACI Concrete Field-Testing Technicians, Grade I according to ACI CP-1 or equivalent certification program.
 - 2) Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be ACI-certified Concrete Laboratory Testing Technician - Grade II.
- B. Testing and Inspection:
 1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
 2. Owner will provide Testing and Inspection on concrete:
 - a. Owner will employ testing agencies to perform testing and inspection on concrete as specified in Field Quality Control in Part 3 of this specification:
 - 1) 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 and perform contractor testing and inspection.
 - 2) See Section 01 1200: 'Multiple Contract Summary'.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 1. Expansion Joint Filler Material:
 - a. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage And Handling Requirements:
 1. Expansion Joint Filler Material:
 - a. Store materials in a clean, dry area in accordance with manufacturer's instructions.
 - b. Protect materials during handling and application to prevent damage.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Manufacturers:
 1. Manufacturer Contact List:
 - a. Aridus Admixture by US Concrete, Euless, TX www.us-concrete.com/aridus/.

- b. BASF (Construction Chemicals Division), Cleveland, OH www.master-builders-solutions.basf.us/en-us.
 - c. Bonsal American, Charlotte, NC www.bonsal.com.
 - d. Concure Systems Admixture by Concure Systems, Phoenix, AZ www.ConcureSystems.com.
 - e. Dayton Superior Specialty Chemicals, Kansas City, KS www.daytonsuperiorchemical.com.
 - f. Euclid Chemical Company, Cleveland, OH www.euclidchemical.com.
 - g. Fritz-Pak Concrete Admixtures, Dallas, TX www.fritzpak.com.
 - h. GCP Applied Technologies, Cambridge, MA www.gcpat.com/construction/en-us.
 - i. ISE Logik Industries, Gulfport, MS www.iselogik.com.
 - j. Kryton International Inc., Vancouver, British Columbia, Canada www.kryton.com.
 - k. L & M Construction Chemicals, Omaha, NE www.lmcc.com.
 - l. Larsen Weldcrete by Larsen Products Corp, Rockville, MD www.larsenproducts.com.
 - m. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com and Sika Canada, Pointe Claire, QC www.sika.ca.
 - n. Unitex, Kansas City, MO www.unitex-chemicals.com.
 - o. U S Mix Products Co, Denver, CO www.usspec.com.
 - p. W R Meadows, Hampshire, IL www.wrmeadows.com.
- B. Performance:
- 1. Design Criteria: Conform to requirements of ASTM C94/C94M unless specified otherwise:
 - 2. Capacities:
 - a. For testing purposes, following concrete strengths are required:
 - 1) At 7 days: 70 percent minimum of 28-day strengths.
 - 2) At 28 days: 100 percent minimum of 28-day strengths.
- C. Materials:
- 1. Hydraulic Cement: Meet requirements of ASTM C150/C150M, Type <Insert Type>.
 - a. Meet requirements of ASTM C595/C595M, Type <Insert Type>.
 - b. Meet requirements of ASTM C1157/C1157M, Type <Insert Type>.
 - 2. Aggregates:
 - a. Coarse:
 - 1) Meet requirements of ASTM C33/C33M or nonconforming aggregate that by test or actual service produces concrete of required strength and conforms to local governing codes.
 - 2) Aggregate shall be uniformly graded by weight.
 - b. Fine:
 - 1) Meet requirements of ASTM C33/C33M.
 - 2) Aggregate shall be uniformly graded by weight.
 - 3. Water: Clear, apparently clean, and potable.
 - 4. Admixtures And Miscellaneous:
 - a. Fly Ash:
 - 1) Meet requirements of ASTM C618, Class F (or Class C where Class F is not available) and with loss on ignition (LOI) of three (3) percent maximum.
 - b. Chemical:
 - 1) No admixture shall contain calcium chloride nor shall calcium chloride be used as an admixture. All chemical admixtures used shall be from same manufacturer and compatible with each other.
 - 2) Air Entraining Admixture:
 - a) Meet requirements of ASTM C260/C260M.
 - b) Type Two Acceptable Products:
 - (1) Equal as approved by Architect before use. See Section 01 6200.
 - 3) Water Reducing Admixture:
 - a) Meet requirements of ASTM C494/C494M, Type A and containing not more than 0.05 percent chloride ions.
 - b) Type Two Acceptable Products:
 - (1) Equal as approved by Architect before use. See Section 01 6200.
 - 4) Water Reducing, Retarding Admixture:
 - a) Meet requirements of ASTM C494/C494M, Type D and contain not more than 0.05 percent chloride ions.

- b) Type Two Acceptable Products:
 - (1) Equal as approved by Architect before use. See Section 01 6200.
- 5) High Range Water Reducing Admixture (Superplasticizer):
 - a) Meet requirements of ASTM C494/C494M, Type F or G and containing not more than 0.05 percent chloride ions.
 - b) Type Two Acceptable Products:
 - (1) Equal as approved by Architect before use. See Section 01 6200.
- 6) Non-Chloride, Non-Corrosive Accelerating Admixture:
 - a) Meet requirements of ASTM C494/C494M, Type C or E and containing not more than 0.05 percent chloride ions.
 - b) Type Two Acceptable Products:
 - (1) Equal as approved by Architect before use. See Section 01 6200.
- 7) Corrosion Inhibiting Admixture:
 - a) Liquid admixture to inhibit corrosion of steel reinforcement in concrete by introducing proper amount of anodic inhibitor. Admixture shall contain thirty (30) percent calcium nitrite solution and shall be used where called for in specifications or on drawings.
 - b) Type Two Acceptable Products:
 - (1) Eucon CIA by Euclid.
 - (2) DCI or DCI-S by GCP Applied Technologies.
 - (3) Equal as approved by Architect before use. See Section 01 6200.
- 8) Alkali-Silica Reactivity Inhibiting Admixture:
 - a) Specially formulated lithium nitrate admixture for prevention of alkali-silica reactivity (ASR) in concrete. Admixture must have test data indicating conformance to ASTM C1293.
 - b) Type Two Acceptable Products:
 - (1) Eucon Integral ARC by Euclid.
 - (2) RASIR by W R Grace.
 - (3) Equal as approved by Architect before use. See Section 01 6200.
- 9) Viscosity Modifying Admixture (VMA):
 - a) Liquid admixture used to optimize viscosity of Self-Consolidating Concrete (SCC). Subject to compliance with requirements, provide following at dosage rates per manufacturer's recommendation.
 - b) Type Two Acceptable Products:
 - (1) Equal as approved by Architect before use. See Section 01 6200.
- 10) Shrinkage Reducing Admixture (SRA):
 - a) Liquid admixture specifically designed to reduce drying shrinkage and potential for cracking.
 - b) Type Two Acceptable Products:
 - (1) Equal as approved by Architect before use. See Section 01 6200.
- 11) Rapid Drying Admixture in Interior Concrete Slabs on Grade:
 - a) Admixture specifically designed to promote rapid drying of concrete.
 - b) Type Two Acceptable Products:
 - (1) Equal as approved by Architect before use. See Section 01 6200.
- 12) Moisture Vapor Reduction Admixture (MVRA):
 - a) Liquid, inorganic, ASTM C494/C494M Type S Admixture free of volatile organic compounds (VOCs); specifically formulated to close capillary systems formed during concrete placement and to reduce moisture vapor emission and transmission with no adverse effect on concrete properties or finish flooring.
 - b) Type Two Acceptable Products:
 - (1) MVRA 900 by ISE Logik Industries: www.iselogik.com.
 - (2) Concure Systems Admixture by Concure Systems, Phoenix, AZ www.ConcureSystems.com.
 - (3) Equal as approved by Architect before use. See Section 01 6200.
- 13) Waterproofing Admixture: Admixture formulated to reduce permeability to liquid water, with no adverse effect on concrete properties:
 - a) Functioning by growth of crystals in capillary pores.
 - b) Permeability of Cured Concrete: No measurable leakage when tested in accordance with COE CRD-C 48 at 200 feet of head; provide test reports.
 - c) Type Two Acceptable Products:

- (1) CWPA 800 by ISE Logik Industries: www.iselogik.com.
- (2) Krystol Internal Membrane (KIM) by Kryton: www.kryton.com.
- (3) Equal as approved by Architect before use. See Section 01 6200.

2.2 ACCESSORIES

- A. Formwork:
1. Meet requirements specified in Section 03 1113:
- B. Bonding Agents:
1. Type Two Acceptable Products:
 - a. Acrylic Additive by Bonsal American.
 - b. Day Chem Ad Bond (J-40) by Dayton Superior.
 - c. Flex-Con by Euclid Chemical Co.
 - d. Larsen Weldcrete by Larsen Products Corp.
 - e. Everbond by L & M Construction Chemicals.
 - f. MasterEmaco A 660 (formally Acryl 60) by BASF.
 - g. U S Spec Multicoat by U S Mix Products.
 - h. Intralok by W R Meadows.
 - i. Equal as approved by Architect before use. See Section 01 6200.
- C. Expansion Joint Filler:
1. Expansion Joint Filler Material:
 - a. Design Criteria:
 - 1) Resilient, flexible, non-extruding, expansion-contraction joint filler meeting requirements of ASTM D1751.
 - 2) 1/2 inch thick.
 - 3) Resilience:
 - a) When compressed to half of original thickness, recover to minimum of seventy (70) percent of original thickness.
 - b. Type Two Acceptable Products:
 - 1) Fiber Expansion Joint by W R Meadows, Hampshire, IL www.wrmeadows.com.
 - 2) Equal as approved by Architect before installation. See Section 01 6200.
- D. Finishing Material (Exposed Vertical Faces of Foundation and Retaining Walls):
1. Finishing Material available in multiple concrete shades to closely match concrete surface.
 2. Type Two Acceptable Products:
 - a. Mixture of 1 part cement (using same cement as used in concrete foundations), 1 part sand with 95 percent passing #50 sieve.
 - b. RapidSet WunderFixx by CTS Cement Manufacturing Corporation, Cypress, CA www.rapidset.com.
 - c. Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
1. Concrete Forms:
 - a. Verify dimensions and spot elevations for locations of forms for concrete footings, stem walls, building slabs, curbs, gutters, walkways, and drainage systems are correct before concrete is placed.
 - 1) Notify Architect of incorrect dimensions or spot elevations in writing.
 - 2) Do not place concrete until corrections are made and verified.

3.2 PREPARATION

- A. Concrete Mixing:
1. General:
 - a. All concrete shall be machine mixed.
 - b. Water gauge shall be provided to deliver exact predetermined amount of water for each batch.
 - c. Reliable system must be employed to ensure that no less than predetermined amount of cement goes into each batch.
 - d. Re-tempering partly set concrete will not be permitted.
 2. Transit Mix:
 - a. Transit mix concrete may be used provided it conforms to Specifications and tests herein described and ASTM C94/C94M.
 - b. Central plant producing concrete and equipment transporting it are suitable for production and transportation of controlled concrete and plant is currently approved by local state DOT.
 - c. Maximum elapsed time between time of introduction of water and placing shall be one (1) hour.
 - d. Minimum time of mixing shall be one (1) minute per cubic yard after all material, including water, has been placed in drum, and drum shall be reversed for an additional two (2) minutes.
 - e. Mixing water shall be added only in presence of Inspecting Engineer or inspector employed by Testing Agency.
 - f. Trucks shall not be overloaded in excess of rated capacity as recommended by manufacturer.
 3. Cold Weather Concreting Procedures:
 - a. General Requirements:
 - 1) Materials and equipment required for heating and protection of concrete shall be approved and available at Project site before beginning cold weather concreting.
 - 2) Forms, reinforcement, metallic embedments, and fillers shall be free from snow, ice, and frost. Surfaces that will be in contact with newly placed concrete, including sub-grade materials, shall be 35 deg F minimum at time of concrete placement.
 - 3) Thaw sub-grade 6 inches deep minimum before beginning concrete placement. If necessary, re-compact thawed material.
 - 4) Use no frozen materials or materials containing ice.
 - 5) See ACI 306.1 'Standard Specification for Cold Weather Concreting' for additional requirements.
 4. Hot Weather Concreting Procedures:
 - a. General:
 - 1) Maximum concrete temperature allowed is 90 deg F in hot weather.
 - 2) Cool aggregate and subgrades by sprinkling.
 - 3) Avoid cement over 140 deg F.
 - 4) Use cold mixing water or ice.
 - 5) Use fog spray or evaporation retardant to lessen rapid evaporation from concrete surface.
 - 6) See ACI 305.1 'Specification for Hot Weather Concreting' for additional requirements.
- B. Surface Preparation:
1. Earthwork Preparation:
 - a. Aggregate base and subgrade:
 - 1) Prepare aggregate base as specified in Section 31 1123.
 - 2) Prepare natural soil subgrade as specified in Section 31 2213.
 - 3) Prepare fill subgrade as specified in Section 31 2323.
 2. Inserts, bolts, boxes, templates, pipes, conduits, and other accessories required by Divisions 22, 23, and 26 shall be installed and inspected before placing concrete.
 3. Install inserts, bolts, boxes, templates, pipes, conduits, and other accessories furnished under other Sections to be installed as part of work of this Section:
 - a. Tie anchor bolts for hold-down anchors and columns securely to reinforcing steel.
- C. Removal:
1. Remove water and debris from space to be placed:

3.3 INSTALLATION

A. Placing Concrete:

1. General:
 - a. Place as soon after mixing as possible.
 - b. Deposit as nearly as possible in final position.
 - c. No concrete shall be deposited in water.
 - d. Placing of concrete shall be continuous until panel or section is complete.
 - e. Compact concrete in forms by vibrating and other means where required.
 - 1) Thoroughly consolidate concrete around reinforcing bars (Consolidation not required in concrete around reinforcing bars with Mix Type G).
 - 2) Use and type of vibrators shall conform to ACI 309.
 - f. Form vertical surfaces full depth. Do not allow concrete to flow out from under forms in any degree into landscaped areas.
 - g. Consolidate concrete thoroughly.
 - h. Do not embed aluminum in concrete.
 - i. Do not use contaminated, deteriorated, or re-tempered concrete.
 - j. Avoid accumulation of hardened concrete.
 - k. Dusting with cement not permitted.
2. Footings:
 - a. Level top of finish footing and leave rough.
 - b. Where joints are required, bulkhead, key horizontally, and dowel with two No. 5 reinforcing bars, 48 inches long.
3. Foundation Walls: Leave steel projecting where required for floor tie.
4. Exterior Slabs:
 - a. For continuous placing and where shown on Drawings, saw cut one inch deep control joints before shrinkage occurs (2 inches at 6 inch slabs).
5. Miscellaneous Concrete Elements:
 - a. Equipment Bases: Coordinate with appropriate Sections for locations and dimensions.
 - b. Light Pole Bases, Mow Strips, and Aprons:
 - 1) Install bond breaker consisting of three (3) layers of 30 lb. roofing felt between pole base and adjoining sidewalk, mow strip and building foundations, and aprons and building foundations.
 - c. Mow Strips and Aprons:
 - 1) Aggregate base not necessary under mow strips and aprons.
 - 2) Form and cast mow strips in place.
 - 3) Set top of mow strip above finish grade as follows:
 - a) Sodded Areas: 2 inches below.
 - b) Seeded Areas: One inch below.
 - c) Ground Cover Areas: 2 inches below.
 - d) Trees and Shrub Areas (not individual trees): 4 inches below.
 - 4) Compact topsoil underneath mow strips and aprons to density of undisturbed earth.
 - d. Pipe Bollards:
 - 1) Install plumb and fill with concrete.
 - e. Sidewalks, Exterior Stairs, And Landings:
 - 1) Slope with cross slope of 1/8 to 1/4 inch per ft (one to two percent) in direction of intended drainage.
 - 2) Slope away from building 1/8 to 1/4 inch per ft (one to two percent) minimum.
 - 3) Concrete walks shall be screeded to bring surface to grades and lines as indicated. Surface shall be floated with wood float with no coarse aggregate showing and then given broom finish before concrete sets.
6. Joints:
 - a. Control Joints (Contraction Joints):
 - 1) Form control joints with early-entry, dry-cut saws as soon as final trowel operations are complete, and joints can be cut without raveling.
 - 2) Depth of control joints shall be approximately one quarter of concrete slab thickness, but not less than one inch.
 - 3) Control joints to be hand tooled in sidewalks, curbs and gutters, mow strips, and aprons.
 - 4) Table One:

Concrete Control Joint On-Center Spacing (+/-)		
Sidewalks	4 feet to 6 feet	1.2 meters to 1.8 meters
Curbs and Gutters	10 feet	3.0 meters
Mow Strips	3 feet to 5 feet	0.90 meters to 1.50 meters
Flat Drainage Structures	10 feet	3 meters
Retaining Walls w/guardrails	Align with posts	
Retaining Walls w/chain link fencing	Align with posts	

b. Expansion Joints:

- 1) Expansion joints in Concrete Paving are specified in Section 32 1313.
- 2) Install so top of expansion joint material is 1/4 inch below finished surface of concrete.
- 3) No expansion joint required between curbs and sidewalks parallel to curb.
- 4) Provide expansion joints at ends of exterior site concrete elements that are perpendicular to and terminate at curbs, building foundations or other concrete elements (i.e. sidewalks, mow strips, aprons).
- 5) Provide expansion joints between sidewalks that are parallel, and adjacent, to storage building or main building.
- 6) Provide expansion joints around perimeter of concrete slab on grade at mechanical enclosure, around perimeter of slab on grade at dumpster enclosure and at top and bottom of exterior stairs.
- 7) Table Two:

Concrete Expansion Joint (Isolation) On-Center Spacing (+/-)		
Sidewalks, Curbs and Gutters	40 feet to 100 feet	12 meters to 30 meters
Mow Strips and Aprons	20 feet to 40 feet	6 meters to 12 meters
Flat Drainage Structures	50 feet	15 meters
Retaining Walls w/guardrails	36 feet	11 meters
Retaining Walls w/chain link fencing	50 feet	15 meters

- 8) Seal expansion joints as specified in Section 07 9213 for following areas:
 - a) Between entryway slabs and building foundations.
 - b) Between sidewalks and building foundations.
 - c) Within curbs and gutters.
 - d) Within flat drainage structures and at joints between flat drainage structures and other concrete elements.
- 9) Expansion joints are not required to be sealed for following areas:
 - a) Within aprons and where apron abuts sidewalks.
 - b) Within mow strips and where mow strip abuts building foundation and sidewalks.
 - c) Within sidewalks.
7. Bonding Fresh and Hardened Concrete:
 - a. Re-tighten forms.
 - b. Roughen surfaces.
 - c. Clean off foreign matter and laitance.
 - d. Wet but do not saturate.
 - e. Slush with neat cement grout or apply bonding agent.
 - f. Proceed with placing new concrete.
8. Anchor Bolts:
 - a. Place anchor bolts not tied to reinforcing steel immediately following leveling of concrete. Reconsolidate concrete around bolt immediately after placing bolt.
 - b. Do not disturb bolts during finishing process.

B. Finishing:

1. Interior Concrete Flatwork:
 - a. Screed Concrete.
 - b. Float Finish:
 - 1) Float as soon after screeding as possible.

- 2) Consolidate surface with power-driven floats with exception of areas inaccessible to power-driven floats, which may be hand-floated.
- 3) Re-straighten, cutting down high spots and filling low spots.
- 4) Repeat float passes and re-straightening until surface has uniform, smooth, granular texture.
- c. Rough:
 - 1) Top of building slab to receive setting bed for ceramic or paver tile.
- d. Trowel Finish:
 - 1) Steel trowel slab after concrete has set enough to avoid bringing water and fines to surface.
 - 2) Perform troweling with power-driven trowels with exception of areas inaccessible to power-driven trowels, which may be hand-troweled.
 - 3) Continue troweling passes and re-straightening with 10-foot highway straightedge until surface is free of trowel marks and uniform in texture and appearance.
 - 4) Apply burnished, burned-out trowel finish.
2. Exterior Concrete Flatwork:
 - a. Curb, Gutter, Sidewalks, Mow Strips, Flat Drainage Structures, Stairs, And Miscellaneous:
 - 1) After completion of final floating, performed immediately after screeding and when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
 - a) Provide fine hair finish where grades are less than 6 percent 1-1/4 inch.
 - b) Provide rough hair finish where grades exceed 6 percent 1-1/4 inch.
 - c) Broom finish, by drawing broom across concrete surface, perpendicular to line of traffic. Repeat operation if required to provide fine line texture acceptable to Architect. At curb and gutter, apply broom finish longitudinal to curb and gutter flowline.
 - d) On inclined slab surfaces, provide coarse, non-slip finish by scoring surface with stiff-bristled broom, perpendicular to line of traffic. At curb and gutter, apply broom finish longitudinal to curb and gutter flowline.
 - e) Do not remove forms for twenty-four (24) hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Architect.
 - f) Round edges exposed to public view to 1/2-inch radius, including edges formed by expansion joints.
 - g) Remove edger marks.
3. Vertical Surfaces (Exposed To View Vertical Surfaces, Exposed Retaining Walls, Exposed Foundation Walls, Concrete Piers, and etc.):
 - a. General:
 - 1) Finishing Material to fill and smooth interior and exterior concrete surface defects such as spalls, gouges, cracks, dents, chips, bug holes, stone pockets, honeycombs, voids and other defective areas.
 - 2) Chamfer lines shall be finished.
 - b. Surface Preparation:
 - 1) Formwork shall be stripped from concrete while concrete is still 'green'.
 - 2) Concrete surface to be finished immediately after formwork has been removed.
 - a) Immediately after removing forms, remove joints, marks, bellies, projections, loose materials and other irregularities, and cut back metal ties from surfaces to be exposed.
 - b) Repair defective areas and voids or stone pockets with Finishing Material and smooth to even surface matching surrounding undamaged area.
 - c. Smooth Rubbed Finish:
 - 1) Thoroughly wet with water, apply Finishing Material in thin layer, rub in circular motion to smooth uniform finish.
 - 2) Entire surface shall be protected from rapid drying for not less than three (3) days.
 - 3) Surfaces shall be cleaned of drip marks and discolorations.
 - 4) Concrete surface shall be left with clean, neat, uniform finish, free from form markings and shall be uniform in color and texture.
4. Light Pole Bases:

- a. Exposed portion to have smooth rubbed finish as specified in Vertical Surfaces in previous paragraph.
- C. Curing:
 - 1. Membrane Concrete Curing:
 - a. As specified in Section 09 3923 'Membrane Concrete Curing'.
 - b. Follow Manufacturer's written instructions for preparation, application rates, placement, and cleanup:
 - 1) Apply as soon as troweling on interior concrete is complete.
 - 2) Apply as soon as brooming or finishing of exterior concrete is complete.
 - 3) Spraying application is required.
 - 4) Do not dilute or thin product.
 - 5) Do not apply when temperature of concrete is less than 40 deg F.
 - 6) Apply uniformly without puddles or ponding.
 - 7) Do not apply before bleed water has dissipated.
 - 8) Do not apply over standing water.
- D. Exterior Concrete Sealer:
 - 1. Exterior Concrete Sealer:
 - a. Exterior concrete placed after about September 1 and located in areas of freeze/thaw cycles and deicing salts are to be sealed per Section 03 3517 'Exterior Concrete Sealer'.
 - b. Apply product as specified in Section 03 3517.
- E. Tolerances:
 - 1. General:
 - a. Tolerances shall conform to requirements of ACI 117 or CSA A23.1/A23.2, except where specified differently:
 - 1) Floor test surfaces shall be measured and reported within seventy two (72) hours after completion of slab concrete finishing operations and before removal of any supporting shores to eliminate any curling effect F-numbers.
 - b. Maximum Variation Tolerances:
 - 1) Table Three:

Maximum Variation Tolerances		
Thickness, standard	plus 3/8-inch, minus 1/4 inch	plus 9.5 mm, minus 3 mm
Thickness, footings	minus 0 inch	minus 0 mm
Plan, 0 - 20 feet	1/2 inch	12.7 mm
Plan, 40 feet or greater	3/4 inch	19 mm
Plan, footings	plus 1/2 inch	plus 12.7 mm
Eccentricity, footings	2-inch maximum standard, 1/2 inch at masonry	50 mm maximum standard, 12.7 mm at masonry
Openings, size	minus 1/4 inch, plus one inch	minus 6 mm, plus 25.4 mm
Openings, location	plus / minus 1/2 inch at center	plus / minus 12.7 mm at center
Plumb	1/2 inch maximum	12.7 mm maximum
Consecutive Steps, treads	1/4 inch	6 mm
Consecutive Steps, risers	1/8 inch	3 mm
Flight of Stairs, treads	1/4 inch in total run	6 mm in total run
Flight of Stairs, risers	1/8 inch in total height	3 mm in total height

- 2. Local Flatness / Levelness of Interior Slabs:
 - a. Carpet and Tile Areas:
 - 1) Specified Overall Value of F_F25 / F_L20 and Minimum Local Value of F_F15 / F_L13 when tested in accordance with ASTM E1155.
 - 2) Specified Overall Value of F_F30 / F_L20 and Minimum Local Value of F_F18 / F_L13 when tested in accordance with ASTM E1155 in ceramic, resilient or vinyl tiled areas.
 - 3) Used on building slabs to be covered by carpet and tile as shown on Contract Drawings. Verify and coordinate with Finish Schedule.

- 4) Remedy For Out-of-Tolerance Building Slabs:
 - a) Sections of building slabs which do not meet specified tolerances but are within ten (10) percent of specified tolerances, may be corrected by grinding or filling, at Owner's option.
 - b) Remove and replace sections of slabs measuring outside specified correctable tolerances.
 - c) Carpet areas: If floor leveling compounds or concrete patching compounds are required to bring floor into specified tolerances, they will be provided by Owner in conjunction with carpet installation and back-charged to Contractor.

3.4 FIELD QUALITY CONTROL

A. Field Tests and Inspections:

1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
 - a. Quality Control is sole responsibility of Contractor:
 - 1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
 - a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
 2. Reinforcement Bars and Bolts:
 - a. Testing Agency shall provide inspections will include following:
 - 1) Bolts:
 - a) Inspection of bolts to be installed in concrete prior to and during placement of concrete.
 - b) Periodic inspection of anchors installed in hardened concrete.
 - 2) Reinforcement Bars:
 - a) Periodic inspection of reinforcement bars and placement prior to concrete placement to verify grade, size, cover, spacing, and position of reinforcing.
 - b) Inspect that all reinforcement bars are be positively identified as to heat number and mill analysis.
 - c) Confirm surface of reinforcing bars is free of form release oil or other deleterious substances.
 3. Concrete:
 - a. Testing Agency shall provide testing and inspection for concrete as per ASTM C1077.
 - b. Testing and inspections, if performed, will include following:
 - 1) Periodic inspection verifying use of required design mix.
 - 2) Inspection of reinforcing bars and anchor bolts before placement of concrete for proper installation.
 - 3) Inspection at time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine temperature of concrete.
 - 4) Inspection of concrete placement for proper application techniques.
 - a) Steel tools are not to be used on exterior concrete.
 - 5) Periodic inspection for maintenance of specified curing temperature and techniques:
 - a) Steel tools are not to be used on exterior concrete. Bull floating and finish floating is to be performed with magnesium or wood floats.
 - 6) Periodic inspect of formwork for shape, location and dimensions of concrete member being formed:
 - a) Certified Inspector shall inspect forms for general location, configuration, camber, shoring, sealing of form joints, correct forming material, concrete accessories, and form tie locations.
 - 7) Periodic inspection of concrete finishing operations for proper finishing techniques.
 - 8) Periodic inspection for placement of specified curing compounds.
 - c. Testing Agency will sample and test during placement of concrete as directed by Architect and may include following:
 - 1) Sampling Fresh Concrete: ASTM C172/C172M, except modified for slump to comply with ASTM C94/C94M:
 - a) Slump: ASTM C143/C143M, test each time set of compressive specimens are made.

- b) Air Content: ASTM C173/C173M, volumetric method for lightweight or normal weight concrete: ASTM C231/C231M, pressure method for normal weight concrete each time set of compression test specimens are made.
- c) Concrete Temperature: Test each time set of compressive specimens are made.
- d) Unit Weight: ASTM C567/C567M, test each time set of compressive specimens are made.
- 2) Concrete floor flatness and floor levelness of interior slabs as per ASTM E1155.
- 3) Concrete moisture and alkalinity testing. See Section 09 0503 Flooring Substrate Preparation.
- d. Compression Test Specimen: ASTM C31/C31M, one (1) set of four (4) standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
- e. Compressive Strength Tests: ASTM C39/C39M:
 - 1) Obtain one (1) composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd, but less than 50 cu. yd, plus one (1) set for each additional 50 cu. yd or fraction thereof.
 - 2) One (1) specimen tested at seven (7) days, two (2) specimens tested at twenty-eight (28) days, and one (1) specimen retained in reserve for later testing if required.
 - 3) If strength of field-cured cylinders is less than eighty-five (85) percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing in-place concrete.
 - 4) Strength level of concrete will be considered satisfactory if averages of sets of three (3) consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.
- f. Samples:
 - 1) Fresh Concrete: ASTM C172/C172M except modified for slump to comply with ASTM C94/C94M.
 - a) Slump: ASTM C143/C43M, test each time set of compressive specimens are made.
 - b) Air Content: ASTM C173/C173M, volumetric method for lightweight or normal weight concrete: ASTM C231/C231M, pressure method for normal weight.
 - c) Concrete Temperature: Test each time set of compressive specimens are made.
 - d) Unit Weight: ASTM C567/C567M, test each time set of compressive specimens are made.
- B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
 - 1. Correct any work found defective or not complying with contract document requirements at no additional cost to the Owner.

3.5 CLEANING

- A. General:
 - 1. Curing:
 - a. Clean tools, equipment as directed by Manufacturer's instructions.

3.6 PROTECTION

- A. Concrete:
 - 1. Protect concrete that has not received its initial set from precipitation to avoid excess water in mix and unsatisfactory surface finish.
 - 2. Do not allow materials resulting from construction activities, which will affect concrete or application of finish floor systems adversely, to come in contact with interior concrete slabs.
 - 3. Protect interior concrete floors from stains, paint, mortar and other construction activities.
- B. Curing:

1. Restrict foot or vehicle traffic as curing membrane dries as recommended by Manufacturer.

END OF SECTION

**SECTION 03 3517
CONCRETE SEALER FINISHING**

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 - 1. Furnish and install Concrete Sealer on concrete surfaces as described in Contract Documents including:
 - a. Concrete sealers are used on existing or new exterior concrete surfaces exposed to freeze/thaw cycles and deicing salts or where exterior concrete is placed after about September 1st or as otherwise desired by Project Manager or Facilities Manager.
 - 1) Concrete sealer on exterior concrete is not needed or used in areas not exposed to freeze/thaw cycles and deicing salts.

- B. Related Requirements:
 - 1. Section 03 3111: 'Cast-In-Place Structural Concrete' for concrete mix information and use admixtures.
 - 2. Section 03 3923: 'Membrane Concrete Curing' for curing application.
 - 3. Section 32 1723: 'Pavement Markings' for concrete pavement parking stripes.

1.2 REFERENCES

- A. Definitions:
 - 1. Concrete Sealers: As used in this specification, are sealers applied to concrete surfaces to protect from surface damage, corrosion, and staining. Sealers either block pores in concrete to reduce absorption of water and salts or form impermeable layer which prevents such materials from passing. Concrete sealer, when selected and applied properly, will prevent intrusion of water and deicers, minimizing freeze/thaw damage.
- B. Reference Standards:
 - 1. American Association of State and Highway Transportation Officials:
 - a. AASHTO T 259-02(2012), 'Standard Method of Test for Resistance of Concrete to Chloride Ion'.
 - b. AASHTO T 260-97(2011), 'Standard Method of Test for Sampling and Testing for Chloride Ion in Concrete and Concrete Raw Materials'.
 - 2. ASTM International:
 - a. ASTM C672/C672M-12 'Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals'.
 - 3. German Institute for Standardization (DIN Standards):
 - a. DIN EN 1504-2,' Products and systems for the protection and repair of concrete structures - Definitions, requirements, quality control and evaluation of conformity - Part 2: Surface protection systems for concrete (2005).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference: Schedule pre-installation conference for same time as application of mockup application.
- B. Sequencing:

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Concrete Sealer:
 - 1) Manufacturer's product literature or cut-sheets for specified products.
 - 2) Manufacturer's LEED product literature for specified products.
- B. Informational Submittals:
 - 1. Manufacturer Instructions:
 - a. Concrete Sealer: Written preparation and application instructions.
 - 2. Source Quality Control Submittals:
 - a. Provide protection plan of surrounding areas and non-work surfaces if requested by Architect/Owner's Representative.
 - 3. Qualification Statements:
 - a. Applicator: Provide qualification documentation.

1.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Comply with applicable VOC standards and other local requirements.
- B. Qualifications:
 - 1. Applicator:
 - a. Applicator shall be acceptable to Manufacturer as applicator of its product.

- b. Minimum five (5) satisfactorily completed installations of comparable quality, scope, similar size, and complexity in past two (2) years before bidding. Include contact information of person with oversight of each project.
 - c. Provide qualification documentation.
- C. Mockup:
1. Required for all projects. Scheduled as per pre-installation conference.
 2. Mockup shall be representative of work to be expected.
 3. Mockup will be used to judge workmanship, concrete substrate preparation, operation of equipment, material application.
 4. Square footage or size of mock up is between Architect/Owner's Representative and Concrete Sealer Applicator. Consider between 10 sq ft to 20 sq ft for small projects and 100 sq ft to 200 sq ft for larger areas.
 5. Provide as many field mockups required to verify selections made under submittals and to demonstrate effects of concrete sealer. Approval does not constitute approval of deviations from Contract Documents, unless such deviations are specifically approved by Architect/Owner's Representative in writing.
 6. Install mockup in accordance with specification using same materials, staff and equipment.
 7. Use same personnel that will be doing project, including Supervisor.
 8. Approvals should be based on:
 - a. Compliance with approved submittals.
 9. Approval from Architect/Owner's Representative is required BEFORE starting work on Project.
 10. Allow twenty-four (24) hours for inspection of mockup before proceeding with work.

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. Follow Manufacturer's written instructions for handling and storage of product:
 - a. Store in unopened containers in clean, dry area between 35 deg F and 110 deg F or as directed by Manufacturer's instruction.

1.7 FIELD CONDITIONS

- A. Ambient Conditions:
1. Concrete Sealer:
 - a. Follow printed Manufacturer's instruction for environmental hazards:
 - b. Follow printed Manufacturer's instruction for ambient conditions for application of product including:
 - 1) Minimum and maximum application temperatures.
 - 2) Application precautions when rain is expected.

PART 2 - PRODUCTS

2.1 PRODUCTS

- A. Exterior Concrete Sealer:
1. Description:
 - a. Concrete sealer that protects new and existing exterior concrete from freeze/thaw cycles and deicing salts.
 2. Design Criteria:
 - a. General:

- 1) Penetrating water repellent silane or linseed oil/mineral spirit concrete sealers are to be used.
- 2) Siloxanes are not to be used to replace silane or linseed oil/mineral spirits sealers.
- b. Linseed Oil/Mineral Spirits Sealers:
 - 1) Protects concrete from freeze/thaw cycles and deicing salts.
 - 2) Resists penetration of water and deicing salts.
- c. Silane Based Sealers:
 - 1) Protects concrete from freeze/thaw cycles and deicing salts.
 - 2) Resists penetration of water and deicing salts.
 - 3) 100 percent silane active ingredient content.
 - 4) Penetrating sealer.
 - 5) Water repellent.
 - 6) Clear (colorless, non-yellowing). Surface appearance after application: unchanged.
3. Limitations:
 - a. VOC:
 - 1) If Low VOC product is required or desired, use only those products listed as 'Low VOC' in acceptable products below.
4. Type One Acceptable Products. See Section 01 6200 for definition of Categories. Applicator Option:
 - a. Linseed Oil/Mineral Spirits Sealers:
 - 1) Anti Spall J33 Concrete Sealer by Dayton Superior Corporation, Miamisburg, OH www.daytonsuperior.com.
 - a) Low VOC.
 - 2) Equal product meeting design criteria requirements as approved by Architect/Owner's Representative before BID. See Section 01 6200.
 - b. Silane Based Sealers:
 - 1) MasterProtect H 1000 by BASF, Cleveland, OH www.master-builders-solutions.basf.us.
 - a) Low VOC.
 - 2) Weather Worker J29A by Dayton Superior Corporation, Miamisburg, OH www.daytonsuperior.com.
 - 3) Baracade Silane 100 by Euclid, Cleveland, OH www.euclidchemical.com.
 - a) Low VOC.
 - 4) Sikagard 705L by Sika Corporation, Lyndhurst, NJ www.usa.sika.com.
 - a) Low VOC.
 - 5) TK-590-100 by TK Products, Minnetonka, MN www.tkproducts.com.
 - 6) Equal product meeting design criteria requirements as approved by Architect/Owner's Representative before BID. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 1. Verify concrete has properly cured.

3.2 PREPARATION

- A. Surface Preparation:
 1. Concrete Sealer:
 - a. Take necessary precautions to protect adjoining property.
 - b. Do not contaminate any body of water by direct application, cleaning of equipment or disposal of wastes.
 2. Cleaning:
 - a. Clean concrete surface of membrane curing and all dirt, mud spots, silt spots, loose material, vegetation, oil spots, and other objectionable and foreign material.
 - b. Remove debris, sand, dirt, and dust from concrete surface.

- c. Power brooms, power blowers, air compressors, water flushing equipment, and blowers are acceptable equipment for cleaning concrete surface.

3.3 APPLICATION

- A. Concrete Sealer:
 1. General:
 - a. Apply concrete sealer after surface preparation has been completed as per Manufacturer's recommendations.
 - b. Follow Manufacturer's ambient conditions for minimum and maximum application temperatures and application precautions when rain is expected.
 - c. Stir material thoroughly before and during application if required by Manufacturer.
 - d. Do not apply sealer if standing water is visible on concrete surface to be treated.
 - e. Apply even distribution of sealer.
 - f. Do NOT over apply. All product should penetrate substrate with no surface build-up. Any excess or puddles of material must be removed.
 2. Apply Concrete Sealer:
 - a. Linseed Oil/Mineral Spirits Sealers:
 - 1) For maximum protection, apply onto concrete surface before it is exposed to deicing salts.
 - 2) Do not apply in temperatures below 40 deg F.
 - 3) Apply first coat at 1 gallon per 350 sq ft.
 - 4) When first coat is dry to touch, apply second coat at 1 gallon per 600 sq ft.
 - 5) When second coat is totally dry, surface is ready for traffic.
 - 6) Texture and absorption of surface will influence final coverage rates.
 - 7) This application will turn concrete to dark amber color.
 - b. Silane Based Sealers:
 - 1) Apply at rate of about 1 gallon per 300 sq ft or as per Manufacturer's recommendations depending upon absorbency of concrete surface.
 3. Allow Concrete Sealer to dry as per Manufacturer's recommendations.

3.4 CLEANING

- A. General:
 1. Clean tools, equipment and spills as directed by Manufacturer's instructions.
 2. Clean drips and over spray while still wet.
- B. Waste Management:
 1. Sterilant/Concrete Sealers:
 - a. Follow Manufacturer's recommendations for approved disposal of product and containers.
 - 1) Do not reuse empty containers.

END OF SECTION

- a. ASTM C309-11, 'Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete'.

1.3 SUBMITTALS

- A. Action Submittals:
 1. Product Data:
 - a. Manufacturer's product data.
 - b. Material Safety Data Sheets (MSDS).
- B. Informational Submittals:
 1. Manufacturer Instructions:
 - a. Printed installation instructions.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 1. Comply with applicable VOC standards and other local requirements.

1.5 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. Follow Manufacturer's written instructions for handling and storage of product:
 - a. Store in unopened containers in clean, dry area between 35 deg F and 110 deg F (Keep from freezing) or as directed by Manufacturer's instruction.
 2. Shelf Life: Do not use curing compound that is over one (1) year from manufacturer date.

1.6 FIELD CONDITIONS

- A. Ambient Conditions:
 1. Do not apply curing compound when temperature of concrete is less than 40 deg F.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Membrane Concrete Curing:
 1. Description:
 - a. Clear water-based, ready-to use membrane curing agent that cures freshly placed concrete, forming effective barrier against moisture loss from concrete surface.
 2. Design Criteria:
 - a. Exterior Concrete:
 - 1) Dissipating or non-dissipating membrane curing agent.
 - b. Interior Concrete:
 - 1) Dissipating membrane curing agent only.
 - c. VOC-compliant compound.
 - d. Meet requirements of ASTM C309 and AASHTO M 148, Type 1 or 1-D, Class B.
 - e. Interior concrete: containing no mineral spirits, naphtha, or other components detrimental to finish flooring installation.
 - f. Maintain ninety-five (95) percent of mix water present in concrete mass after application.

- g. Gradually dissipate after twenty-eight (28) days without leaving stain or discoloring concrete surface.
- 3. Horizontal and Vertical Cast-In-Place Structural Concrete:
 - a. Type One Acceptable Products:
 - 1) Exterior Concrete:
 - a) Clear Cure J7WB by Dayton Superior Corporation, Miamisburg, OH www.daytonsuperior.com.
 - b) Clear Water Resin by Right Point, Dekalb, IL www.rightpointe.com.
 - c) L&M Cure R by L&M Construction Chemicals, Inc. Omaha, NE www.lmcc.com.
 - d) VOCOMP 20 (do not use when concrete sealer will be applied in areas of freeze/thaw and deicer salts) by W.R. Meadows, Inc. Hampshire, IL www.wrmeadows.com.
 - e) 1100-Clear by W. R. Meadows, Inc. Hampshire, IL www.wrmeadows.com.
 - 2) Interior Concrete:
 - a) Clear Cure J7WB by Dayton Superior Corporation, Miamisburg, OH www.daytonsuperior.com.
 - b) Clear Water Resin by Right Point, Dekalb, IL www.rightpointe.com.
 - c) L&M Cure R by L&M Construction Chemicals, Inc. Omaha, NE www.lmcc.com.
 - d) 1100-Clear by W. R. Meadows, Inc. Hampshire, IL www.wrmeadows.com.
 - b. Equal product meeting design criteria requirements as approved by Architect/Owner's Representative before BID. See Section 01 6200.

PART 3 - EXECUTION: Not Used

END OF SECTION

- a. ASTM C1107/C1107M-17, 'Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink).'
2. United States Army Corps of Engineers (USACE):
 - a. CRD C-621-93, 'Handbook for Concrete and Cement Standard Specification for Packaged, Dry, Hydraulic-Cement Grout (Non-shrink).

1.3 SUBMITTALS

- A. Action Submittals
 1. Product Data:
 - a. Manufacturer's data sheets on each product to be used, including:
 - 1) Preparation instructions and recommendations.
 - 2) Storage and handling requirements and recommendations.
 - 3) Manufacturer's printed installation instructions for each product.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Delivery And Acceptance Requirements:
 1. Materials shall be delivered in original, unopened packages with labels intact clearly identifying product name and manufacturer until time of use.
- B. Storage And Handling Requirements:
 1. Follow Manufacturer's recommendations including but not limited to following:
 - a. Store in clean, dry location.
 - b. Keep containers sealed until ready for use.
 - c. Store materials at room temperature before use.
 2. Protect materials during handling and placement to prevent damage or contamination.
 - a. Protect materials from freezing or overheating.
 3. Shelf Life: One (1) year minimum in original, unopened containers.

1.5 FIELD CONDITIONS

- A. Ambient Conditions:
 1. General:
 - a. Do not place grout over frozen concrete.
 2. Maintain environmental conditions and protect Work during and after installation to comply with referenced standards and Manufacturer's printed recommendations:
 - a. Do not install products under environmental conditions outside Manufacturer's recommendations.
 3. Follow ACI requirements for cold and hot weather concreting or Manufacturer's written instructions, whichever is more stringent:
 - a. Cold Weather Limitations:
 - 1) Follow requirements of ACI 306R for cold weather concreting.
 - b. Hot Weather Limitations:
 - 1) Follow requirements of ACI 305R for hot weather concreting.
 - c. ACI 305R-10, 'Guide to Hot Weather Concreting'.
 - d. ACI 306R-10, 'Guide to Cold Weather Concreting'.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Design Criteria:
 1. Description:

- a. Commercial non-shrink, non-metallic grout.
2. Meet following requirements:
 - a. ASTM C1107/C1107M, Type B or Type C.
 - b. Corps and Engineers CRD C-621.
 - c. Compressive strength of 6000 psi minimum.
- B. Type Two Acceptable Products:
 1. Masterflow 928 by BASF Systems, Shakopee, MN or BASF Canada, Mississauga, ON www.buildingsystems.basf.com.
 2. ProSpec F77 by Bonsal American, Inc., Charlotte, NC www.bonsal.com.
 3. Advantage 1107 Grout by Dayton Superior Corporation, Oregon, IL www.daytonsuperiorchemical.com.
 4. NS Grout by Euclid Chemical Company, Cleveland, OH www.euclidchemical.com.
 5. Five Star Grout by Five Star Products Inc, Fairfield, CT www.fivestarprouducts.com.
 6. Duragrout by L&M Construction Chemicals Inc., Omaha, NE www.lmcc.com.
 7. Planigrout 712 by MAPEI Corporation, Deerfield Beach, FL www.mapei.US or Mapei Inc., Laval, QC www.mapei.com/CA.
 8. SikaGrout 212 by Sika Corporation, Lyndhurst, NJ www.usa.sika.com or Sika Canada, Inc. Pointe-Claire, QC www.can.sika.com.
 9. MP Grout by US Mix Products Company, Denver, CO www.usspec.com.
 10. Sealtight CG-86 Grout by W R Meadows, Hampshire, IL www.meadows.com.
 11. Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 1. Examine substrate and verify substrate is suitable for installation.
 2. Notify Architect of unsuitable conditions in writing.
 - a. Do not install board over unsuitable conditions.
 - b. Commencement of Work by installer is considered acceptance of substrate.

3.2 PREPARATION

- A. Surface Preparation:
 1. Prepare concrete surfaces in accordance with Manufacturer's written instructions:
 2. Remove all loose materials.
 3. Clean surface of any substance that could interfere with bond on material including dirt, paint, tar, asphalt, wax, oil, grease, latex compounds, form release agents, laitance, loose toppings, foreign substances and any other residues.
 4. Saturate area to be grouted with water in accordance with Manufacturer's written instructions.

3.3 APPLICATION

- A. General:
 1. Follow Manufacturer's recommended thickness.
- B. Mixing:
 1. Mix grout in accordance with Manufacturer's written instructions.
 2. Add mix water in amount in accordance with Manufacturer's written instructions to provide required placing consistency.
 3. Do not add water in amount that will cause bleeding or segregation of mixed grout.
 4. Do not add any sand, cement, admixtures, or fluidifiers to grout.

- C. Placement:
 - 1. Place grout in accordance with Manufacturer's written instruction including but not limited to the following:
 - a. Proper curing is required.
 - b. Use cold weather or hot weather grouting procedures in accordance with Manufacturer's written instructions, as temperature dictates:
 - 1) Do not use at temperatures that may cause premature freezing.
 - 2) Do not allow to freeze until 4000 psi is attained.
 - c. Employ cold weather or hot weather grouting practices as temperatures dictates.
 - 2. Completely eliminate air pockets and provide full contact between grout and item being grouted. Do not exceed Manufacturer's recommended thickness.
- D. Curing:
 - 1. Cure grout in accordance with Manufacturer's written instructions or ACI curing practices.
 - 2. Wet cure grout until forms are removed.
 - 3. Seal grout surfaces after forms are removed as recommended by Manufacturer.
- E. Keep grout surfaces wet after curing compound has dried for as long as recommended by Manufacture.

3.4 FIELD QUALITY CONTROL

- A. Field Inspections:
 - 1. Verify product has been installed as per Contract Documents and Manufacturer's written instructions.
- B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
 - 1. Correct any work found defective or not complying with Contract Document requirements at no additional cost to the Owner.

3.5 CLEANING

- A. Use clean water.
- B. Clean tools and equipment with water before material hardens.

3.6 PROTECTION

- A. Follow Manufacturer's recommendation for protection when applying material.
- B. Protect placed grout from freezing until minimum strength of 4000 psi is reached.
- C. Protect placed grout from damage during construction.

END OF SECTION

SECTION 04 2113**BRICK VENEER UNIT MASONRY****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install masonry units as veneer on framing as described in Contract Documents.

- B. Products Installed But Not Furnished Under This Section:
 - 1. Engraved Stone Panel Signage.
 - 2. Masonry Accessories:
 - a. Drip edge/plate.
 - b. Flexible flashing for brick sills.
 - c. Flexible flashing for bottom of masonry veneer.
 - d. Mortar guard.
 - e. Termination bar.
 - f. Weep vents.
 - 3. Masonry Veneer Ties.
 - 4. Metal Lintels.
 - 5. Reglets.

- C. Related Requirements:
 - 1. Sections Under 04 0000 Heading: 'Masonry':
 - a. Pre-installation conference held jointly with other masonry related sections.
 - 2. Section 04 0501: 'Common Masonry Requirements' for:
 - a. Common masonry requirements and procedures.
 - b. Pre-installation conference held jointly with other masonry related sections.
 - 3. Section 04 0513: 'Cement and Lime Masonry Mortaring' for quality of mortar.
 - 4. Section 04 0521: 'Masonry Veneer Ties' for quality of masonry veneer ties.
 - 5. Section 04 0523: 'Masonry Accessories' for furnishing drip edge/plate, flexible flashing, mortar guard, termination bars and weep vents.
 - 6. Section 05 1223: 'Structural Steel Buildings' for metal lintels.
 - 7. Section 07 7126: 'Reglets'.
 - 8. Section 07 9213: 'Elastomeric Joint Sealants'.
 - 9. Section 10 1424: 'Engraved Stone Panel Signage'.

1.2 REFERENCES

- A. Definitions:
 - 1. Section 04 0501: 'Common Masonry Requirements' for:
 - a. Common Masonry Terms.
 - b. Brick and Brick Classifications.

- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM C67-18, 'Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile'.
 - b. ASTM C216-17a, 'Standard Specification for Facing Brick (Solid Masonry Made from Clay or Shale)'.
 - 2. The Masonry Society (TMS):
 - a. TMS 402/602-16, 'Building Code Requirements and Specification for Masonry Structures'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 - 1. Participate in MANDATORY pre-installation conference as specified in Section 01 3100 held jointly with other Division 04 'Masonry' specifications in this Project that require pre-installation conference as specified in Section 04 0501.
 - a. Schedule pre-installation conference during construction of mockup panel.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Samples:
 - a. One (1) full size brick minimum, one (1) sample of each special shape, and physical samples which demonstrate full range of color and texture.
 - b. Type of veneer tie used.
- B. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Record Documentation:
 - 1) Manufacturers Documentation:
 - a) Brick Manufacturer's literature or cut sheet.
 - b) Brick color and type selection.
 - 2) Testing and Inspection Reports:
 - a) Testing Agency Testing and Inspecting Reports.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
 - a. Minimum of five (5) years' experience on successfully completed projects of similar nature.
- B. Testing And Inspection:
 - 1. As specified in Section 04 0501: 'Common Masonry Requirements'.
- C. Mockups:
 - 1. Sample panel 4 feet (1.20 m) long by 3 feet (900 mm) high of proposed color range, texture, bond, mortar, and workmanship. Include mock-up framing and sheathing to show wall construction to be used on Project, including:
 - a. Anchor and tie systems.
 - b. Any specialty details, such as reveals, soldier courses, window details and etc.
 - c. Brick expansion joints if required on Project.
 - d. Flexible flashing and required components at foundation.
 - e. Seismic reinforcing.
 - 2. Sample panel(s) shall be constructed using 'production run' material to be used on Project unless otherwise approved in writing by Architect and/or Owner.
 - 3. Sample panel(s) to be used as standard of comparison for masonry work built of same material.
 - 4. Sample panel(s) shall remain at jobsite until all masonry is completed.
 - 5. Do not start work of this Section until Architect has accepted sample panel(s).

1.6 DELIVERY, HANDLING, AND STORAGE

- A. Delivery And Acceptance Requirements:
 - 1. As specified in Section 04 0501: 'Common Masonry Requirements'.
- B. Storage And Handling Requirements:
 - 1. Aggregate, Cementitious Material, Masonry Accessories, Masonry Units, and Reinforcement:

- a. As specified in Section 04 0501: 'Common Masonry Requirements'.

1.7 FIELD CONDITIONS

A. Ambient Conditions:

1. Cold Weather and Hot Weather Limitations:
 - a. As specified in Section 04 0501: 'Common Masonry Requirements'.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Design Criteria:

1. Face Brick: Meet requirements of ASTM C216 or CSA A82.
 - a. Brick Grade SW.
 - b. Brick Type: FBX.
 - c. Efflorescence:
 - 1) Provide brick that has been tested according to ASTM C67 and is rated 'Not Effloresced'.
 - d. Initial rate of absorption: Less than **30 sq. in (30 g)** per minute when tested per ASTM C67.
 - e. Size (actual dimensions): Match existing.
 - f. Brick shall be free of defects, deficiencies, and surface treatments, including coatings that would interfere with proper setting of brick or significantly impair strength or performance of Work.
 - g. Face or faces that will be exposed in place shall be free of chips that exceed limits set in ASTM C216 of five (5) percent for FBX. Aggregate length of chips shall not exceed ten (10) percent.
 - h. Other than chips, face or faces shall be free of cracks or other imperfections detracting from appearance of designated sample when viewed from distance of **15 feet (4.6 meters)** away. Number of brick in delivery that are broken or otherwise fail to meet requirements for chippage and tolerances shall not exceed five (5) percent.
2. Brick shall be cleanable using standard method specified below when using specified mortar.

B. Materials:

1. Mortar (as specified in Section 04 0513: 'Cement And Lime Masonry Mortaring'):
 - a. Type 'N' preferred for unit masonry three stories or less. Use Type 'S' if unit masonry is over three stories.
2. Brick:
 - a. Brick shall be true to size and shape. No warped brick permitted. Brick for Project shall be fired in same run.
 - b. Match existing in size, color, and texture.

2.2 ACCESSORIES

A. Cleaning Compounds:

1. Use type of compound recommended by Brick Manufacturer based on minerals present in masonry units.
2. Type Two Acceptable Products:
 - a. 202 or 202V by Diedrich Technologies, Oak Creek, WI www.diedrichtechnologies.com.
 - b. Sureklean No. 600 or Vana-Trol by ProSoCo Inc, Kansas City, KS www.prosoco.com.
 - c. Equal as approved by Architect before use. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 - 1. Examine substrate and verify substrate is suitable for installation of masonry.
 - 2. Verify built-in items are in proper location, and ready for roughing into masonry.
 - 3. Notify Architect of unsuitable conditions in writing.
 - a. Do not install masonry over unsuitable conditions.
 - b. Commencement of Work by installer is considered acceptance of substrate.

3.2 PREPARATION

- A. Coordinate placement of reinforcement, anchors and accessories, flashings and weep holes and other moisture control products specified in other sections.
- B. Clean:
 - 1. Prior to placing masonry:
 - a. Clean reinforcement and shanks of anchor bolts by removing mud, oil, or other materials that will adversely affect or reduce bond at time mortar or grout is placed.
 - b. Remove laitance, loose aggregate, and anything else that would prevent mortar from bonding to foundation.

3.3 INSTALLATION

- A. Interface With Other Work:
 - 1. Masonry Cutting:
 - a. Make cuts proper size to accommodate work of other trades.
 - b. Cut openings for electrical devices using cover plates no larger than can be covered by standard size plate.
 - c. Replace unit masonry in which larger than necessary openings are cut.
 - d. Do not patch openings with mortar or other material.
- B. General:
 - 1. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
 - 2. Step back unfinished work for joining with new work. Use toothing only with Architect's approval.
 - 3. Built-In Work:
 - a. As work progresses, install masonry flashings and weep holes and other built-in work specified in other sections.
- C. Mortar:
 - 1. Use mortar within two (2) hours of initial mixing. Discard mortar that has begun to set. Set masonry units within one (1) minute of spreading mortar.
 - 2. Do not allow mortar build-up in cavity between brick veneer and wall framing.
 - 3. Cold Weather and Hot Weather Limitations:
 - a. Place mortar as specified in Section 04 0501: 'Common Masonry Requirements'.
- D. Tolerances:
 - 1. Masonry shall be laid true to vertical and horizontal planes within **1/8 inch in 10 feet (3 mm in 3 meters)**, non-cumulative. Recess masonry where indicated.
 - 2. Maintain **3/8 inch (9.5 mm)** mortar joints throughout.
- E. Brick Masonry Units:
 - 1. Laying:
 - a. Layout:

- 1) Running bond except where noted otherwise. Select brick so there is uniform distribution of hues.
- 2) Use solid brick where brick coursing would otherwise show cores.
- b. Joints:
 - 1) Do not tool until mortar has taken initial set.
 - 2) Tool concave. When tooling joints, squeeze mortar back into joint.
 - 3) Point holes in joints. Fill and tool properly.
- c. Brick:
 - 1) Wet each brick to saturation. Lay brick when surface is dry. Brick absorption when laid should not exceed **0.025 oz/sq inch (457 g/sq mm)** maximum.
 - 2) Shove brick into place in full mortar bed, do not lay.
 - 3) Completely fill horizontal and vertical joints. Do not furrow bed joints.
 - 4) Strike back-side joints on brick flush. Do not allow mortar build-up in cavity between masonry veneer and stud wall sheathing.
 - 5) Step back unfinished work for joining with new work. Use toothing only with Architect's approval.
2. Placing Mortar:
 - a. General:
 - 1) Use mortar within two (2) hours of initial mixing. Discard mortar that has begun to set.
 - 2) Set masonry units within one (1) minute of spreading mortar.
 - b. Bed joints at foundations:
 - 1) In starting course on foundations and other supporting members, construct bed joints so that bed joint thickness is at least **1/4 inch (6.4 mm)** and not more than:
 - a) **3/4 inch (19 mm)** when masonry is ungrouted or partially grouted.
 - b) **1-1/4 inch (32 mm)** when first course of masonry is solid grouted and supported by concrete foundation.
 - c. Bed and head joints:
 - 1) Unless otherwise required, construct **3/8 inch (9.5 mm)** thick bed and head joints, except at foundation.
 - 2) Construct joints that also conform to following:
 - a) Fill holes not specified in exposed and below grade masonry with mortar.
 - b) Tool joint with round jointer when mortar is thumbprint hard.
 - c) Remove masonry protrusions extending **1/2 inch (12.7 mm)** or more into cells or cavities to be grouted.
 - d. Solid units:
 - 1) Unless otherwise required, place mortar so that bed and head joints are fully mortared and:
 - a) Do not fill head joints by slushing with mortar.
 - b) Construct head joints by shoving mortar tight against adjoining unit.
 - c) Do not deeply furrow bed joints.
 - e. Open end units with beveled ends:
 - 1) Fully grout open-end units with beveled ends.
 - 2) Head joints of open-end units with beveled ends need not be mortared:
 - a) At beveled ends, form grout key that permits grout within **5/8 inch (15.9 mm)** of face of unit.
 - b) Tightly butt units to prevent leakage of grout.
- F. Masonry Veneer Ties:
 1. Place corrugated sheet-metal anchors, sheet-metal anchors, and wire anchors as follows:
 - a. Free of material that may destroy bond.
 - b. Install in same course as masonry as brick reinforcement on centerline of brick width.
 - c. Install as detailed by screwing through sheathing into framing:
 - 1) Install as detailed by screwing through sheathing into framing.
 - 2) Begin approximately **8 inches (200 mm)** from base of masonry and with maximum spacing of **16 inches (400 mm)** vertically and at each vertical stud horizontally.
 - 3) Install final row of ties within **8 inches (200 mm)** of top course of brick.
 - d. Provide at least one (1) adjustable two-piece anchor, anchor of wire size W 1.7 (MWII), or **22 ga (0.8 mm)** corrugated sheet-metal anchor for each **2.67 sq ft (0.25 sq m)** of wall area.
 - 1) Provide at least one anchor of other types for each **3.5 sq ft (0.33 sq m)** of wall area.

- e. Space anchors at maximum of **32 inches (813 mm)** horizontally and **25 inches (635 mm)** vertically, but not to exceed applicable requirement of as specified in two previous paragraphs.
- f. Provide additional anchors around openings larger than **16 inch (400 mm)** in either dimension:
 - 1) Space anchors around perimeter of opening at maximum of **3 feet (0.90 m)** on center.
 - 2) Place anchors within **12 inch (300 mm)** of opening.
2. Seismic Reinforcing:
 - a. Install in same course as masonry ties on centerline of brick width.
 - b. Attach reinforcing to ties in accordance with Manufacturer's instructions.
 - c. Lap ends of horizontal joint reinforcing **8 inches (200 mm)** at joints.
- G. Flashing:
 1. General:
 - a. Install embedded flashing, metal drip edges, with weep holes and other components in masonry at lintels, ledges, floors, and other obstructions to downward flow of water in wall, and where indicated.
 - b. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 2. Flexible flashing:
 - a. Install embedded flashing behind lower edge of air infiltration barrier.
 - b. Carry flashing vertically as detailed, but not less than **6 inch (150 mm)** above horizontal plane.
 - c. Lap flexible flashing minimum of **6 inch (150 mm)**.
 - d. Seal all flashing laps with compatible lap cement.
 - e. Install flashing with sealant between flashing and drip edge/plate.
 - f. Do not stop flashing behind face of brickwork.
 - g. Place flashing at all points where air space is interrupted.
 - h. Extend head flashings no less than **6 inch (150 mm)** beyond edges of openings and turn up to form watertight pan, seal with mastic.
 - i. Extend sill flashings no less than **8 inch (200 mm)** minimum height to form watertight pan, seal with mastic.
 - j. All discontinuous flashing shall be turned up minimum **1 inch (25 mm)** into head joint a flashing ends to form an end dam.
 3. Drip edge/plate: Install with sealant (or equal) between drip edge/plate and substrate.
 4. Termination bar: Install termination bar with sealant.
- H. Weep Holes:
 1. General:
 - a. Weep holes must be placed at base of cavity and at all other flashing levels providing means of draining away any moisture that may have found its way into cavity.
 - b. Weep holes must provide clear access to cavity and must be placed directly on flashing for proper drainage.
 2. Install weep vents in weep holes at **33 inches (875 mm)** on center maximum at bottom masonry course at foundation and above windows and doors.
- I. Vents (Open Head Joints):
 1. Place vents at top of cavity air space of full height masonry walls.
 2. Install weep vents in weep holes at **33 inches (875 mm)** on center maximum and should be centered between weep holes at base of Masonry wall.
- J. Mortar Guard:
 1. Place mortar guard continuously between brick and sheathing at bottom masonry course at foundation and above windows, and doors.
- K. Expansion Joints:
 1. Unit Masonry:
 - a. See Contract Drawings if required):

- 1) Keep clean of all mortar and debris.
- 2) Install expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span expansion joints without provision to allow for in-plane wall or partition movement.
- 3) Provide vertical joints where indicated by inserting compressible filler of width required for installing backer rod and sealant specified in section 07 9213: 'Elastomeric Joint Sealants', but not less than **3/8 inch (9.5 mm)**.

3.4 FIELD QUALITY CONTROL

A. Non-Conforming Work:

1. Remove and replace defective material at Architect's direction and at no additional cost to Owner.

3.5 CLEANING

A. General:

1. Clean exposed masonry surfaces of stains, efflorescence, mortar and grout droppings, and debris using methods that do not damage masonry
2. After mortar has hardened, wet masonry and clean with specified cleaning compound. Use stiff fibered brush for application. Rinse masonry surfaces with water immediately after cleaning. Leave masonry clean, free of mortar daubs, and with tight mortar joints.
3. Wash adjacent non-masonry surfaces. Use detergent and soft brushes or cloth.
4. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

B. Waste Management:

1. Clean up masonry debris and remove from site.

3.6 PROTECTION

A. General:

1. During construction, all walls should be kept dry by covering top of wall with a strong, water-resistant membrane at end of each day or shutdown period. Covering should overhang wall by at least **24 inches (610 mm)** on each side, and should be secured against wind.
2. Covering should remain in place until top of cavity wall is completed or protected by adjacent materials.
3. Protect masonry with covering during rainy weather.

B. Cold Weather Requirements:

1. In cold weather, all materials and walls should be properly protected against freezing including storing of materials, preparation of mortar, heating of masonry units, laying precautions, and protection of Work.
2. Remove all masonry deemed frozen or damaged.

C. Stain prevention: Prevent grout, mortar, and soil from staining face of masonry to be left exposed. Immediately remove mortar and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with pointed and integral finishes, from mortar droppings.
4. Turn scaffold boards near wall on edge at end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

END OF SECTION

1.3 SUBMITTALS

- A. Informational Submittals:
1. Certificate: Certificate of pressure treatment showing compliance with specification requirements and including information required under IBC Section 2303.1.8.1, 'Identification'.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Manufacturers:
1. Type One Acceptable Manufacturers:
 - a. Arch Wood Protection Inc, Atlanta, GA www.wolmanizedwood.com.
 - b. Hoover Treated Wood Products, Thomson, GA www.frtw.com.
 - c. Osmose Inc, Griffin, GA www.osmose.com.
 - d. U S Borax Inc, Valencia, CA www.borax.com/wood.
 - e. Viance LLC, Charlotte, NC www.treatedwood.com.
 - f. Equal as approved by Architect before bidding. See Section 01 6200.
- B. Performance:
1. Framing lumber grade and species shall be as specified in Section 06 1100 for particular use.
 2. Interior Wood in Contact with Concrete or Masonry:
 - a. Preservatives:
 - 1) Disodium octoborate tetrahydrate (DOT / SBX) meeting requirements of AWPA U1 and with retention of 0.25 lbs per cu ft.
 - 2) Zinc borate meeting requirements of AWPA U1 and with retention of 0.17 lbs per cu ft.
 - 3) CCA-C (47.5 percent chromium trioxide, 18.5 percent copper oxide and 34 percent arsenic pentoxide) by Koppers Performance Chemicals, Griffin, Georgia, <http://www.koppersperformancechemicals.com/> (0.25 lb/cu ft minimum retention).
 - 4) DURA-GUARD by Hoover Treated Wood Products, Thomson, GA www.frtw.com (.40 lb/cu ft minimum retention).
 - b. Lumber: Treat in accordance with AWPA U1.
 3. Exterior Wood Continuously Exposed To Weather:
 - a. Preservatives: Waterborne preservatives meeting requirements of AWPA U1 with retention levels as required by AWPA U1 for specific application.
 - b. Lumber: Treat in accordance with AWPA U1.

PART 3 - EXECUTION: Not Used

END OF SECTION

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	Length	Diameter
8d Box	2-1/2 inches	0.113 inch	63.5 mm	2.827 mm
8d Common	2-1/2 inches	0.131 inch	63.5 mm	3.389 mm
10d Box	3 inches	0.128 inch	76.2 mm	3.251 mm
10d Common	3 inches	0.148 inch	76.2 mm	3.759 mm
16d Box	3-1/2 inches	0.135 inch	88.9 mm	3.411 mm
16d Sinker	3-1/4 inches	0.148 inch	82.6 mm	3.759 mm
16d Common	3-1/2 inches	0.162 inch	88.9 mm	4.115 mm

- B. Materials:
 - 1. Wood fastener list:
 - a. Provide VMR Suppliers with wood fastener list.
 - 2. 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.
3. 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.
4. 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

6. Section 06 1753: 'Shop Fabricated Wood Trusses'.
7. Section 06 1800: 'Glued-Laminated Construction'.
8. Sections under 06 4000 Heading: 'Architectural Woodwork' for wall blocking requirements.
9. Sections in Division 07: Roofing membranes for related blocking, wood nailers, and curbs.
10. Section 08 4113: 'Aluminum-Framed Entrances and Storefronts':
 - a. Pre-installation conference held jointly with Section 06 1100.

1.2 REFERENCES

- A. Association Publications:
 1. American Lumber Standard Committee (ALSC) (Maintains NIST standard):
 - a. Voluntary Product Standard:
 - 1) PS 20-15, 'American Softwood Lumber Standard'.
 2. National Institute of Standards and Technology (NIST), U. S. Department of Commerce:
 - a. Voluntary Product Standard DOC PS 20-15, 'American Softwood Lumber Standard'.
- B. Reference Standards:
 1. Truss Plate Institute / Structural Building Components Association:
 - a. TPI / SBCA. 'Building Component Safety Information BCSI 2013, 'Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses'.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 1. Participate in MANDATORY 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) Equipment and gypsum board blocking in wood framed walls.
 - 2) Operable partition headers.
 - 3) Rough opening.
 - 4) Shear walls and struts.
 - 5) Nails and nailing requirements.
 - 6) Truss installation.
 - 7) 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.
 2. Manufacturer Instructions:
 - a. Copies of pamphlets specified in REFERENCE Article. After Architect's examination, keep pamphlets on Project site with approved shop drawings. Pamphlets may be obtained from Truss Plate Institute, Wood Truss Council of America, or from Truss Fabricator.
 3. Qualification Statements:
 - a. Alternate Supplier(s):
 - 1) Provide name and contact information.
 - 2) Provide Qualification documentation as requested.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Suppliers:

- a. Licensed by American or Canadian Institute of Timber Construction, or American Wood Systems.
- b. Category Three Approved Suppliers Approved Supplier(s):
 - 1) Approval subject to agreement process approval.
- c. Alternate Supplier(s):
 - 1) Fabricator Firm specializing in performing work of this section:
 - a) Firm experience in supplying products indicated for this Project.
 - b) Financial stability.
 - c) Sufficient production capacity to produce required units.
 - d) Comply with specifications and Contract Documents.
 - e) Agree to complete reporting documents, including: Agree to provide total costs to the Church including breakdown costs of millwork.
 - 2) Submit documentation to Architect or Owner.

1.6 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.
3. Handle and store wood trusses in accordance with ANSI / WTCA Booklet BSCI except trusses may be unloaded by dumping if trusses are shipped horizontally, are rolled off low profile roller bed trailer, and no part of any truss is required to drop more than 18 inches.

PART 2 - PRODUCTS

2.1 SUPPLIERS

A. Suppliers:

1. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements:
 - a. BMC, West Jordan, UT. www.BuildWithBMC.com. Contact Par Palmer:
 - 1) Office: (801) 224-0541.
 - 2) Mobile: (801) 376-9853.
 - 3) E-Mail: Par.Palmer@BuildWithBMC.com or www.BuildWithBMC.com.
 - b. J. M. Thomas Forest Products, Ogden, UT. www.thomasforest.com. Contact Tom Karren:
 - 1) Office: (800) 962-8780.
 - 2) FAX: 801-782-9652.
 - 3) E-Mail: tom@thomasforest.com.
 - c. Shelter Products, Inc., Portland, OR www.shelter-products.com. Contact Mike Running:
 - 1) Office: (800) 662-3612.
 - 2) Cell: NA.
 - 3) FAX: (503) 238-2663.
 - 4) E-Mail: mrunning@shelter-products.com.

INFORMATION: Alternate Supplier(s) are to be included on each project. One or two Alternate Supplier(s) are to be included as approved by Project Manager. Alternate Supplier(s) must provide Qualification Statement submittal as outlined in this specification to Project Manager. Provide Supplier name(s) and contact information.

- d. Alternate Supplier:

- 1) .
- 2) .

2.2 MATERIALS

- A. Wood Framing List:
 1. Provide Category Three Approved Suppliers with wood framing list.
- B. 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 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. Preservative Treated Plates / Sills:
 - 1) 2x4: 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 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).
- C. Posts, Beams, And Timbers 5 Inches by 5 Inches and Larger:
 1. Design Criteria:
 - a. No. 1 or better Douglas Fir or Southern Pine.
- D. Lumber Ledgers:
 1. Design Criteria:
 - a. No. 2 Douglas Fir-Larch, or Southern Pine.
- E. See Contract Drawings for additional requirements.

2.3 ACCESSORIES

- A. Blocking:
 1. Sound lumber without splits, warps, wane, loose knots, or knots larger than 1/2 inch.
- B. Furring Strips:
 1. Utility or better.
- C. Sill Sealer:
 1. Closed-cell polyethylene foam, 1/4 inch 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 in 20 feet, non-cumulative in length of wall.
 - b. 1/8 inch in 10 feet with 1/4 inch maximum in height of wall.
 - c. Distances between parallel walls shall be 1/4 inch 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.
 4. Firestops:
 - a. Horizontal or vertical concealed spaces in walls, light coves, soffits, drop ceilings, and other features over 10 feet 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, length or height.
 5. Sill Plates:
 - a. Shear Walls and Bearing Walls:
 - 1) Provide specified anchor 12 inches maximum and 4 inches 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 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. Posts And Columns:
 - a. Unless shown otherwise, nail members of multiple member columns together with 16d at 6 inches on center from each side.
 7. Beams And Girders:
 - a. Built-Up Members:
 - 1) Stagger individual members of multiple span beams and girders so, over any one support, no more than half the members will have a joint. In all cases, however, joints shall occur over supports.
 - 2) Unless shown otherwise on Drawings, nail two-ply built-up members with 10d nails 12 inches on center top and bottom, staggered on opposite sides. Nail three-ply built-up members with 16d nails at 12 inches on center, top and bottom, staggered, on opposite sides. Set with crown edge up with full bearing at ends and intermediate supports.
 - b. Pre-Fabricated Members:
 - 1) Solid glu-lam, LVL, LSL, or PSL members may be used in place of built-up 2x framing members. Size shall be same as built-up member.
 - 2) Solid LVL or PSL members may be used in place of built-up LVL members. Size shall be same as sum of built-up members.
 - c. Wood shims are not acceptable under ends.
 - d. Do not notch framing members unless specifically shown in Drawing detail.

8. Nailing:
 a. Stud to plate (coordinate with Contract Drawings):

2 by 4 inch nominal	38 by 89 mm	End nail, two 16d OR toe nail, four 8d
2 by 6 inch nominal	38 by 140 mm	End nail, three 16d OR toe nail, four 8d
2 by 8 inch nominal	38 by 184 mm	End nail, four 16d OR toe nail, six 8d
2 by 10 inch nominal	38 by 235 mm	End nail, five 16d OR toe nail, six 8d
1-3/4 by 5-1/2 inch LVL	44 by 140 mm LVL	End nail, three 16d OR toe nail, four 8d
1-3/4 by 7-1/4 inch LVL	44 by 184 mm LVL	End nail, four 16d OR toe nail, six 8d
1-3/4 by 9-1/4 inch LVL	44 by 235 mm LVL	End nail, five 16d OR toe nail, six 8d
1-3/4 by 11-1/4 inch LVL	44 by 286 mm LVL	End nail, six 16d OR toe nail eight 8d

- b. Top plates: Spiked together, 16d, 16 inches on center.
 c. Top plates: Laps, lap members 48 inches minimum and nail with 16d nails 4 inches on center
 d. Top plates: Intersections, three 16d.
 e. Backing And Blocking: Three 8d, each end.
 f. Corner studs and angles: 16d, 16 inches on center.
- F. Roof And Ceiling Framing:
1. Place with crown side up at 16 inches on center unless noted otherwise.
 2. Install structural blocking and bridging as necessary and as described in Contract Documents.
 3. Special Requirements:
 - a. Roof And Ceiling Joists: Lap joists 4 inches minimum and secure with code approved framing anchors.
 - b. Roof Rafters and Outlookers:
 - 1) Cut level at wall plate and provide at least 2-1/2 inches bearing where applicable. Spike securely to plate with three 10d nails.
 - 2) Attach to trusses or other end supports with framing anchors described in Contract Documents.
 - 3) Provide for bracing at bearing partitions.
 4. Installation of Wood Trusses:
 - a. Handle, erect, and brace wood trusses in accordance with TPI / WTCA Booklet BCSI.
 - b. Do not install damaged or broken wood trusses. Replace wood trusses that are broken, damaged, or have had members cut out during course of construction.
 - c. Provide construction bracing for trusses in accordance with TPI DSB-89.
 - d. Provide continuous 2x4 horizontal web bracing as shown on truss shop drawings.
 - 1) Secure bracing to each truss with two 10d or 16d nails.
 - 2) Lap splice bracing by placing bracing members side by side on common web member. Butt splices are not acceptable.
 - e. Unless directed or shown otherwise, provide diagonal 2x4 bracing between trusses at each line of horizontal web bracing.
 - 1) This diagonal bracing shall be continuous and extend from junction of web and top chord of one truss to junction of web and bottom chord of different truss.
 - 2) Install bracing at approximately 45-degree angle. Bracing will extend over three trusses minimum or more as determined by height of trusses and 45-degree installation angle.
 - 3) Install brace on side of web opposite horizontal web bracing and nail to each web with two 10d or 16d nails.
 - 4) Install one brace every 20 feet as measured from top of brace to top of next brace.
 5. Installation of Glue-Laminated Structural Units:
 - a. Install work in accordance with Fabricators instructions and Glue-Lam Erection Safety Practices.
 - b. Adequately support and brace work until tied into building structure to insure against collapse due to wind or other forces.
 - c. Maintain protection of beams until roofing has been installed.
 6. Installation of Structural Composite Lumber:
 - a. Install temporary horizontal and cross bracing to hold members plumb and in safe condition until permanent bracing is installed.
 - b. Install permanent bracing and related components before application of loads to members.

7. Installation of wood Web Joists:
 - a. Handle, erect, and brace sheathing wood web joists in accordance with Manufacturer's instructions.
 - b. Do not install damaged or broken wood web joists.
 - c. Install temporary horizontal and cross bracing to hold members plumb and in safe condition until permanent bracing is installed.
 - d. Cut holes through webs at locations or of sizes shown on Drawings and as recommended by Manufacturer.
 8. Secure headers and header backing to structure as described in Contract Documents.
- G. Accessory / Equipment Mounting and Gypsum Board Back Blocking (nailers) for Wood Framing:
1. Furnish and install blocking in wood framing required for hardware, specialties, equipment, accessories, and mechanical and electrical items, etc.
- H. Accessory / Equipment Mounting and Standing & Running Trim Blocking (nailers) for Metal Framing:
1. Furnish and install blocking in wood framing required for hardware, specialties, equipment, accessories, and mechanical and electrical items, etc.
 2. Attach blocking not installed with clips with two fasteners in each end of each piece of blocking.
- I. Furring Strips:
1. On Wood or Steel: Nail or screw as required to secure firmly.
 - a. Ceiling:
 - 1) Attach furring strips to the underside of structural elements with #8 wood screws, of length to penetrate wood framing 1 inch minimum.

END OF SECTION

- a. 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'.
 - b. ASTM C1177/C1177M-17, 'Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing'.
 - c. ASTM C1280-18, 'Standard Specification for Application of Gypsum Sheathing'.
 - d. ASTM D3273-16, 'Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber'.
 - e. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - f. ASTM E119-18c, 'Standard Test Methods for Fire Tests of Building Construction and Materials'.
2. Gypsum Association:
 - a. GA-253-07, 'Application of Gypsum Sheathing'.
 - b. GA-254-07, 'Fire-Resistant Gypsum Sheathing'.
 3. Underwriters Laboratories (UL):
 - a. UL 263: 'Test Method for Building Construction and Materials' (14th edition).
 - b. UL 723: 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'; (11th Edition - 2018).

1.3 SUBMITTALS

- A. Action Submittals:
 1. Product Data:
 - a. Manufacturer's specifications and installation instructions for each product specified.
- B. Closeout Submittals:
 1. Include following in Operations and Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Final, executed copy of Warranty.
 - b. Record Documentation:
 - 1) Manufacturers documentation:
 - a) Manufacturer's literature or cut sheet.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 1. Burning Characteristics:
 - a. Meet requirements of ASTM E84 or UL 723.
 2. Fire-Test-Response Characteristics:
 - a. For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E119 or UL 263 by testing and inspecting agency acceptable to authorities having jurisdiction.

1.5 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. Store materials stacked flat on leveled supports off ground to prevent sagging or damage to edges, ends and surfaces.
 2. Protect materials against damage from weather, direct sunlight exposure, surface contamination, construction traffic, or other causes.
 3. Follow Manufacturer's recommendations for protecting materials against mold from water exposure during storage, installation or after completion.

1.6 WARRANTY

- A. Manufacturer Warranty:
 - 1. Defects:
 - a. Manufacturer's five (5) year Limited Warranty against defects.
 - 2. Exposure:
 - a. Manufacturer's twelve (12) month Limited Warranty that product will withstand exposure to normal weather conditions when stored and installed according to Manufacturer's instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Manufacturers:
 - 1. Manufacturer Contact List:
 - a. CertainTeed Gypsum, Inc, Tampa, FL www.certainteed.com.
 - b. Georgia Pacific Gypsum Corp, Atlanta, GA www.gp.com.
 - c. USG, Chicago, IL www.usg.com.
- B. Gypsum Sheathing Board:
 - 1. Description:
 - a. Gypsum Sheathing is manufactured with a water resistive gypsum core with paper. Gypsum sheathing is intended for use as a substrate under exterior wall claddings in any climate.
 - 2. Design Criteria:
 - a. Non-fire-rated exterior wall construction:
 - 1) Meet requirements of ASTM C1177/C1177M, 1/2 inch thick, faced with water-resistant facing material front and back, and having treated core.
 - 2) Meet Burning Characteristics and Fire-Test Response Characteristics as specified in Quality Assurance in Part 1 of this specification.
 - 3) Meet mold resistance requirements of ASTM D3273: 10, in a test as manufactured.
 - 4) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
 - a) DensGlass Sheathing by Georgia Pacific.
 - b) GlasRoc Sheathing by CertainTeed.
 - c) Securock Glass-Mat by USG.

2.2 ACCESSORIES

- A. Fasteners:
 - 1. Bugle head screws as recommended by Sheathing Manufacturer and meeting requirements of ASTM C1002, corrosion resistant treated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification Of Conditions:
 - 1. Inspection:
 - a. Examine substrate and verify framing is suitable for installation of sheathing:
 - 1) Notify Architect of unsuitable conditions in writing.
 - 2) Do not install sheathing over unsuitable conditions.
 - 3) Commencement of Work by installer is considered acceptance of substrate.

3.2 INSTALLATION

- A. General:
 - 1. Non-fire-rated exterior wall construction:
 - a. Comply with requirements of ASTM C1280, or GA-254, and Manufacturer's written instructions.
- B. Walls:
 - 1. Fastening:
 - a. Apply from center of wallboard towards ends and edges.
 - b. Do not apply screws closer than 3/8 inch to ends or edges. Screws on adjacent ends or edges shall be opposite each other. Space screws not over 6 inches on center.
 - c. Adjust power screw-driver to set heads in 1/32 inch dimple.
 - d. Drive screws with shank perpendicular to face of board.
 - 2. Single Layer Application:
 - a. Use board of size to give minimum number of joints.
 - b. Edge joints to be parallel to and occur over framing members.
 - c. Butt edges in moderate contact. Do not force in place.
 - d. Leave facings true with joint, finishing flush, vertical work plumb.
 - 3. Sealing Sheathing Joint/Penetrations:
 - a. Seal as required, according to Sheathing Manufacturer's written recommendations.
- C. Gypsum Board used with Soffits: Eliminate control and taped joints where board is sheathed with aluminum.

3.3 PROTECTION

- A. Gypsum Sheathing used with EIFS:
 - 1. Follow Manufacturer's recommendation for protecting gypsum sheathing from moisture and deterioration damage until air barrier, structural sheathing or exterior finish system is installed.

END OF SECTION

1. Certificates: Provide certification confirming that material structural design properties and design stresses have met or exceed requirements shown on Drawings.
2. Test And Evaluation Reports: Copies of ICC or CCMC reports showing approval materials.
3. Qualification Statements:
 - a. Alternate Supplier(s):
 - 1) Provide name and contact information.
 - 2) Provide Qualification documentation as requested.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Suppliers:
 - a. Category Three Approved Supplier(s):
 - 1) Approval subject to agreement process approval.
 - b. Alternate Supplier(s):
 - 1) Fabricator Firm specializing in performing work of this section.
 - 2) Provide documentation of the following:
 - a) Firm experience in supplying products indicated for this Project.
 - b) Financial stability.
 - c) Sufficient production capacity to produce required units.
 - d) Comply with specifications and Contract Documents.
 - e) Agree to complete reporting documents, including: Agree to provide total costs to the Church including breakdown costs of millwork.
 - 3) Submit documentation to Architect or Owner.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage And Handling Requirements:

1. Store members on job site in accordance with Manufacturer's instructions.
2. Keep dry and provide supports to keep members off floor or ground.
3. Split plastic wrappers of members stored encased in plastic on bottom side to allow for air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

USA PROJECTS: Include following paragraph.

A. Suppliers:

1. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements:
 - a. BMC, West Jordan, UT. www.BuildWithBMC.com. Contact Par Palmer:
 - 1) Office: (801) 224-0541.
 - 2) Mobile: (801) 376-9853.
 - 3) E-Mail: Par.Palmer@BuildWithBMC.com or www.BuildWithBMC.com.
 - b. J. M. Thomas Forest Products, Ogden, UT. www.thomasforest.com. Contact Tom Karren:
 - 1) Office: (800) 962-8780.
 - 2) FAX: 801-782-9652.
 - 3) E-Mail: tom@thomasforest.com.
 - c. Shelter Products, Inc., Portland, OR www.shelter-products.com. Contact Mike Running:
 - 1) Office: (800) 662-3612.
 - 2) Cell: NA.
 - 3) FAX: (503) 238-2663.
 - 4) E-Mail: mrunning@shelter-products.com.

INFORMATION: Alternate Supplier(s) are to be included on each project. One or two Alternate Supplier(s) are to be included as approved by Project Manager. Alternate Supplier(s) must provide Qualification Statement submittal as outlined in this specification to Project Manager. Provide Supplier name(s) and contact information.

- d. Alternate Supplier:
 - 1) .
 - 2) .

- B. Acceptable Manufacturers:
 1. Boise Cascade Corp, Boise, ID www.bc.com.
 2. Georgia-Pacific Corp, Atlanta, GA www.gp.com.
 3. Jager Industries Inc, Calgary, AB www.jagerbuildingsystems.com.
 4. Louisiana Pacific Corp, Portland, OR www.lpcorp.com.
 5. Roseburg Forest Products, Roseburg, OR www.roseburg.com.
 6. Trus Joist Corp, Div Weyerhaeuser, Boise, ID www.tjm.com or Surrey, BC (604) 588-7878.
 7. Web Joist, Chehalis, WA www.webjoist.com.
 8. Weyerhaeuser, Engineered Lumber Products, Boise, ID www.woodbywy.com.
 9. Equal as approved by Architect before bidding. See Section 01 6200.

- C. Design Criteria:
 1. Materials shall be tested and evaluated in accordance with ASTM D5456.
 2. Materials shall have current ICC-ES Evaluation Report, report approved by International Codes Council, or report issued by Architect approved model code evaluation service and shall comply with requirements of report.

- D. Materials:
 1. Wood framing list:
 - a. Provide Category Three Approved Suppliers with wood framing list.
 2. Members:
 - a. Identify materials by stamp or stamps indicating manufacturer's name, product trade name, grade, species (if applicable), evaluation report number, plant number, and name or logo of independent inspection agency.
 3. Adhesive: Meet requirements of ASTM D2559.

- E. Fabrication: Materials shall be manufactured in a plant evaluated for fabrication by governing code evaluation service and under supervision of third party inspection agency listed by governing code evaluation service.

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 07 3113**ASPHALT SHINGLES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install Asphalt Shingle Roofing System as described in Contract Documents.
- B. Related Requirements:
 - 1. Division 22: Plumbing vent piping.
 - 2. Division 23: HVAC flues and air piping.
- C. Products Installed But Not Furnished Under This Section:
 - 1. Miscellaneous flashing and sheet metal:
 - a. Drip metal.
 - b. Valley flashing.
 - c. Wall flashings.
 - 2. Pipe and flue roof jacks.
 - 3. Ridge vent.
- D. Related Requirements:
 - 1. Section 07 6310: 'Steep Slope Roof Flashing: Asphalt Tile' for furnishing of roof flashing, pipe jacks, drip edge and miscellaneous flashing and sheet metal.
 - 2. Section 07 7226: 'Ridge Vent.

1.2 REFERENCES

- A. Definitions:
 - 1. Flame Spread Classification: Categories as per ASTM E84/UL 723 or CAN/ULC-S102:
 - a. Class A: Highest fire-resistance rating for roofing as per ASTM E108. Indicated roofing is able to withstand severe exposure to fire exposure to fire originating from sources outside building.
 - b. Class B: Fire-resistance rating indicating roofing materials are able to withstand moderate exposure to fire originating from sources outside of building.
 - c. Class C: Fire-resistance rating indicating roofing materials are able to withstand light exposure to fire originating from sources outside of building.
 - 2. Wind Uplift: Wind-induced forces on roof system or components in roof system. Wind uplift generally includes negative pressure component caused by wind being deflected around and across surfaces of building and positive pressure component from air flow beneath roof deck.
- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM D226-09/D226M-17, 'Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing'.
 - b. ASTM D1970/D1970M-18, 'Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection'.
 - c. ASTM D3018/D3018M-11(2017), 'Standard Specification for Class A Asphalt Shingles Surfaced with Mineral Granules'.
 - d. ASTM D3019/D3019M-17, 'Standard, 'Standard Specification for Lap Cement Used with Asphalt Roll Roofing, Non-Fibered, Asbestos-Fibered, and Non-Asbestos-Fibered'.
 - e. ASTM D3161/D3161M-16a, 'Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method)'.

- f. ASTM D3462/D3462M-16, 'Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules'.
- g. ASTM D4869/D4869M-16a, 'Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing'.
- h. ASTM D7158/D7158M-17, 'Standard Test Method for Wind Resistance of Asphalt Shingles (Uplift Force/Uplift Resistance Method)'.
- i. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
- j. ASTM E108-17, 'Standard Test Methods for Fire Tests of Roof Coverings'.
- k. ASTM F1667-18, 'Standard Specification for Driven Fasteners: Nails, Spikes, and Staples'.
- 2. Canadian Standards Association (CSA Group):
 - a. CSA A123.5-16, 'Asphalt Shingles Made from Organic Felt and Surfaced with Mineral Granules / Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules'.
- 3. International Building Code (IBC) (2018 Edition or latest edition adopted by AHJ):
 - a. Chapter 15, 'Roof Assemblies And Rooftop Structures'.
- 4. National Fire Protection Association:
 - a. NFPA 101: 'Life Safety Code' (2015 Edition).
- 5. Standards Council of Canada:
 - a. CAN/ULC-S102:2018, 'Method of Test for Surface Burning Characteristics of Building Materials and Assemblies'.
 - b. CAN/ULC-S107:2010-R2017, 'Methods of Fire Tests of Roof Coverings'.
- 6. Underwriters Laboratories (UL):
 - a. UL 580: 'Tests for Uplift Resistance of Roof Assemblies' (5th Edition).
 - b. UL 723, 'Tests for Safety Test for Surface Burning Characteristics of Building Materials' (11th Edition).
 - c. UL 790, 'Standard Test Methods for Fire Tests of Roof Coverings' (8th Edition).
 - d. UL 2218, 'Standard for Impact Resistance of Prepared Roof Covering Materials' (2nd Edition).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 - 1. Participate in MANDATORY pre-installation conference:
 - a. Roofing Installer's Foreman and those responsible for installation of roofing to be in attendance. Include Shingle Manufacturer's Representative if available.
 - 2. Schedule pre-installation conference at project site after completion of the installation of roof sheathing but before installation of any roofing system component.
 - 3. In addition to agenda items specified in Section 01 3100, review following:
 - a. Review if Project is in high wind area.
 - b. Review if Project could have ice dam problems.
 - c. Review if Project could have fungus-algae resistance problems.
 - d. Review Shingle Manufacturer's ventilation requirements.
 - e. Review Shingle Manufacturer's Ambient Conditions requirements.
 - f. Review existing roof conditions including moisture on deck, protruding deck fasteners, specified gaps between sheathing, and other items affecting issuance of roofing warranty.
 - g. Review proper valley, flashing, penetrations, secondary underlayment, sealants, and nailing requirements.
 - h. Review racking installation method is not permitted.
 - i. Review Cleaning and Disposal requirements.
 - j. Review Special Procedure Submittal for Warranty Information to be given to Manufacturer before Manufacture will issue Roof Warranty by Installer.
 - k. Review safety issues.
- B. Sequencing:
 - 1. Sequence of Roofing Materials (see valley flashing detail in Contract Drawings):
 - a. Apply continuous **12 inches (300 mm)** wide strip at edge of eaves and rakes of secondary underlayment.
 - b. Metal drip edge.
 - c. Secondary underlayment.

- d. Apply three (3) continuous **36 inch (900 mm)** wide sheets of secondary underlayment in valley.
 - e. Install one (1) continuous **36 inch (300 mm)** wide strip of primary underlayment atop secondary underlayment and centered over valley.
 - f. Install formed valley metal over strip of primary underlayment.
 - g. Apply **12 inches (300 mm)** wide strips of secondary underlayment lapping nailed edge of formed valley metal **3 inches (75 mm)**.
 - h. Primary underlayment.
 - i. Asphalt shingles.
 - j. Counter flashings over step flashing.
2. Coordinate sequencing of products furnished in Section 07 7226: 'Ridge Vents'.

1.4 SUBMITTALS

A. Action Submittals:

- 1. Product Data:
 - a. Color and style selection.
- 2. Samples:
 - a. Full size shingle.

B. Informational Submittals:

- 1. Certificates:
 - a. Installers:
 - 1) Provide current Certification for completion of certified training from Shingle Manufacturer.
 - 2) Installer's signed certificate stating roofing system complies with Contract Documents performance requirements and work only performed by trained and authorized personnel in those procedures.
- 2. Tests And Evaluation Reports:
- 3. Reports:
 - a. Manufacturer's test reports.
 - b. Wind speed coverage for warranted wind speed.
 - c. High wind reports and approvals if required by AHJ.
- 4. Manufacturers' Instructions:
 - a. Shingle Manufacturer's installation instructions and details for installation of secondary underlayment at penetrations, dormers, eaves, rakes, etc, to fit environmental conditions at Project.
- 5. Special Procedure Submittals:
 - a. Contact Owner's Representative (FM Group or Project Manager) for following information:
 - 1) Installer to include following mandatory information to be added to 'Roofing Manufacturer System Warranty' submitted with Closing Documents.
 - a) Name of Owner (name of FM Group) _____
 - b) Mailing Address (FM office address) _____
 - c) Building Property ID (unique 7 digit identifier) _____
 - d) Project site address: _____
 - e) Roof Completion Date _____
 - f) Any addition data required from Manufacturer.
 - 2) Installer to include following mandatory information to be added to 'Roof Installer Workmanship Warranty' submitted with Closing Documents:
 - a) Name of Owner (name of FM Group) _____
 - b) Mailing Address (FM office address) _____
 - c) Building Property ID (unique 7 digit identifier) _____
 - d) Project site address: _____
 - e) Roof Completion Date _____
 - f) Any addition data required from Manufacturer.
- 6. Qualification Statement:
 - a. Installer:
 - 1) Asphalt Shingles:
 - a) Provide Qualification documentation.

C. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Asphalt Shingles:
 - a) Final, executed copy of 'Roofing Manufacturer System Warranty' including wind speed coverage and required Owner mandatory information.
 - b) Final, executed copy of 'Roof Installer Workmanship Warranty' including required Owner mandatory information.
 - 2) Verify mandatory information as specified in Special Procedure Submittal has been included in Final Warranty.
 - b. Record Documentation:
 - 1) Manufacturers Documentation:
 - a) Manufacturer's literature.
 - b) Color selections.
 - c) Test and evaluation reports.
 - 2) Roofing Inspection Documentation:
 - a) Include copy of roof inspection report.
 - 3) Certificate: Installer statement of compliance for performance requirements.
 - 4) Certificate: Installer completion of certified training.
 - 5) Test And Evaluation Report: UL fire-resistance rating test report.
 - 6) Test And Evaluation Report: NFPA 101 Class A approval.
 - 7) Test And Evaluation Report: Wind resistance requirements required.

D. Maintenance Material Submittals:

1. Extra Stock Materials:
 - a. Provide one (1) square minimum of bundled shingles.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:

1. Building Codes:
 - a. Meet requirements for NFPA 101 Class A roof assembly.
 - b. Roof system will meet requirements of all federal, state, and local codes having jurisdiction.
2. Fall Protection: Meet requirement of fall protection as required by federal, state, and local codes having jurisdiction.
3. Fire Characteristics:
 - a. Provide shingles and related roofing materials with fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency:
 - 1) Exterior Fire-Test Exposure: Class A; UL 790, CAN/ULC-S102, or ASTM E108, for application and roof slopes indicated.
 - a) Materials shall be identified with appropriate markings of applicable testing agency.
4. Impact Resistance:
 - a. Meet UL 2218 impact resistant testing.
 - b. Meet UL 2218 Class 4 impact resistant rating for hail.
5. Wind Resistance:
 - a. Meet ASTM D3161/D3161M for wind resistance.
 - 1) Installation shall comply with IBC Table 1507.2.7, 'Attachment'.
6. Wind Speed:
 - a. As required to meet local codes having jurisdiction.
7. Wind Uplift Resistance:
 - a. Meet UL 580 wind uplift of roof assemblies.
 - b. Meet UL 1897 uplift test for roof covering systems.
 - c. Meet ASTM D7158/D7158M for wind resistance for uplift force/uplift resistance.

B. Qualifications:

1. Manufacturer:
 - a. Asphalt Shingles:

- 1) Asphalt shingles are required to be produced under quality control program administered by inspection agency currently accredited by ICBO ES or recognized by National Evaluation Service, Inc. Quality control manual developed in consultation with approved agency, and complying with ICBO ES Acceptance Criteria for Quality Control Manuals (AC10), must be submitted.
- b. Underlayment:
 - 1) Underlayment is required to be manufactured under approved quality control program with inspections by inspection agency accredited by International Accreditation Service (IAS) or otherwise acceptable to ICC-ES.
 - 2) Quality documentation complying with ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted for roof underlayment.
2. Roof Installer Foreman Qualifications:
 - a. Requirements of Section 01 4301 applies but not limited to the following:
 - 1) Provide documentation if requested by Architect.
 - a) Approved and authorized by Roofing Manufacturer to install Manufacturer's product and eligible to receive Manufacturer's warranty before bid.
 - b) Completed Shingle Manufacturer's certified trained.
 - c) Have thorough knowledge of installing asphalt shingle roofing and have minimum of five (5) years roofing experience.
 - d) Current license for the city, county, and state where project is located and license for specific type of roofing work to be performed.
 - e) Roofing Installer's foreman shall be skilled in his trade and qualified to lay out and supervise the Work.
 - f) Flashing installation shall be performed by personnel trained and authorized by Roofing Manufacturer.
3. Roof Installer:
 - a. Provide 'Roof Installer Workmanship Warranty' as specified in Warranty in Part 1 of this specification.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 1. Make no deliveries to job site until installation is about to commence, or until approved storage area is provided.
 2. Deliver products job site in Manufacturer's original unopened containers or wrappings with labels intact and legible bearing all seals and approvals.
 3. Deliver materials in sufficient quantities to allow continuity of work.
 4. Remove any material not approved from job site.
- B. Storage And Handling Requirements:
 1. Storage Requirements:
 - a. Follow Manufacturer's instructions and precautions for storage and protection of materials.
 - b. Protect roof materials from physical damage, moisture, soiling, and other sources in a clean, dry, protected location.
 - c. Stacking:
 - 1) Shingles: Bundles should be stacked flat.
 - 2) Underlayment:
 - a) Do not double-stack pallets.
 - b) Stack rolls upright until installation.
 - d. Temperature:
 - 1) Shingles:
 - a) Store in covered ventilated area at maximum temperature of 110 deg F (43 deg C).
 - b) Use extra care in handling shingles when temperature is below 40 deg F (4.4 deg C).
 - 2) Underlayment: Store in area with temperature between 40 deg F and 100 deg F (4.4 deg C and 38 deg C).
 - e. Unacceptable Material:
 - 1) Remove from job site materials that are determined to be damaged by Architect or by Roofing Manufacturer and replace at no additional cost to Owner.

2. Handling Requirements:
 - a. Handle rolled goods to prevent damage to edge or ends.
3. Roof Top Loading:
 - a. Lay shingle bundles flat.
 - b. Do not bend over ridge.

1.7 FIELD CONDITIONS

- A. Ambient Conditions:
 1. General:
 - a. Proceed with installation only when existing and forecasted weather conditions permit roofing to be performed according to manufacturer's written instructions and warranty requirements.
 2. Shingles:
 - a. Do not install shingles at lower temperatures than allowed by Shingle Manufacturer for application.
 3. Underlayment:
 - a. Install self-adhering sheet underlayment within range of ambient and substrate temperatures recommended by manufacturer.

1.8 WARRANTY

- A. Special Warranty:
 1. Shingle Manufacturer's special forty (40) year minimum labor and material warranty written for The Church of Jesus Christ of Latter-day Saints program, including but not limited to:
 - a. CertainTeed:
 - 1) First ten (10) years minimum of warranty will provide for full replacement cost, including tear-off and disposal, for any failure, including material defects and workmanship. Remaining thirty (30) years of warranty will provide for pro-rated replacement cost.
 - b. GAF:
 - 1) First ten (10) years minimum of warranty will provide for full replacement cost, including tear-off and disposal, for any failure, including material defects and workmanship. Remaining thirty (30) years of warranty will provide for pro-rated replacement cost.
 - c. Malarkey (Alaska or Canada projects only):
 - 1) First ten (10) years minimum of warranty will provide for full replacement cost, including tear-off and disposal, for any failure, including material defects and workmanship. Remaining thirty (30) years of warranty will provide for pro-rated replacement cost.
 - d. Owens Corning:
 - 1) First ten (10) years minimum of warranty will provide for full replacement cost, including tear-off and disposal, for any failure, including material defects and workmanship. Remaining thirty (30) years of warranty will provide for pro-rated replacement cost.
 2. Standard Wind Areas:
 - a. Roofing system will resist blow-offs in winds up to **110 mph (177 kph)** for ten (10) years when installed as specified below.
 - b. Meet requirements of ASTM D3161/D3161M UL Class D.
 3. Algae resistance for fifteen (15) years.
 4. Roof Installer Workmanship Warranty:
 - a. Provide ten (10) year workmanship warranty on roofing system and related components, including flashings, and responsible for all repairs to roofing system and related components due to roof installer's own negligence or faulty workmanship:
 - 1) In the event that, during ten (10) year period following installation, Roof Installer defaults or fails to fulfill its obligation in relation to workmanship warranty as specified in Manufacturer's Agreement, Manufacturer will assume that obligation for remainder of ten (10) year period following original installation and Owner shall have no obligation to make or pay for repairs to or materials for roofing system that are necessary due to Roof Installer's negligence or faulty installation during that period.

PART 2 - PRODUCTS**2.1 SYSTEM****A. Manufacturers:****1. Manufacturer Contact List:**

- a. CertainTeed Roofing Products, Valley Forge, PA www.certainteed.com.
 - 1) Contact Information: Wendy Fox, (800) 404-9880 wfox@dataworksintl.com.
- b. GAF Materials Corp., Wayne, NJ www.gaf.com.
 - 1) Contact Information: John Arellano (office) (210) 896-1041 (fax) (210) 259-8050.
- c. Malarkey Roofing Products, Portland OR:
 - 1) Contact Information: Joe Russo (425) 418-3456 Joe.Malarkey@outlook.com.
- d. Owens Corning, Toledo, OH www.owenscorning.com.
 - 1) Duration Premium shingles are available in all areas of the USA and Canada including all Duration Premium colors under Church contract. Request shingles through local distribution. Any distribution questions, contact Area Sales Manager.
 - 2) For all other questions, Contact: Sam Baroudi (419) 248-7754 sam.baroudi@owenscorning.com. or Robert Hill (801) 553-2417 Robert.Hill@owenscorning.com.

B. Components:**1. Shingles And Underlayment:**

- a. Fiberglass mat shingles meeting or exceeding requirements of:
 - 1) UL Class A Fire Resistance.
 - 2) ASTM D3018/D3018M, Type I (self sealing).
 - 3) Standard Wind Areas: ASTM D3161/D3161M UL Class D.
 - 4) Impact Resistant Shingles: Meet requirements of UL 2218 Class 4 Impact, ASTM E108 Class A Fire Resistance, ASTM D3161/D3161M Class F Wind, ASTM D7158/D7158M Class H Wind, ASTM D3018/D3018M Type 1, ASTM D3462/D3462M, and UL 790 Class A Fire Resistance.
 - 5) Secondary Underlayment: Meet requirements of ASTM D1970/D1970M and UL 790 Class A Fire Resistance.
 - 6) Primary (Synthetic) Underlayment: Meet requirements of ASTM D226/D226M and ASTM D4869/D4869M (physical properties only) or ASTM D1970/D1970M and ASTM E108 Class A Fire.
 - 7) Integral algae resistance:
 - a) Use compatible flashing and trim materials to avoid electrolysis problem with material used in algae shingles.
 - 8) Color as selected by Architect from Shingle Manufacturer's full color line.
- b. Category Three Approved Manufactures and Products. See Section 01 6200 for definitions of Categories:
 - 1) CertainTeed:
 - a) Shingles:
 - (1) Standard Wind: Hatteras / Landmark Premium.
 - (2) Impact Resistant: Landmark IR.
 - (3) Hip And Ridge Shingles: Shadow Ridge or Laminate Accessory for shingle used.
 - b) Primary Underlayment Under Shingles:
 - (1) Synthetic Underlayment: Diamond Deck.
 - c) Secondary Underlayment Under Shingles:
 - (1) WinterGuard Granular.
 - or
 - (2) WinterGuard Sand.
 - or
 - (3) WinterGuard High Tack/High Temperature.
 - d) Secondary Underlayment Under Shingles over Unheated Buildings:
 - (1) Not required over unheated buildings such as Storage Shed and Stake Pavilions.
 - 2) GAF:

- a) Shingles:
 - (1) Standard Wind: Timberline Ultra HD.
 - (2) Impact Resistant: Timberline ArmorShield II.
 - (3) Hip And Ridge Shingles: TimberTex or Ridglass.
- b) Primary Underlayment Under Shingles:
 - (1) Synthetic Underlayment: Tiger Paw.
- c) Secondary Underlayment Under Shingles:
 - (1) Weatherwatch.
 - or
 - (2) StormGuard.
- d) Secondary Underlayment Under Shingles over Unheated Buildings:
 - (1) Not required over unheated buildings such as Storage Shed and Stake Pavilions.
- 3) Malarkey (Alaska or Canada projects):
 - a) Shingles:
 - (1) Standard Wind: Polymer Modified SBS Legacy.
 - (3) Impact Resistant: Polymer Modified SBS Legacy.
 - (4) Hip And Ridge Shingles: Modified SBS Hip and Ridge Strips #225 10 inches (254 mm) or #227 12 inches (305 mm).
 - b) Primary Underlayment Under Shingles:
 - (1) Synthetic Underlayment: Secure Start #1030.
 - (2) Polymer Modified SBS Underlayment: Right Start UDL.
 - c) Secondary Underlayment Under Shingles:
 - (1) Arctic Seal Self-Adhering underlayment #401.
 - d) Secondary Underlayment Under Shingles over Unheated Buildings:
 - (1) Not required over unheated buildings such as Storage Shed and Stake Pavilions.
- 4) Owens Corning:
 - a) Note:
 - (1) Duration Premium shingles are available in all areas of the USA and Canada including all Duration Premium colors under Church contract. Request shingles through local distribution.
 - (2) Any questions, contact Manufactures Area Sales Manager.
 - b) Shingles:
 - (1) Standard Wind: Duration Premium shingles.
 - (2) Impact Resistant: Duration Storm Impact-Resistant Shingles with WeatherGuard.
 - (3) Hip And Ridge Shingles: DecoRidge Hip & Ridge.
 - c) Primary Underlayment Under Shingles:
 - (1) Synthetic Underlayment: Deck Defense High Performance Roof Underlayment.
 - d) Secondary Underlayment Under Shingles:
 - (1) Weatherlock G Granulated Self-Sealing Ice & Water Barrier.
 - or
 - (2) Weatherlock Specialty Tile & Metal for High Temperature.
 - or
 - (3) Weatherlock Cold Climate for cold weather adhesion and flexibility.
 - e) Secondary Underlayment Under Shingles over Unheated Buildings:
 - (1) Not required over unheated buildings such as Storage Shed and Stake Pavilions.

2.2 ACCESSORIES

- A. Elastomeric Roofing Sealant:
 - 1. Design Criteria:
 - a. Meet requirements of ASTM D3019/D3019M.
 - b. Non-asphalt roofing cement (not permitted).
 - c. Elastomeric.
 - d. Cold temperature pliability.

- e. Compatible with roof penetration boots.
 - 2. Category Four Products And Manufacturers. See Section 01 6200 for definitions of Categories:
 - a. Flintbond SBS Modified Bitumen Caulk by CertainTeed.
- B. Fasteners:
- 1. Primary Underlayment:
 - a. Corrosion resistant roofing nails with **one inch (25 mm)** diameter head and **3/4 inch (19 mm)** long shank minimum.
 - 1) If shingles applied as underlayment is laid, use metal or plastic head Simplex roofing nails.
 - 2) If shingles not applied as underlayment is laid, use plastic head only.
 - b. Staples not permitted.
 - 2. Shingles:
 - a. Design Criteria:
 - 1) Meet following requirements for nails:
 - a) Comply with ASTM F1667, Type I, Style 20-Roofing Nails.
 - b) Eleven gauge galvanized steel or equivalent corrosion-resistant roofing nail.
 - c) Nail head sizes: **3/8 inch (9.5 mm)** nominal diameter.
 - d) Sufficient length to penetrate through roof sheathing **1/4 inch (6 mm)** or **3/4 inch (19 mm)** minimum into solid wood decking.
 - e) Hot-dipped galvanized or electroplated fasteners comply with requirements of ASTM A153, Class D.
 - f) Stainless-steel fasteners meet requirements of Type 304 (UNS S30400) or Type 316 (UNS S31600).
 - b. General:
 - 1) Hot-dipped galvanized, electroplated non-corrosive gun-driver nails, or stainless-steel fasteners may be used.
 - 2) Fasteners within **15 miles (24.1 km)** of coastal areas (oceanside) applications must use hot-dipped galvanized or stainless steel.
 - 3) All exposed fasteners (including ridge shingles) must use hot-dipped galvanized or stainless steel.
 - 4) Staples not permitted:
 - a) Architect/Roof Consultant may approve in writing, staple gun that installs exposed fasteners with staples.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Category Three Approved Manufacture's Roofing Installers: See Section 01 4301.
 - 1. Utah Area:
 - a. Approved Installers:
 - 1) CertainTeed:
 - 2) CertainTeed:
 - a) AMCO American Roofing Co., Salt Lake City, UT – Contact: Keith J Yorgason (801) 269-1276.
 - b) Far West Roofing, Bluffdale, UT – Contact Douglas Cooper (801) 253-7799.
 - c) Heritage Roofing, Bluffdale, UT – Contact: James Smith (801) 576-8447.
 - d) Island Heights Construction Inc., Logan, UT – Contact: Casey Ringer (435) 753-7403.
 - e) JTS Roofing Inc., Ogden, UT – Contact: Todd Shupe (801) 627-6450.
 - f) Mountain Peak Builders, Inc., Logan, UT – Contact: Zane Rust (435) 787-4174.
 - g) North Face Roofing, Inc., Park City, UT – Craig Peters (801) 455-8492.
 - h) Perkes Roofing, Ogden, UT – Contact: Mark Perkes (801) 731-6918.
 - i) Redd Roofing Co., Ogden, UT – Lance Redd (801) 621-1363.
 - j) Stout Roofing Inc., St George, UT - Contact: Kelly Casey (435) 635-4288.
 - k) Stuart Roofing, Ogden, UT, Forest Stuart (801) 394 1923.
 - l) VIP Roofing, Centerville, UT – Contact: Max Ker (801) 631-6182.

- m) White Roofing Co., Nephi, UT – Contact: Charles Shannon White (801) 376-1088.
- 3) GAF:
 - a) American Roofing Co. (AMCO), Salt Lake City, UT – Contact: Keith Yorgason (801) 269-1276.
 - b) Aspen Roofing, Salt Lake City, UT – Contact: Jon Brady (801) 483-1660.
 - c) Capital Roofing Service, Inc., Sandy, UT – Contact: Paul Hitzman (801) 562-5568.
 - d) Fortress Roofing, Murray, UT – Contact: Adam Cordon (801) 509-8625.
 - e) Knockout Roofing, Riverton, UT – Contact Jared Gran (801) 604-4090.
 - f) Lifetime Roofing, West Point, UT - Parker Cornably (801) 200-7426.
 - g) Parrish Construction, American Fork, UT – Contact: Tyler Parrish (801) 787-3633.
 - h) RSW Plus, Nephi, UT – Contact: Rick White (435) 623-1719.
 - i) Skyline Roofing Inc., La Verkin, UT - Contact: Adam Stout (435) 635-3172.
 - j) Wesley Green Roofing, UT – Contact: Scott Horsepool (801) 486-3411.
- 4) Owens-Corning:
 - a) American Roofing Co. (AMCO), Salt Lake City, UT – Contact: Keith J Yorgason (801) 269-1276.

3.2 EXAMINATION

- A. Verification Of Conditions:
 - 1. Examine deck to determine if it is satisfactory for installation of roofing system. Conditions include, but are not limited to, moisture on deck, protruding deck fasteners, specified gaps between sheathing, and other items affecting issuance of roofing warranty.
 - a. Report unsatisfactory conditions in writing to Architect.
 - b. Commencement of Work by installer is considered acceptance of substrate.
 - 2. Verify existing soffit and ridge vents meet ventilation code requirements.
 - a. Report inadequate ventilation conditions with recommendations in writing to Architect.

3.3 PREPARATION

- A. Protection Of In-Place Conditions:
 - 1. Install only as much roofing as can be made weathertight each day, including flashing and detail work.
- B. Surface Preparation:
 - 1. Clean roof deck:
 - a. Remove dirt, protruding nails, shingle nails, and debris, before installation of underlayment.
 - 2. Roof deck must be dry to help prevent buckling of deck, which can result in deck movement and damage to primary underlayment.
 - 3. Following Manufacturer's recommendations for placing materials on roof.
 - a. Prevent material from sliding off roof.

3.4 INSTALLATION

- A. General:
 - 1. Schedule and execute work without exposing interior building areas to effects of inclement weather. Protect existing building and its contents against all risks.
- B. Sequence of Roofing Materials as shown and noted on Contract Drawings:
 - 1. 12 inch strip Secondary Underlayment at Eave.
 - 2. Metal Drip Edge.
 - 3. General Secondary Underlayment.
 - 4. Valley Secondary Underlayment (8' - 6" (2.62 m) wide strip of Secondary Underlayment (3 strips) in Valleys applied over sheathing).
 - 5. Valley Secondary Underlayment (36 inch (915 mm) wide Primary Underlayment under Valley Metal).

6. Valley Metal (24 inch (610 mm) wide valley metal 10 ft (3.05 m) lengths).
7. 12 inch strip of Secondary Underlayment over nailed edges (of Valley Metal).
8. General Primary Underlayment.
9. Asphalt Shingles, Step Flashings.
10. Counter Flashing.

C. Underlayment:

1. General:
 - a. Temporary Roof:
 - 1) Do not use permanent underlayment installation as temporary roof.
 - 2) If temporary roof is used, remove completely before installation of permanent underlayment.
 - b. Follow Shingle Manufacturer's recommendations for installation of primary and secondary underlayment, particularly at eaves, rakes, and penetrations, unless specified installation procedures and Contract Drawing details are more stringent.
 - c. Avoid scuffing underlayment that can compromise surface and cause leaking. If scuffing occurs, following Manufacturer's recommendation for repair.
 - d. Staples are not permitted.
 - e. Weather conditions:
 - 1) Do not leave underlayment exposed to weather more than thirty (30) days after beginning of underlayment installation even if Manufacture allows longer period of time.
 - 2) If underlayment is exposed for more than thirty (30) days after beginning of underlayment installation, treat as temporary roof under first paragraph above.
 - 3) If moisture is deposited on exposed underlayment, obtain written approval from Shingle Manufacturer's Representative before installing shingles.
 - f. Install valley secondary underlayment, valley primary underlayment, and valley metal after installation of general secondary underlayment, but before installation of general primary underlayment.
2. Primary Underlayment:
 - a. Apply 48 inch (1 200 mm) wide courses over complete deck, including areas covered with secondary underlayment unless specified otherwise.
 - 1) Overlap underlayment before fastening.
 - 2) Maintain end laps of 6 inch (150 mm) and side laps of 3 inch (76 mm).
 - 3) Stop primary underlayment between 3 and 6 inches (75 and 150 mm) of inside edge of strip of secondary underlayment installed over edge of formed valley metal.
 - b. Nailing Synthetic Underlayment:
 - 1) Use low-profile plastic or steel cap corrosion resistant nails with 1 inch (25 mm) diameter heads to fasten underlayment in place. (Fastening underlayment without caps is not permitted).
 - 2) Nails must be driven properly. Improperly driven fasteners such as over-driving, under-driving and nails driven at an angle are not permitted.
 - 3) Fasteners should be long enough to penetrate at least 3/4 inch (19 mm) into roof sheathing. Fasteners must be lie flush to roof deck at 90 degree angle to roof deck and tight with underlayment.
 - 4) Do not nail through metal flashing, except drip edge, when installing primary underlayment.
 - 5) Follow Shingle Manufacturer's installation instructions for following:
 - a) Securing underlayment to roof deck adjusting for roof slope nailing requirements.
 - b) Side lap, end lap, and overlapping nailing requirements.
 - c) Rake and eave nailing requirements.
 - d) High wind condition nailing requirements.
 - e) Sealants recommendations.
3. Secondary Underlayment:
 - a. Under Shingles:
 - 1) Lap end joints 6 inches (150 mm) and side joints 3 inch (76 mm) minimum.
 - 2) Apply continuous 12 inches (300 mm) wide strip at edge of eaves and rakes before installing drip edge.
 - 3) Apply two (2) 36 inch (900 mm) wide courses along eaves and rakes as described in Contract Documents with first course overlapping drip edge and 12 inches (300 mm) wide previously applied strip.

4. Valley Underlayment:
 - a. Apply three (3) continuous **36 inch (900 mm)** wide sheets of secondary underlayment in valley lapped to provide **102 inch (2 590 mm)** wide covered area centered over valley.
 - b. Apply one (1) continuous **36 inch (300 mm)** wide strip of primary underlayment atop secondary underlayment and centered over valley.
 - c. Install formed valley metal over strip of primary underlayment.
 - 1) Nail top of each section and lap **8 inches (200 mm)** in direction of flow.
 - 2) Seal laps with continuous bead of elastomeric roofing sealant.
 - 3) Secure edges of valley metal with fasteners spaced at **12 inches (300 mm)** maximum on center and approximately **1/2 inch (13 mm)** in from edge of metal.
 - d. Install **12 inches (300 mm)** wide strips of secondary underlayment lapping nailed edge of formed valley metal **3 inches (75 mm)**.
- D. Shingles:
 1. Before installing shingles, inspect underlayment and metal installation with Architect and Owner. Correct improperly installed and damaged material before beginning shingle installation.
 2. Racking installation method is not permitted by Owner and will be considered non-conforming work.
 3. Starter shingles:
 - a. Manufacturer's starter shingles are required for Shingle Warranty.
 - b. Install shingles at eave and rakes in accordance with Shingle Manufacturer's instructions.
 - c. Cut shingles in accordance with Shingle Manufacturer's instructions, or use approved starter course.
 - d. Nail to eave granule side up in continuous mastic bed with cut edge down-slope and edge overhanging eave **3/8 inch (9 mm)** so sealing tabs are at edge of eave.
 - e. Install shingles with maximum exposure recommended by Shingle Manufacturer.
 - f. Lay first course directly over starter strip with ends flush with starter strip at eaves and so joints in starter strip are offset **4 inches (100 mm)** minimum from joints in first course.
 4. Lay shingles so end joints are offset in accordance with Shingle Manufacturer's installation procedures.
 5. Insure alignment by snapping chalk line at least each fifth course to control horizontal and vertical alignment.
 6. Run courses true to line with end joints properly placed. Leave shingles flat without wave and properly placed.
 7. Hip and ridge shingles:
 - a. Manufacturer's hip and ridge shingles are required for Shingle Warranty.
 - b. Install specified hip and ridge shingles in accordance with Shingle Manufacturer's instructions.
 - c. Run ridge shingles as directed by Architect.
 8. Nailing:
 - a. General:
 - 1) Six (6) Nail Pattern as recommended by Shingle Manufacturer for Shingle Warranty in each shingle.
 - 2) Place in relation to top edge of shingle as required by Shingle Manufacturer.
 - 3) Place nails **one inch (25 mm)** from each end of shingle and remainder evenly spaced between.
 - 4) Should any nail fail to penetrate sheathing by **1/4 inch (6 mm)** minimum, drive additional nail nearby.
 - b. Nailing guns:
 - 1) Nails must be driven properly. Improperly driven fasteners such as over-driving, under-driving and nails driven at an angle are not permitted.
 - 2) Adjust nail gun pressure for nailing flush and tight to deck without cutting shingle surface.
 - 3) Drive nails perpendicular to shingle surface so nail head is flat against shingle.
 - 4) Should any nail fail to penetrate sheathing by **1/4 inch (6 mm)** minimum, drive additional nail nearby.
 9. Hand-Sealing:
 - a. If ambient temperature or exposure to sun will not be sufficient to secure adhesive strip to under-lying shingle within one week, hand seal shingles with elastomeric roofing sealant.
 10. Over valley metal:

- a. Do not drive nails through valley metal.
 - b. Run chalk line so valley metal will be exposed **6 inches (150 mm)** wide at top and diverge **3/32 inch (one mm)** per **ft (300 mm)** down to eaves.
 - c. Neatly trim shingles to this line.
 - d. Seal trimmed shingle edges to valley metal with continuous bead of elastomeric roofing sealant applied within **one inch (25 mm)** of shingle edge.
11. Vent pipe sleeve flange:
 - a. Vent pipe sleeve flange as specified in Section 07 6310.
 - b. Fit shingles under lower edge and over sides and upper edge.
 - c. Set vent pipe flange in elastomeric roofing sealant.
 - d. Embed shingles in elastomeric roofing sealant where they overlap flange.
 - e. Apply bead of elastomeric roofing sealant at junction of vent pipe and vent flashing.
 12. Furnished and installed in Section 07 7226 'Ridge Vents'.

3.5 FIELD QUALITY CONTROL

- A. Non-Conforming Work:
 1. Correct any work found defective or not complying with Contract Document requirements at no additional cost to the Owner.
 2. Raking installation method is not permitted by Owner and will be considered to be not complying with Contract Document requirements and must be corrected at no additional cost to Owner.

3.6 CLEANING

- A. General:
 1. All tools and unused materials must be collected at end of each workday and stored properly off finished roof surface and protected from exposure to elements.
 2. Leave metals clean and free of defects, stains, and damaged finish.
 - a. Replace fascia metal that is scratched through finish to base metal.
 3. Properly clean finished roof surface after completion.
 4. Verify drains and gutters are not clogged.
 5. Clean shingles and building of soiling caused by this installation.
 6. Clean and restore all damaged surfaces to their original condition.
- B. Waste Management:
 1. Disposal:
 - a. All work areas are to be kept clean, clear and free of debris always.
 - b. Do not allow trash, waste, or debris to collect on roof. These items shall be removed from roof daily.
 - c. Remove debris resulting from work of this Section from roof and site. Dispose of or recycle all trash and excess material in manner conforming to current EPA regulations and local laws.

3.7 PROTECTION

- A. Do not permit traffic over finished roof surface.

END OF SECTION

SECTION 07 6210**GALVANIZED STEEL FLASHING AND TRIM****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install miscellaneous flashing, counterflashing, and hold-down clips as described in Contract Documents and not specified to be of other material.
- B. Products Furnished But Not Installed Under This Section:
 - 1. Gravel stops, copings, scuppers, and miscellaneous sheet metal specialties not specified to be of other materials.
- C. Related Requirements:
 - 1. Section 06 1100: 'Wood Framing' for wood base.
 - 2. Sections under 07 3000 heading: 'Steep Slope Roofing' for installation of gravel stops, copings, scuppers, and miscellaneous roofing related flashing.
 - 3. Sections under 07 5000 heading: 'Membrane Roofing' for installation of gravel stops, copings, scuppers, and miscellaneous roofing related flashing.
 - 4. Section 07 9213: 'Elastomeric Joint Sealant'.

1.2 REFERENCES

- A. Reference Standards:
 - 1. ASTM International:
 - a. ASTM A653/A653M-18, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
 - b. ASTM A792/A792M-10(2015), 'Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process'.
 - 2. Federal Specifications:
 - a. TT-S-00230C(2) Sealing Compound, Elastomeric Type, Single Component, (For Caulking, Sealing, and Glazing in Buildings and Other Structures).

PART 2 - PRODUCTS**2.1 SYSTEM**

- A. Manufacturers:
 - 1. Type Two Acceptable Manufacturers Of Metal:
 - a. CMG – Coated Metals Group, Denver, CO www.cmgmetals.com.
 - b. Drexel Metals, LLC, Ivyland, PA www.drexmet.com.
 - c. Fabral, Lancaster, PA www.fabral.com.
 - d. Firestone Metal Products, Anoka, MN www.unaclad.com.
 - e. MBCI, Houston, TX www.mbc.com.
 - f. Metal Sales Manufacturing Corp, Sellersburg, IN www.mtlsales.com.
 - g. O'Neal Flat Rolled Metals (member of O'Neal Industries), Brighton, CO www.ofrmetals.com.
 - h. Petersen Aluminum Corp, Elk Grove, IL www.pac-clad.com.
 - i. Ryerson, Chicago, IL www.ryerson.com.
 - j. Equal as approved by Architect before installation. See Section 01 6200.

- B. Materials:
 - 1. Sheet Metal:
 - a. Galvanized iron or steel meeting requirements of ASTM A653/A653M, G 90 or Galvalume steel meeting requirements of ASTM A792/A792M AZ50, 50 ksi.
 - 1) 22 ga (0.792 mm) for hold-down clips.
 - 2) 24 ga (0.635 mm) for all other.
- C. Fabrication:
 - 1. Form accurately to details.
 - 2. Profiles, bends, and intersections shall be even and true to line.
 - 3. Fold exposed edges 1/2 inch (12.7 mm) to provide stiffness.
- D. Finish:
 - 1. Exposed to view:
 - a. Provide face coating of polyvinylidene Fluoride (PVF₂) Resin-base finish (Kynar 500 or Hylar 5000) containing seventy (70) percent minimum PVF₂ in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
 - b. Reverse side coating shall be thermo-cured system consisting of corrosion inhibiting epoxy primer applied over properly pre-treated metal.
 - 2. Color as selected by Architect from Manufacturer's standard colors.

2.2 ACCESSORIES

- A. Sealants: Rubber base type conforming to Fed Spec TT-S-00230C.
- B. Fasteners:
 - 1. Of strength and type consistent with function.
 - 2. Nails: Hot-dipped galvanized.
 - 3. Screws, Bolts, And Accessory Fasteners: Galvanized or other acceptable corrosion resistant treatment.
- C. Roof Diverter:
 - 1. Roof Diverter (Kickout Diverter) required when vertical wall extends beyond lower roof.
 - a. 24 ga (0.635 mm) galvanized iron or steel meeting requirements for sheet metal specified in materials above.
 - b. Size: 6 inch (150 mm) x 6 inch (150 mm) by 12 inches (300 mm) length.
- D. Step Flashing:
 - 1. Step flashing required for steep slope for roof to wall flashing.
 - a. 24 ga (0.635 mm) galvanized iron or steel meeting requirements for sheet metal specified in materials above.
 - b. Size: 5 inch (125 mm) x 5 inch (125 mm) by 8 inch (200 mm) or 12 inches (300 mm) length.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install with small, watertight seams.
- B. Slope to provide positive drainage.
- C. Provide sufficient hold down clips to insure true alignment and security against wind.
- D. Provide 4 inch (100 mm) minimum overlap.

- E. Allow sufficient tolerance for expansion and contraction.
- F. Insulate work to prevent electrolytic action.
- G. Roof Diverter (Kickout Diverter):
 1. Extend roof diverter 1 inch (25 mm) minimum beyond face edge of lower roof.
 2. Extend underlayment vertically up wall behind flashing.
 3. Solder all joints.
 4. Apply sealant.

3.2 CLEANING

- A. Leave metals clean and free of defects, stains, and damaged finish.

END OF SECTION

SECTION 07 6311**METAL SOFFIT PANELS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install metal soffit panel system as described in Contract Documents.

1.2 REFERENCES

- A. Reference Standards:
 - 1. ASTM International:
 - a. ASTM A653/A653M-18, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
 - b. ASTM A792/A792M-10(2015), 'Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process'.
 - c. ASTM B209-14, 'Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate'.
 - d. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Manufacturer's literature or cut sheet for products furnished.
- B. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Final, executed copy of Warranty.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Fire Characteristics Performance Requirement:
 - a. Meet requirements of ASTM E84 Class A fire rating.
- B. Qualifications:
 - 1. Installer:
 - a. Minimum three (3) years experience with installations of comparable quality, scope, similar size, and complexity before bidding.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 - 1. Materials shall be delivered in original, unopened packages with labels intact.
 - 2. Inspect delivered material for damage.
- B. Storage And Handling Requirements:

1. Stack panels on pallets or above ground, covered with weathertight and ventilated covering. Prevent condensation build-up or moisture entrapment in materials.
2. Store panels not in contact with other materials that might cause staining, denting or other surface damage.

1.6 WARRANTY

- A. Manufacturer Warranty:
1. Manufacturer's standard warranty against manufacturer defects.
 2. Manufacturer's written thirty five (35) year warranty on paint finish against cracking, peeling, blistering, chalk, and color change.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Manufacturers:
1. Type One Acceptable Manufacturers Of Metal:
 - a. AEP / Span, Dallas, TX www.aep-span.com.
 - b. ATAS Aluminum Products, Allentown, PA www.atas.com.
 - c. Fabral, Lancaster, PA www.fabral.com.
 - d. Fashion Inc, Ottawa, KS www.fashioninc.com.
 - e. Firestone Metal Products, Anoka, MN www.unaclad.com.
 - f. MBCI, Houston, TX www.mbc.com.
 - g. O'Neal Flat Rolled Metals (member of O'Neal Industries), Brighton, CO www.ofrmetals.com.
 - h. Petersen Aluminum Corp, Elk Grove, IL www.pac-clad.com.
 - i. Ryerson, Chicago, IL www.ryerson.com.
 - j. Equal as approved by Architect before bidding. See Section 01 6200.
- B. Performance:
1. Design Criteria:
 - a. Flush panel design.
 - 1) Panels shall be interlocked full length of panel.
 - 2) Panel widths shall be Manufacturer's standard.
 - b. Performance Standard: ATAS Wind-LOK Soffit MPS120.
- C. Materials:
1. **0.032 inch (0.8 mm)** thick minimum 3105-H24 alloy aluminum meeting requirements of ASTM B209.
 2. **24 ga (0.0276 in) (0.7010 mm)** galvanized iron or steel meeting requirements of A653/A653M, G 90.
 3. **24 ga (0.0276 in) (0.7010 mm)** minimum 50 ksi galvalume steel meeting requirements of ASTM A792/A792M AZ-55.
- D. Fabrication:
1. Panels shall be uniformly dimensioned, roll formed to lengths to avoid trimming.
 2. Panel system shall be anchored as recommended by Manufacturer.
 3. Panels shall be continuous.
- E. Finish:
1. Polyvinylidene Fluoride (PVF₂) Resin-base (Kynar 500 or Hylar 5000) finish for coil coating components containing 70 percent minimum PVF₂ in resin portion of formula. Thermo-cured two coat system consisting of corrosion inhibiting epoxy primer and top coat factory applied over properly pre-treated metal.
 2. Color as selected by Architect from Manufacturer's standard colors.

2.2 ACCESSORIES

- A. Fastening Devices: 1-1/2 inch (38 mm) cadmium or zinc plated ring shanked nails.
- B. Continuous Soffit Vent:
 - 1. Type Two Acceptable Products:
 - a. Aluminum 8.8 sq in (56.8 sq cm) net free ventilation per lineal foot (0.32 m). Width: 2 inches (50 mm). Color: white or brown.
 - 1) Mastic VAS70 Vent-A-Strip (Model 70) by Mastic Home Exteriors by Ply Gem Chicago, IL www.mastic.com/.
 - b. Aluminum 9.9 sq in (63.9 sq cm) net free ventilation per lineal foot (0.32 m). Width: 2-1/4 inches (57 mm). Color: white or brown.
 - 1) Mastic VAS79 Vent-A-Strip (Model 79) by Mastic Home Exteriors by Ply Gem Chicago, IL www.mastic.com/.
 - c. Equal as approved by Architect before installation. 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 soffit system.
 - 2. Notify Architect of unsuitable conditions in writing.
 - a. Do not install soffit over unsuitable conditions.
 - b. Commencement of Work by installer is considered acceptance of substrate.

3.2 INSTALLATION

- A. Conceal fasteners where possible. Paint heads of exposed fasteners to match background.
- B. Isolate from dissimilar metals to prevent electrolytic action.

3.3 FIELD QUALITY CONTROL

- A. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
 - 1. Correct any work found defective or not complying with contract document requirements including buckling or bowing due to improper installation and touch up of minor scratches and spots at no additional cost to the Owner.

3.4 CLEANING

- A. General:
 - 1. Clean exposed panel surfaces promptly after installation in accordance with manufacturer's instructions.
- B. Waste Management:
 - 1. Dispose of waste in provided waste receptacles (dumpsters) as specified in Section 01 7400.

END OF SECTION

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. F76 Privacy Lock: Latch bolt operated by lever from either side. Outside lever locked by push button inside and unlocked by emergency key from outside or rotating lever from inside.
 - c. 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.
 - d. F84 Classroom Deadlock: Dead locking latch bolt operated by lever from either side, except when outside lever is locked, latch bolt is operated by key in outside lever or by rotating inside lever.
 - e. F86 Utility Space Door Lock: Dead locking latch bolt operated by key in outside lever or by rotating inside lever. Outside lever is always fixed.
 - f. F91 Store Door Lock: Deadlocking latch operated by either lever. Key in either lever locks / unlocks both levers.
 - g. F109 Entrance Lock: Turn/push button locking: Pushing and turning button disengages outside lever, requiring using of key until button is manually unlocked. Push-button locking: Pushing button disengages outside lever until unlocked by key or by turning inside lever. Disengages outside spindle from latch when locked.
 - h. E2142 Deadbolt: Dead bolt operated by key from either side. Bolt automatically dead locks when fully thrown.
 - i. E2152 Deadbolt: Dead bolt operated by key from outside and turn unit from inside. Bolt automatically dead locks when fully thrown.

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 EXTERIOR DOORS**

- A. Single Exterior Doors:
1. **Group 3:**
 - a. 1 set: Weatherstrip.
 - b. 1 each: Closer.

- c. 3 each: Hinges.
- d. 1 each: Lockset Function F86.
- e. 1 each: Stop.
- f. 1 each: Threshold.

END OF SECTION

SECTION 08 1213**HOLLOW METAL FRAMES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Hollow metal frames.
- B. Related Requirements:
 - 1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for installation.

1.2 REFERENCES

- A. 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 A568/A568M-17a, 'Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
 - b. ASTM A653/A653M-17, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
 - 3. Steel Door Institute:
 - a. SDI A250.8-2017, 'Specifications for Standard Steel Doors and Frames'.
 - b. SDI A250.11-2012, 'Recommended Erection Instructions for Steel Frames'.

1.3 SUBMITTALS

- A. Informational Submittals:
 - 1. Copy of SDI A250.11.

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. Any current member of Steel Door Institute.
- C. Frames:
1. Cold rolled furniture steel:
 - a. Interior Frames: 16 ga. (1.6 mm).
 - b. Exterior Frames: 14 ga. (1.9 mm).
 2. Provide labeled frame to match fire rating of door.
 3. Finish:
 - a. Use one of following systems:
 - 1) Prime surfaces with rust inhibiting primer.
 - 2) Galvanize.
 4. Anchors: 16 US ga (1.6 mm) minimum meeting UL or other code acceptable requirements for door rating involved.
- D. Fabrication:
1. General Requirements:
 - a. Frames shall be welded units. Provide temporary spreader on each welded frame.
 - b. Provide Manufacturer's gauge label for each item.
 - c. Make breaks, arrises, and angles uniform, straight, and true. Accurately fit corners.
 2. Frame width dimension:
 - a. Fabricate frame 1/8 inch (3 mm) wider than finished wall thickness as described in Contract Documents.
 3. Provide mortar guards at strikes and hinges.
 4. Anchors:
 - a. Provide three jamb anchors minimum for each jamb. On hinge side, install one anchor at each hinge location. On strike side, install one anchor at strike level and anchors at same level as top and bottom hinges. Tack weld anchors on frames intended for installation in framed walls.
 - b. Frames installed before walls are constructed shall be provided with extended base anchors in addition to other specified anchors.
 - c. Anchor types and configurations shall meet wall conditions.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 08 1313**HOLLOW METAL DOORS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Hollow metal doors.
- B. Related Requirements:
 - 1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for door installation.

1.2 REFERENCES

- A. Association Publications:
 - 1. National Association of Architectural Metal Manufacturers (NAAMM):
 - a. HMMA 810-09, 'Hollow Metal Doors'.
 - b. HMMA 860-13, 'Guide Specifications For Hollow Metal Door and Frames'.
 - 2. Steel Door Institute:
 - a. SDI-108, 'Recommended Selection and Usage Guide for Standard Steel Doors'.
- B. 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 A568/A568M-17a, 'Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for'.
 - b. ASTM A653/A653M-17, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
 - c. ASTM C1036-16, 'Standard Specification for Flat Glass'.
 - d. ASTM C1048-18, 'Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass'.
 - 3. Steel Door Institute:
 - a. SDI A250.8-2017, 'Specifications for Standard Steel Doors and Frames'.

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. Any current member of Steel Door Institute.
- C. Doors:
1. Meet one of following requirements:
 - a. Meet requirements of Steel Door Institute ANSI / SDI A250.8.
 - b. Commercial grade steel meeting requirements of ASTM A568/A568M, Class 1:
 - 1) Grade I for interior doors, Grade II for exterior doors.
 - 2) Model 1 Full Flush or Model 2 Seamless designs at Manufacturer's option.
 - 3) Type F, G, or L as required.
 - 4) Finish:
 - a) Interior doors primed or galvanized as per ASTM A653/A653M.
 - b) Exterior doors galvanized and primed as per ASTM A653/A653M.
 2. Insulation: Insulate doors at exterior of main building sufficient to provide U-value of 0.10 maximum.
 3. Factory Glazing:
 - a. Narrow Light:
- D. Fabrication:
1. General:
 - a. Mortise and reinforce doors for hinges and locks.
 - b. Reinforce doors for closers and other surface applied hardware.
 - c. Drill and tap on job.
 - d. Seams along vertical edges of door need not be filled.
 - e. Do not extend hinge cut out full width of door unless fill strip is inserted, weld filled, and ground smooth so no seam appears on back face plate.
 - 1) Construct UL fire doors and frames to meet UL's specific approval according to current procedure for door rating involved, Procedure No. R-3791 and R-3821 as listed by UL.
 - a) Labeling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify Manufacturer.

2.2 SOURCE QUALITY CONTROL

- A. Tests:
1. Verification of Performance:
 - a. Label each door as conforming to above required standards.

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. Canadian Projects:
 - a. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories:
 - 1) Allmar Inc. Calgary, AB www.allmar.com.
 - a) Contact Information: Earl Blakie, Phone (403) 236-2604 or (877) 505-5675, FAX (403) 236-2119, e-mail, earl@allmar.com.
- B. Existing Projects (Door Hardware Only):
- 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) Clark Security Products, Salt Lake City, UT www.clarksecurity.com:

- a) First Contact Information: Nick Barfuss: phone (801) 994-7469, toll-free (800) 453-6430 or e-mail nick.barfuss@clarksecurity.com.
 - b) Second Contact Information: John Williams: phone (253) 232-2089 or e-mail john.williams@clarksecurity.com.
 - 4) Intermountain Lock & Security Supply, Salt Lake City, UT www.implss.com:
 - a) Contact Information: Joe Pehrson: cell (801) 419-4591 or e-mail joe.pehrson@implss.com.
 - 5) 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. Canadian Projects:
- a. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories:
 - 1) Allmar Inc. Calgary, AB www.allmar.com.
 - a) Contact Information: Earl Blakie, Phone (403) 236-2604 or (877) 505-5675, FAX (403) 236-2119, e-mail, earl@allmar.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

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).
 - b) 1-3/8 inch 35 mm wood or metal doors: 3-1/2 inches by 3-1/2 inches (89 mm by 89 mm).
 - 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.
 - b. Exterior:
 - 1) Hager: BB 1191.
 - 2) Ives: 5BBI.
 - 3) McKinney: TA 2314.
 - 4) PBB: BB21.
 - 5) Stanley: FBB 191.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 08 7104**OPERATING TRIM****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Interior push / pulls.
- B. Related Requirements:
 - 1. Section 08 7101: Common Hardware Requirements and VMR Suppliers.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Standard Door Push / Pulls:
 - 1. Size: **15 inches (380 mm)** by **3-1/2 inch (89 mm)**.
 - 2. Type Two Acceptable Products:
 - a. PS3515, PL3515 / 80301 by Glynn-Johnson, Indianapolis, IN www.glynn-johnson.com.
 - b. 39E, 30S by Hager, St Louis, MO www.hagerhinge.com.
 - c. 8200, 8302 by Ives, Wallingford, CT www.iveshardware.com.
 - d. 70B, 105x70B by Rockwood Manufacturing Co, Rockwood, PA www.rockwoodmfg.com.
 - e. Equal as approved by Architect before installation. See Section 01 6200.

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

SECTION 08 7106**CLOSING DEVICES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Closers for flush wood doors and hollow metal doors.
- B. Related Requirements:
 - 1. Section 08 7101: 'Common Finish Hardware Requirements'.
 - 2. Section 08 7108: 'Stops And Holders'.

1.2 SUBMITTALS

- A. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Manufacturer's final executed copy of warranty.

1.3 WARRANTY

- A. Manufacturer Warranty:
 - 1. Manufacturer's Standard Warranty, five (5) years minimum.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Manufacturers:
 - 1. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
 - a. 8900 Series by Dorma Architectural Hardware, Reamstown, PA www.dorma.com/usa.
 - b. 1461 Series by LCN Closers, Princeton, IL www.lcnclosers.com.
 - c. 8501 Series by Norton Door Controls, Charlotte, NC www.nortondoorcontrols.com.
 - d. 1431 Series by Sargent, New Haven, CT www.sargentlock.com.
 - e. D-3550/D-3551 Series by Stanley (dormakaba Americas), Indianapolis IN www.stanleyhardwarefordoors.com/products/.
- B. Surface-Mounted Overhead Door Closers:
 - 1. Closers provided under this Section shall be from same Manufacturer.
 - 2. Provide parallel arms on closers unless door position in relation to adjacent wall requires otherwise. Provide covers.
 - 3. Door Closers on doors that swing 180 degree as shown on Contract Documents:
 - a. Closers shall allow for 180 degree opening without engaging stop function. Wall stop or Floor stop is specified in Door Schedule and Section 08 7108, 'Stops And Holders'.
 - b. Closers shall have following features:
 - 1) Adjustable sweep speed.
 - 2) Adjustable backcheck.
 - 3) Non-handed, non-sized.
 - 4) Hold open arm function (Friction Hold Open) (Non-Fire-Rated Corridors).

4. Door Closers on doors that swing 90 degree as shown on Contract Documents:
 - a. Closers shall allow for 100 degree opening with engaging stop function.
 - b. Closers shall have following features:
 - 1) Adjustable sweep speed.
 - 2) Adjustable backcheck.
 - 3) Non-handed, non-sized.
 - 4) Hold open arm function with thumb turn or handle control (Cush And Hold) (Non-Fire-Rated Corridors).

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount closers on stop side of door wherever conditions permit.
- B. Through-bolt hardware-to-door connections.

3.2 ADJUSTING

- A. Adjust closers to provide maximum opening force as required by governing code authority and proper backcheck and sweep speed.

END OF SECTION

SECTION 08 7107**PROTECTIVE PLATES AND TRIM****PART 1 - GENERAL****1.1 SUMMARY**

- A. Products Furnished But Not Installed Under This Section:
 - 1. Kick plates.
- B. Related Requirements:
 - 1. Section 08 7101: Common Hardware Requirements and VMR Suppliers.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS**

- A. Manufacturers:
 - 1. Type Two Acceptable Manufacturers:
 - a. Glynn-Johnson, Indianapolis, IN www.glynn-johnson.com.
 - b. Hager, St Louis, MO (800) 255-3590 or (314) 772-4400 www.hagerhinge.com.
 - c. Ives, Wallingford, CT www.iveshardware.com.
 - d. Rockwood Manufacturing Co, Rockwood, PA www.rockwoodmfg.com.
 - e. Equal as approved by Architect before installation. See Section 01 6200.
- B. Protective Plates:
 - 1. Material: 0.050 inch (1.27) mm thick Stainless Steel.
 - 2. Sizes:
 - a. Kick Plates: 10 inches (255) mm high by width of door less 3/4 inch (19 mm) on each side.

PART 3 - EXECUTION: Not Used**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.
 - 2. Door stops and holders.
- 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:

	Interior Wall	Exterior Wall	Floor Mount	Overhead.
b. Hager	236W	255W	243F	---
c. Ives	WS407CCV	WS447	FS438	---
d. Rockwood	409	474 / 475	440 / 441	---
e. Glynn Johnson	---	---	---	GJ 90S
f. Sargent	---	---	---	590S Series
 - g. Equal as approved by Architect before Installation. See Section 01 6200.
- C. Door Stops And Holders:
 - 1. Type Two Acceptable Products:
 - a. Hager: 268F, 268S or 256S, 256W.
 - b. Ives: WS444, WS449, FS446, FS450.
 - c. Rockwood: 472, 473, 476, 477.
 - d. 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

- 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. Acoustical Seals:
 - 1. Color as selected by Architect.
 - 2. Type One Acceptable Products:
 - a. Door Bottom Shoe for Wood Door:
 - 1) 13VDkB by NGP.
 - 2) 211DV by Pemko.
 - b. Door Bottom Shoe for Metal Door:
 - 1) 779S-A by Hager.
 - 2) 35EV by NGP.
 - 3) 217AV by Pemko.
 - c. Equal as approved by Architect before bidding. See Section 01 6200.
- C. 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.
- D. Thresholds:
 - 1. Type One Acceptable Products:
 - a. Design Criteria:
 - 1) Meet handicap accessibility requirements (ADA):
 - 2) Saddle threshold:
 - a) 418S DBA by Hager.
 - b) 411 DKB by NGP.
 - c) 151 D by Pemko.
 - b. Equals as approved by Architect before bidding. See Section 01 6200.
- E. Weatherstripping:
 - 1. Type One Acceptable Products:
 - a. Finish: clear anodized aluminum.
 - b. Perimeter:
 - 1) 800S by Hager.

- 2) A625 A by NGP.
- 3) 35041 CP by Pemko.
- c. Equal as approved by Architect before bidding. See Section 01 6200.
- d. Bottom (see Sweepstrip):

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

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.
 - 2. Furnish and install acoustical sealants as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 07 9219: 'Acoustical Joint Sealants' for quality of acoustical sealants.
 - 2. Section 09 3013: 'Ceramic Tile' for installation of backerboard joint reinforcing.
 - 3. 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.
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 / Surfacer 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. 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. Ceilings:
- a. Apply ceilings first using minimum of two (2) men.
 - b. Use board of length to give minimum number of joints.
 - c. Apply board perpendicular to support.
3. 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
4. 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.
5. 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 not painted or finished:
 - a) GA-214 Level 1: 'All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable'.
 - 2) Gypsum Board Surfaces Under Acoustical Tile:
 - a) GA-214 Level 2: 'All joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Fastener heads and accessories shall be covered with a coat of joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.
 - b) Note: It is critical that gypsum board ceiling be smooth before installing ceiling tile. Drywall joints must be as specified in paragraph above.
 - 3) Gypsum Board Surfaces to Receive: Wall Covering Type A - Section 09 7226: 'Sisal Wall Covering':
 - a) GA-214 Level 3: 'All joints and interior angles shall have tape embedded in joint compound and one additional coat of joint compound applied over all joints and interior angles. Fastener heads and accessories shall be covered with two separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Coat prepared surface with specified wall covering primer'.
 - 4) Gypsum Board Surfaces to Receive: Acoustic Wall Fabric Type B - Section 09 7216, 'Vinyl-Coated Fabric Wall Covering':
 - 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'.
 - 5) Gypsum Board Surfaces to Receive: Acoustic Wall Covering (Fabric or Carpeting) Type C - Section 09 7313, 'Acoustical Wall Carpeting':
 - 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'.
 - 6) Gypsum Board Surfaces to Receive: Painted Texturing - Section 09 9413: 'Interior Textured Finishing':
 - 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'.
 - 7) 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'.

- 8) Gypsum Board Surfaces to Receive: Multi-Color Coating System - Section 09 9419, 'Interior Multi-Color Finishing':
 - 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'.
- 9) Painted, Untextured Gypsum Board Surfaces, Except in Mechanical, Storage, And Utility Areas:
 - a) GA-214 Level 5: 'All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over 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. A thin skim coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer's recommendations, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges. Coat prepared surface with specified primer'.

D. Glass Mat Gypsum Tile Backer:

1. Apply glass mat gypsum tile backer to framing. Attach using specified fasteners spaced **6 inches (150 mm)** on center on edges and into all framing members. Drive screws flush with surface of board.
2. Shim board to be plumb and flat or level and flat, depending on location.
3. Apply reinforcing only at joints where abutting different materials.

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 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 interior gypsum board and plaster 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'.
 - b. 'Attachment: Paint Color Schedule' for O&M / R&I Projects.
 - 2. 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:
- 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) Rest Rooms And Custodial Rooms: Gloss Level 6.
- D. Materials:
 - 1. Primers:
 - a. MPI Product 50, 'Primer Sealer, Latex, Interior'.
 - 2. Finish Coats:

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.

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 woodwork and wood floors 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'.
 - b. 'Attachment: Paint Color Schedule' for O&M / R&I Projects.

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. Wood Floors:
 - a. Low to medium traffic: MPI Product 60, 'Floor Paint, Latex, Low Gloss'.
 - 2. 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.

END OF SECTION

SECTION 26 0519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Single conductor building wire.
- B. Nonmetallic-sheathed cable.
- C. Underground feeder and branch-circuit cable.
- D. Armored cable.
- E. Metal-clad cable.
- F. Wiring connectors.
- G. Electrical tape.
- H. Heat shrink tubing.
- I. Oxide inhibiting compound.
- J. Wire pulling lubricant.
- K. Cable ties.

1.02 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 23 0923 - Direct-Digital Control System for HVAC: Conductors and cables for temperature control system.
- C. Section 26 0500 - Common Work Results for Electrical
- D. Section 26 0526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- E. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire 2013 (Reapproved 2018).
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft 2011 (Reapproved 2017).
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes 2010, with Editorial Revision (2020).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation 2004 (Reapproved 2020).
- E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape 2017.
- F. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- G. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy 2009.
- H. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems 2017.
- I. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
 - 1. Article 334, "Non-metallic-Sheathed Cable, Types NM, NMC And NMS".
- J. UL 4 - Armored Cable Current Edition, Including All Revisions.
- K. UL 44 - Thermoset-Insulated Wires and Cables Current Edition, Including All Revisions.

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- L. UL 83 - Thermoplastic-Insulated Wires and Cables Current Edition, Including All Revisions.
- M. UL 486A-486B - Wire Connectors Current Edition, Including All Revisions.
- N. UL 486C - Splicing Wire Connectors Current Edition, Including All Revisions.
- O. UL 486D - Sealed Wire Connector Systems Current Edition, Including All Revisions.
- P. UL 493 - Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables Current Edition, Including All Revisions.
- Q. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape Current Edition, Including All Revisions.
- R. UL 719 - Nonmetallic-Sheathed Cables Current Edition, Including All Revisions.
- S. UL 1569 - Metal-Clad Cables Current Edition, Including All Revisions.

1.04 DEFINITIONS

- A. Line Voltage: Over 70 Volts.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
 3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.06 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.
- B. Design Data: Indicate voltage drop and ampacity calculations for aluminum conductors substituted for copper conductors. Include proposed modifications to raceways, boxes, wiring gutters, enclosures, etc. to accommodate substituted conductors.
- C. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.

1.07 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.09 FIELD CONDITIONS

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.

PART 2 PRODUCTS

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2.01 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Nonmetallic-sheathed cable is permitted only as follows:
 - 1. Where not otherwise restricted, may be used:
 - a. For branch circuit wiring in dry locations within structures permitted to be of Types III, IV, and V construction, where fully sprinklered.
 - 2. In addition to other applicable restrictions, may not be used:
 - a. Where exposed to view.
 - b. Where exposed to damage.
 - c. For damp, wet, or corrosive locations.
 - d. Where in contact with earth.
 - e. Above suspended ceilings.
 - f. Where in contact with concrete.
 - g. Where restricted by NFPA 70 Article 334 (generally uses permitted in a meetinghouse are inside of walls and above a sheet rock ceiling in the mezzanine if it is covered on both sides but not above classrooms, the gym or chapel as those are accessible from the mezzanine level)..
- D. Metal-clad cable is permitted only as follows:
 - 1. Where not otherwise restricted, may be used:
 - a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
 - b. Where concealed in hollow stud walls, above accessible ceilings, and under raised floors for branch circuits up to 20 A.
 - 1) Exception: Provide single conductor building wire in raceway for circuit homerun from first outlet to panelboard.
 - 2. In addition to other applicable restrictions, may not be used:
 - a. Where not approved for use by the authority having jurisdiction.
 - b. Where exposed to view.
 - c. Where exposed to damage.
 - d. Where in contact with earth.
 - e. Where in contact with concrete.
 - f. For damp, wet, or corrosive locations, unless provided with a PVC jacket listed as suitable for those locations.
 - g. For isolated ground circuits, unless provided with an additional isolated/insulated grounding conductor.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductors for Grounding and Bonding: Also comply with Section 26 0526.
- H. Conductor Material:
 - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.

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2. Provide copper conductors except where aluminum conductors are specifically indicated or permitted for substitution. Conductor sizes indicated are based on copper unless specifically indicated as aluminum. Conductors designated with the abbreviation "AL" indicate aluminum.
 - a. Substitution of aluminum conductors for copper is permitted, when approved by Owner and authority having jurisdiction, only for the following:
 - 1) Services: Copper conductors size #6 and larger.
 - 2) Feeders: Copper conductors size #6 and larger.
 - b. Where aluminum conductors are substituted for copper, comply with the following:
 - 1) Size aluminum conductors to provide, when compared to copper sizes indicated, equivalent or greater ampacity and equivalent or less voltage drop.
 - 2) Increase size of raceways, boxes, wiring gutters, enclosures, etc. as required to accommodate aluminum conductors.
3. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
4. Tinned Copper Conductors: Comply with ASTM B33.
- I. Minimum Conductor Size:
 1. Branch Circuits: 12 AWG.
 - a. Exceptions:
 - 1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
 - 2) 20 A, 277 V circuits longer than 150 feet: 10 AWG, for voltage drop.
- J. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- K. Conductor Color Coding:
 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 2. Color Coding Method: Integrally colored insulation.
 - a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
 - b. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.
 - c. Equipment Ground, All Systems: Green.

2.03 SINGLE CONDUCTOR BUILDING WIRE

- A. Manufacturers:
 1. Copper Building Wire:
 - a. Cerro Wire LLC: www.cerrowire.com/#sle.
 - b. Encore Wire Corporation: www.encorewire.com/#sle.
 - c. General Cable Technologies Corporation: www.generalcable.com/#sle.
- B. Description: Single conductor insulated wire.
- C. Conductor Stranding:
 1. Feeders and Branch Circuits:
 - a. Size 10 AWG and Smaller: Solid.
 - b. Size 8 AWG and Larger: Stranded.
 - c. Wiring inside of walk-in cooler and freezer shall be stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation:
 1. Copper Building Wire: Type THHN/THWN-2 or XHHW-2, except as indicated below.

- a. Conductors in walk-in cooler and freezer: Type XHHW only.

2.04 NONMETALLIC-SHEATHED CABLE

- A. Manufacturers:
1. Encore Wire Corporation: www.encorewire.com/#sle.
 2. Southwire Company: www.southwire.com/#sle.
- B. Description: NFPA 70, Type NM multiple-conductor cable listed and labeled as complying with UL 719, Type NM-B.
- C. Conductor Stranding:
1. Size 10 AWG and Smaller: Solid.
 2. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.

2.05 UNDERGROUND FEEDER AND BRANCH-CIRCUIT CABLE

- A. Description: NFPA 70, Type UF multiple-conductor cable listed and labeled as complying with UL 493, Type UF-B.
- B. Provide equipment grounding conductor unless otherwise indicated.
- C. Conductor Stranding:
1. Size 10 AWG and Smaller: Solid.
 2. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.

2.06 ARMORED CABLE

- A. Description: NFPA 70, Type AC cable listed and labeled as complying with UL 4, and listed for use in classified firestop systems to be used.
- B. Conductor Stranding:
1. Size 10 AWG and Smaller: Solid.
 2. Size 8 AWG and Larger: Stranded.
- C. Insulation Voltage Rating: 600 V.
- D. Insulation: Type THHN.
- E. Grounding: Combination of interlocking armor and integral bonding wire.
- F. Armor: Steel, interlocked tape.

2.07 METAL-CLAD CABLE

- A. Manufacturers:
1. AFC Cable Systems Inc: www.afcweb.com/#sle.
 2. Encore Wire Corporation: www.encorewire.com/#sle.
 3. Southwire Company: www.southwire.com/#sle.
- B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.
- C. Conductor Stranding:
1. Size 10 AWG and Smaller: Solid.
 2. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.
- F. Grounding: Full-size integral equipment grounding conductor.
- G. Armor: Steel, interlocked tape.
- H. Provide PVC jacket applied over cable armor where indicated or required for environment of installed location.

2.08 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Connectors for Grounding and Bonding: Comply with Section 26 0526.
- C. Wiring Connectors for Splices and Taps:
1. Copper Conductors Size 8 AWG and Smaller: Use re-usable compression connectors.
 2. Copper Conductors Size 6 AWG and Larger: Use compression connectors.
 3. Connections Outside Building: Watertight steel spring wire connections with waterproof, non-hardening sealant.
- D. Wiring Connectors for Terminations:
1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
 2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
 3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
 4. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
 5. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
 6. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
 7. Conductors for Control Circuits: Use crimped terminals for all connections.
- E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.
- F. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. NSI Industries LLC: www.nsiindustries.com/#sle.
- G. Push-in Wire Connectors: Rated 600 V, 221 degrees F.
1. Manufacturers:
 - a. Ideal Industries, Inc: www.idealindustries.com/#sle.
 - b. NSI Industries LLC: www.nsiindustries.com/#sle.
- H. Mechanical Connectors: Provide bolted type or set-screw type.
1. Manufacturers:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. IlSCO: www.ilSCO.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
- I. Compression Connectors: Provide circumferential type or hex type crimp configuration.
- J. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.
1. Manufacturers:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. Thomas & Betts Corporation: www.tnb.com/#sle.
- K. Power Distribution Block: Terminals suitable for use with 75°F (24°C) copper conductors.
1. 16323 by Cooper Bussmann, Ellisville, MO www.bussmann.com

2. LBA363106 by Square D Co, Palatine, IL www.us.squared.com.
3. Substitutions: See Section 01 6000 - Product Requirements

2.09 ACCESSORIES

- A. Electrical Tape:
 1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 2. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
 3. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
 4. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.
 5. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.
 6. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil; suitable for continuous temperature environment up to 221 degrees F.
 7. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.
- B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
 1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. Burndy LLC: www.burndy.com/#sle.
- C. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
- D. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.
- F. Verify that raceway system is complete and cabinets and outlet boxes are free of foreign matter and moisture.

3.02 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION

- A. Circuiting Requirements:
 1. Unless dimensioned, circuit routing indicated is diagrammatic.
 2. When circuit destination is indicated without specific routing, determine exact routing required.

3. Install circuits as shown in Panel Schedules. Group circuit homeruns to panels as shown on Contract Drawings.
 4. Arrange circuiting to minimize splices. Conductors and cables shall be continuous from outlet to outlet.
 5. Include circuit lengths required to install connected devices within 10 ft of location indicated.
 6. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
 7. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
 8. Install wiring of different voltage systems in separate conduits.
 9. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is permitted, under the following conditions:
 - a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
 - b. Increase size of conductors as required to account for ampacity derating.
 - c. Size raceways, boxes, etc. to accommodate conductors.
 10. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).
- D. Install nonmetallic-sheathed cable (Type NM-B) where allowed in other sections and in accordance with NECA 121.
- E. Install underground feeder and branch-circuit cable (Type UF-B) in accordance with NECA 121.
- F. Install armored cable (Type AC) in accordance with NECA 120.
- G. Install metal-clad cable (Type MC) in accordance with NECA 120.
- H. Pre-wired 3/8-inch flexible fixture whips: Allowed only for connection to recessed lighting fixtures, lengths not to exceed 72 inches.
- I. Installation in Raceway:
 1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
 2. Pull all conductors and cables together into raceway at same time.
 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- J. Exposed Cable Installation (only where specifically permitted):
 1. Route cables parallel or perpendicular to building structural members and surfaces.
 2. Protect cables from physical damage.
- K. Line Voltage Cable Installation:
 1. 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.
 2. 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.
 3. Install exposed cables parallel to or at right angles to building structure lines.
 4. Keep cables 6 inches (150 mm) minimum from hot water pipes.

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5. Do not support cables from mechanical ducts or duct supports without Architect's written approval.
 6. Do not bore holes in vertical truss members or notch structural members for cable installation.
- L. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- M. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
- N. Terminate cables using suitable fittings.
1. Armored Cable (Type AC):
 - a. Use listed fittings and anti-short, insulating bushings.
 - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
 2. Metal-Clad Cable (Type MC):
 - a. Use listed fittings.
 - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
- O. Install conductors with a minimum of 12 inches of slack at each outlet.
- P. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- Q. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- R. Make wiring connections using specified wiring connectors.
1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
 3. Do not remove conductor strands to facilitate insertion into connector.
 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
 5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- S. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
 - a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
 - b. For taped connections likely to require re-entering, including motor leads, first apply varnished cambric electrical tape, followed by adequate amount of rubber splicing electrical tape, followed by outer covering of vinyl insulating electrical tape.
 2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.

- a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
 - b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.
3. Wet Locations: Use heat shrink tubing.
- T. Insulate ends of spare conductors using vinyl insulating electrical tape.
 - U. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.
 - V. Identify conductors and cables in accordance with Section 26 0553.
 - W. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
 - X. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
 - 1. Disconnect surge protective devices (SPDs) prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPDs connected.
- C. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

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**SECTION 26 0533.13
CONDUIT FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Intermediate metal conduit (IMC).
- C. Flexible metal conduit (FMC).
- D. Liquidtight flexible metal conduit (LFMC).
- E. Electrical metallic tubing (EMT).
- F. Rigid polyvinyl chloride (PVC) conduit.
- G. Electrical nonmetallic tubing (ENT).
- H. Liquidtight flexible nonmetallic conduit (LFNC).
- I. Conduit fittings.
- J. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 26 0500 - Common Work Results for Electrical: Sleeve seals for conduit penetrations.
- C. Section 26 0526 - Grounding and Bonding for Electrical Systems.
 - 1. Includes additional requirements for fittings for grounding and bonding.
- D. Section 26 0529 - Hangers and Supports for Electrical Systems.
- E. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- F. Section 26 2100 - Low-Voltage Electrical Service Entrance: Additional requirements for electrical service conduits.
- G. Section 31 2316 - Excavation and Trenching.
- H. Section 31 2323 - Fill and Aggregate Base: Bedding and backfilling.

1.03 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC) 2015.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S) 2015.
- C. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit (EIMC) 2018.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT) 2013.
- F. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC) 2017.
- G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable 2014.
- H. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit 2018.
- I. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit 2013.

- J. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing 2016.
- K. NEMA TC 13 - Electrical Nonmetallic Tubing (ENT) 2014 (Reaffirmed 2019).
- L. NEMA TC 14 (SERIES) - Reinforced Thermosetting Resin Conduit and Fittings Series 2015.
- M. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- N. UL 1 - Flexible Metal Conduit Current Edition, Including All Revisions.
- O. UL 6 - Electrical Rigid Metal Conduit-Steel Current Edition, Including All Revisions.
- P. UL 360 - Liquid-Tight Flexible Steel Conduit Current Edition, Including All Revisions.
- Q. UL 514B - Conduit, Tubing, and Cable Fittings Current Edition, Including All Revisions.
- R. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings Current Edition, Including All Revisions.
- S. UL 797 - Electrical Metallic Tubing-Steel Current Edition, Including All Revisions.
- T. UL 1242 - Electrical Intermediate Metal Conduit-Steel Current Edition, Including All Revisions.
- U. UL 1653 - Electrical Nonmetallic Tubing Current Edition, Including All Revisions.
- V. UL 1660 - Liquid-Tight Flexible Nonmetallic Conduit Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
 4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.
- C. Shop Drawings:
 1. Include proposed locations of roof penetrations and proposed methods for sealing.
- D. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2 inch (53 mm) trade size and larger.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

- B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.
- C. Underground:
 1. Under Slab on Grade: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or rigid PVC conduit.
 2. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit, intermediate metallic conduit (IMC), or rigid PVC conduit.
 3. Exterior, Embedded Within Concrete: Use galvanized steel rigid metal conduit or rigid PVC conduit.
 4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
 5. Where steel conduit is installed in direct contact with earth, use corrosion protection tape to provide supplementary corrosion protection or use PVC-coated galvanized steel rigid metal conduit.
 6. Where steel conduit emerges from concrete into soil, use corrosion protection tape to provide supplementary corrosion protection for a minimum of 4 inches on either side of where conduit emerges or use PVC-coated galvanized steel rigid metal conduit.
- D. Embedded Within Concrete:
 1. Within Slab on Grade: Not permitted.
 2. Within Slab Above Ground: Not permitted.
- E. Concealed Within Masonry Walls: Use intermediate metal conduit (IMC).
- F. Concealed Within Hollow Stud Walls: Use electrical metallic tubing (EMT) or Electrical non-metallic tubing (ENT).
- G. Concealed Above Accessible Ceilings: Use electrical metallic tubing (EMT) or Electrical non-metallic tubing (ENT).
- H. Interior, Damp or Wet Locations: Use intermediate metal conduit (IMC).
- I. Exposed, Interior, Not Subject to Physical Damage: Use electrical metallic tubing (EMT).
- J. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.
 1. Locations subject to physical damage include, but are not limited to:
 - a. Where exposed below 8 feet, except within electrical and communication rooms or closets.
- K. Exposed, Exterior: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).

- L. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).
- M. Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit or liquid tight flexible non-metallic conduit (LFNC).
 - 1. Maximum Length: 6 feet.
- N. Connections to Vibrating Equipment:
 - 1. Dry Locations: Use flexible metal conduit.
 - 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
 - 3. Maximum Length: 3 feet unless otherwise indicated.
 - 4. Vibrating equipment includes, but is not limited to:
 - a. Transformers.
 - b. Motors.
- O. Fished in Existing Walls, Where Necessary: Use flexible metal conduit.
- P. Wiring inside of walk-in coolers and freezers: Use liquidtight flexible metal conduit.

2.02 CONDUIT REQUIREMENTS

- A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.
- B. Fittings for Grounding and Bonding: Also comply with Section 26 0526.
- C. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- D. Provide products listed, classified, and labeled as suitable for the purpose intended.
- E. Minimum Conduit Size, Unless Otherwise Indicated:
 - 1. For exterior use: 3/4 inch (21 mm)
 - 2. For interior use: 1/2 inch (16 mm)
- F. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Manufacturers:
 - 1. Allied Tube & Conduit, a Division of Atkore International; []: www.alliedeg.com/#sle.
 - 2. Nucor Tubular Products: www.nucortubular.com/#sle.
 - 3. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.
- B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- C. Fittings:
 - 1. Manufacturers:
 - a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.
 - b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
 - 2. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 3. Material: Use steel or malleable iron.
 - 4. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 INTERMEDIATE METAL CONDUIT (IMC)

- A. Manufacturers:
 - 1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.

2. Nucor Tubular Products: www.nucortubular.com/#sle.

- B. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.
- C. Fittings:
1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.
 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.05 FLEXIBLE METAL CONDUIT (FMC)

- A. Manufacturers:
1. AFC Cable Systems, Inc: www.afcweb.com.
 2. Electri-Flex Company: www.electriflex.com.
 3. International Metal Hose: www.metalhose.com.
- B. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.
- C. Fittings:
1. Manufacturers:
 - a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.
 - b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 3. Material: Use steel.

2.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Manufacturers:
1. AFC Cable Systems, Inc: www.afcweb.com.
 2. Electri-Flex Company: www.electriflex.com.
 3. International Metal Hose: www.metalhose.com.
- B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- C. Fittings:
1. Manufacturers:
 - a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.
 - b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 3. Material: Use steel or malleable iron.

2.07 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
1. Allied Tube & Conduit: www.alliedeg.com.
 2. Nucor Tubular Products: www.nucortubular.com/#sle.
 3. Wheatland Tube Company: www.wheatland.com.
- B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- C. Fittings:
1. Manufacturers:
 - a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.

- b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
- 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
- 3. Material: Use steel.
 - a. Do not use die cast zinc fittings.
- 4. Connectors and Couplings: Use compression (gland) or set-screw type.
 - a. Do not use indenter type connectors and couplings.
- 5. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.
- 6. Embedded Within Concrete (where permitted): Use fittings listed as concrete-tight. Fittings that require taping to be concrete-tight are not acceptable.

2.08 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

- A. Manufacturers:
 - 1. Cantex Inc: www.cantexinc.com/#sle.
 - 2. Carlon, a brand of Thomas & Betts Corporation: www.carlon.com/#sle.
 - 3. JM Eagle: www.jmeagle.com/#sle.
- B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- C. Fittings:
 - 1. Manufacturer: Same as manufacturer of conduit to be connected.
 - 2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.09 ELECTRICAL NONMETALLIC TUBING (ENT)

- A. Manufacturers:
 - 1. Cantex Inc; [_____]: www.cantexinc.com/#sle.
 - 2. Carlon, a brand of Thomas & Betts Corporation; [_____]: www.carlon.com/#sle.
- B. Description: NFPA 70, Type ENT electrical nonmetallic tubing complying with NEMA TC 13 and listed and labeled as complying with UL 1653.
- C. Fittings:
 - 1. Manufacturer: Same as manufacturer of ENT to be connected.
 - 2. Use solvent-welded type fittings.
 - 3. Solvent-Welded Fittings: Rigid PVC fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; suitable for use with ENT.

2.10 LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC)

- A. Manufacturers:
 - 1. AFC Cable Systems, Inc: www.afcweb.com/#sle.
 - 2. Electri-Flex Company: www.electriflex.com/#sle.
 - 3. International Metal Hose: www.metalhose.com/#sle.
- B. Description: NFPA 70, Type LFNC liquidtight flexible nonmetallic conduit listed and labeled as complying with UL 1660.
- C. Fittings:
 - 1. Manufacturer: Same as manufacturer of conduit to be connected.
 - 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B; suitable for the type of conduit to be connected.

2.11 PROHIBITED FITTING MATERIALS

- A. The following fitting type are not permitted: crimp-on, tap-on, indenter, and cast set-screw fittings for EMT.

- B. Spray (aerosol) PVC cement.

2.12 ACCESSORIES

- A. Corrosion Protection Tape: PVC-based, minimum thickness of 20 mil.
- B. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.
- C. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.
 - 1. Spray (aerosol) PVC cement is not permitted.
- D. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force.
- E. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.
- F. Duct Bank Spacers: Nonmetallic; designed for maintaining conduit/duct spacing for concrete encasement in open trench installation; suitable for the conduit/duct arrangement to be installed.
- G. Expansion Fittings: Designed to allow for expansion and contraction in a run of conduit, suitable for type of conduit installed.
 - 1. Products:
 - a. Hot Dip Galvanized: O-Z/Gedney (Emerson) type AX.
 - b. PVC: Carlon type E945.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.
- D. Notify Architect in writing if substrates are not acceptable to install raceways and boxes.
 - 1. Commencing installation constitutes acceptance of existing conditions.

3.02 INSTALLATION

- A. Furnish and install air-vapor barrier boxes, electric service raceways, telephone service raceways, and internet service raceways as described in the contract documents.
 - 1. Install raceways for building services in accordance with service providers requirements.
- B. Install Owner provided corner A/V equipment cabinets.
- C. Install products in accordance with manufacturer's instructions.
- D. Perform work in accordance with NECA 1 (general workmanship).
- E. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
- F. Install intermediate metal conduit (IMC) in accordance with NECA 101.
- G. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.
- H. Install electrical nonmetallic tubing (ENT) in accordance with NECA 111.
- I. Install liquidtight flexible nonmetallic conduit (LFNC) in accordance with NECA 111.
- J. Conduit Routing:
 - 1. Unless dimensioned, conduit routing indicated is diagrammatic.
 - 2. When conduit destination is indicated without specific routing, determine exact routing required.
 - 3. Conceal all conduits unless specifically indicated to be exposed.

4. Conduits in the following areas may be exposed, unless otherwise indicated:
 - a. Electrical rooms.
 - b. Mechanical equipment rooms.
 - c. Within joists in areas with no ceiling.
 5. Unless otherwise approved, do not route conduits exposed:
 - a. Across floors.
 - b. Across roofs.
 - c. Across top of parapet walls.
 - d. Across building exterior surfaces.
 6. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
 7. Arrange conduit to maintain adequate headroom, clearances, and access.
 8. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
 9. Arrange conduit to provide no more than 150 feet between pull points.
 10. Route conduits above water and drain piping where possible.
 11. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
 12. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
 13. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
 - a. Heaters.
 - b. Hot water piping.
 - c. Flues.
 14. Group parallel conduits in the same area together on a common rack.
- K. Conduit Support:
1. Secure and support conduits in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
 3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
 4. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
 5. Use conduit clamp to support single conduit from beam clamp or threaded rod.
 6. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
 7. Use of wire for support of conduits is not permitted.
 8. Where conduit support intervals specified in NFPA 70 and NECA standards differ, comply with the most stringent requirements.
- L. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 3. Use suitable adapters where required to transition from one type of conduit to another.
 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.

5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
 6. Where spare conduits stub up through concrete floors and are not terminated in a box or enclosure, provide threaded couplings equipped with threaded plugs set flush with finished floor.
 7. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
 8. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
 9. Provide PVC adapters at all boxes.
- M. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 4. Conceal bends for conduit risers emerging above ground.
 5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
 6. Provide suitable modular seal where conduits penetrate exterior wall below grade.
 7. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
 8. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
 9. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
- N. Installation in concrete:
1. Install no conduit in concrete unless outside diameter is less than 1/3 of slab, wall, or beam thickness in which it is embedded.
 2. Position conduits in center of concrete below reinforcing steel, and separated by minimum lateral spacing of three diameters.
 3. 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.
 4. Separate conduits penetrating structural slabs in buildings by 2 inches (50 mm) minimum.
 5. Install seal device where underground raceways penetrate concrete building wall.
- O. Underground Installation:
1. Provide trenching and backfilling in accordance with Section 31 2316 and Section 31 2323.
 2. Minimum Cover, Unless Otherwise Indicated or Required:
 - a. Underground, Exterior: 24 inches.
 - b. Under Slab on Grade: 12 inches to bottom of slab.
 - 1) Install conduits under slab on grade only at locations shown on the drawings.
 3. Provide underground warning tape in accordance with Section 26 0553 along entire conduit length for service entrance where not concrete-encased.
 4. Where in contact with earth or concrete, wrap buried galvanized rigid steel and galvanized IMC conduit and fittings completely with corrosion protection tape.

- P. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
 - 1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
 - 2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
 - 3. Where conduits are subject to earth movement by settlement or frost.
- Q. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
 - 1. Where conduits pass from outdoors into conditioned interior spaces.
 - 2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- R. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.
- S. Provide grounding and bonding in accordance with Section 26 0526.
- T. Identify conduits in accordance with Section 26 0553.

3.03 PROHIBITED PROCEDURES

- A. Installation of raceway beneath or embedded in concrete, except where explicitly shown on Contract Documents.
- B. Use of wooden plugs inserted in concrete or masonry units for mounting raceway, supports, boxes, cabinets, or other equipment.
- C. Installation of raceway that has been crushed or deformed.
- D. Use of torches for bending PVC.
- E. Spray applied PVC cement.
- F. Boring holes in truss members.
- G. Notching of structural members.
- H. Supporting raceway from ceiling system support wires.
- I. Nail drive straps or tie wire for supporting raceway.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective conduits.

3.05 CLEANING

- A. Clean interior of conduits to remove moisture and foreign matter.

3.06 PROTECTION

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

**SECTION 31 1000
SITE CLEARING****PART 1 GENERAL****1.01 SUMMARY**

- A. This Section includes the following:
 - 1. Protecting existing trees, shrubs, groundcovers, plants and grass to remain.
 - 2. Clearing and grubbing.
 - 3. Stripping and stockpiling topsoil.
 - 4. Removing above- and below-grade site improvements.
 - 5. Disconnecting and capping or sealing site utilities.
 - 6. Temporary erosion and sedimentation control measures.

1.02 MATERIAL OWNERSHIP

- A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.03 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- D. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

PART 2 PRODUCTS**2.01 SOIL MATERIALS**

- A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 31 Section "Earth Moving."
 - 1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 EXECUTION**3.01 PREPARATION**

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly flag trees and vegetation to remain or to be relocated.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.02 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to Sediment and Erosion Control Drawings.
- B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.03 TREE PROTECTION

- A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.
- B. Do not excavate within tree protection zones, unless otherwise indicated.
- C. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect.

3.04 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 - 1. Arrange with utility companies to shut off indicated utilities.

- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Architect not less than two days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without Architect's written permission.

3.05 CLEARING AND GRUBBING

- A. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.06 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
- C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3.07 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

3.08 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
1. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

END OF SECTION

**SECTION 31 2000
EARTH MOVING****PART 1 GENERAL****1.01 SUMMARY**

- A. This Section includes the following:
 - 1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns and grasses.
 - 2. Excavating and backfilling for buildings and structures.
 - 3. Drainage course for slabs-on-grade.
 - 4. Base course for asphalt paving and concrete pavement and walks.
 - 5. Excavating and backfilling for utility trenches.
- B. Related Sections:
 - 1. Salt Lake City Standards and Specifications for improvements in public Right-of-Way.

1.02 DEFINITIONS

- A. Backfill: Soil material used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Course placed between the subbase course and hot-mix asphalt paving and concrete pavement and walks.
- C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions changes in the Work.
 - 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Subbase Course: Course placed between the subgrade and base course.
- J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.03 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.

PART 2 PRODUCTS**2.01 SOIL MATERIALS**

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM or AASHTO M 145 Soil Classification Groups A-1, A-2-4, A-2-5, and A-3, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487 and A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- E. Base Course: Naturally or artificially graded mixture of crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

PART 3 EXECUTION

3.01 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 31 Section "Site Clearing."
- C. Protect and maintain erosion and sedimentation controls, which are specified in Division 31 Section "Site Clearing." during earthwork operations.

3.02 EXCAVATION

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.03 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.04 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.05 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
 1. Clearance: 12 inches each side of pipe or conduit.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material, 4 inches deeper elsewhere, to allow for bedding course.

3.06 SUBGRADE INSPECTION

- A. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

- B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.07 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.
 - 1. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

3.08 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.09 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Backfill trenches excavated under footings and within 18 inches bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings.
- D. Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.
 - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- E. Place and compact final backfill of satisfactory soil to final subgrade elevation.

3.010 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material.
 - 3. Under steps and ramps, use engineered fill.
 - 4. Under building slabs, use engineered fill.
 - 5. Under footings and foundations, use engineered fill.

3.011 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.012 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
 - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
 - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
 - 3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
 - 4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

3.013 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks: Plus or minus 1 inch.
 - 3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.014 SUBBASE AND BASE COURSES

- A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase and base course under pavements and walks as follows:
 - 1. Shape subbase and base course to required crown elevations and cross-slope grades.
 - 2. Compact subbase and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.015 DRAINAGE COURSE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
 - 1. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 - 2. Compact each layer of drainage course to required cross sections and thicknesses to not less than **95** percent of maximum dry unit weight according to ASTM D 698.

3.016 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable.
- E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.017 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.018 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION

SECTION 32 3113

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes But Not Limited To:
 1. Furnish and install complete fence as described in Contract Documents.

- B. Related Requirements:
 1. Section 03 3111: 'Cast-In-Place Structural Concrete' for mow strips at fencing and setting sleeves in concrete retaining walls.
 2. Section 05 0503: 'Shop-Applied Metal Coatings' for priming and galvanizing repair.
 3. Section 05 0523: 'Metal Fastening' for welding requirements.

1.2 REFERENCES

- A. Association Publications: / Organizations:
 1. Chain Link Fence Manufacturers Institute (CLFMI), Columbia, MD www.chainlinkinfo.org.
 - a. WLG 2445, '*Chain Link Fence Wind Load Guide for the Selection of Line Post and Line Post Spacing*' (2012).
 - b. CLF-SFR0111, '*Chain Link Fence Manufacturers Institute Security Fencing Recommendations*'.
 - c. CLF-PM0610, '*Field Inspection Guide*'.

- d. CLF-TP0211, '*Tested and Proven Performance of Security Grade Chain Link Fencing Systems*'.

B. Reference Standards:

1. ASTM International:
 - a. ASTM A123/A123M-17, 'Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products'.
 - b. ASTM A153/A153M-16a, 'Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware'.
 - c. ASTM A392-11a(2017), 'Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric'.
 - d. ASTM A1011/A1011M-18a, 'Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength'.
 - e. ASTM C1107/C1107M-17, 'Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)'.
 - f. ASTM F1043-18, 'Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework'.
 - g. ASTM F1083-18, 'Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures'.
 - h. ASTM F3000/F3000M-13(2018), 'Standard Specification for Polymer Privacy Insert Slats for Chain Link Fabric and Privacy Chain Link Fabric Manufactured Containing Pre-Installed Privacy Slats'.

1.3 SUBMITTALS

A. Action Submittals:

1. Product Data: Manufacturer literature or cut sheets on fence components.
2. Samples: Types of vision slats and colors for Architect's selection.

B. Closeout Submittals:

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

1.4 WARRANTY

A. Vision Slats:

1. Manufacturers twenty-five (25) year, pro-rata limited Warranty.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Materials:

1. Fabric:
 - a. Chain Link Fabric of 9 ga (3.7 mm) wire, galvanized before or after weaving with 1.2 ounce (34 grams) zinc coating conforming to requirements of ASTM A392, Class I.
 - b. Knuckle both selvages.
2. Framework:
 - a. Posts and Rails shall be roll-formed, self-draining shapes meeting strength requirements of ASTM F1043, Table 3, and with 2 ounce (56.7 grams) zinc coating per 1 sq ft (0.0929 sq meter) of surface area conforming to ASTM A123/A123M.
 - b. Line Posts:

- 1) Line Posts 8 feet (2.45 m) and under:
 - a) 1.875 by 1.625 inch (48 by 41 mm) C-section roll formed from steel conforming to ASTM A1011/A1011M, Grade 45, with minimum theoretical bending strength of 247 lbs (112 kg) under 6 foot (1.80 m) cantilever load.
 - b) 2.375 inch (60 mm) outside diameter Schedule 40 tubular section weighing 3.65 lbs (1.6 kg) per lineal 1 ft (305 mm) meeting requirements of ASTM F1083.
 - c) 2.375 inch (60 mm) outside diameter Schedule 40 tubular section weighing 3.12 lbs (1.42 kg) per lineal 1 ft (305 mm) formed from steel meeting requirements of ASTM A1011/A1011M.
 - c. Terminal And Gate Posts:
 - 1) Gate Posts and gate posts for gate leaves under 6 feet (1.80 m) wide:
 - a) 3.5 by 3.5 inch (89 by 89 mm) roll formed section with minimum theoretical bending strength of 486 pounds (220.5 kg) under 6 foot (1.80 m) cantilever load.
 - b) 3 inch (76 mm) outside diameter Schedule 40 pipe weighing 5.79 lbs (2.63 kg) per lineal 1 ft (305 mm) meeting requirements of ASTM F1083.
 - c) 3 inch (76 mm) outside diameter Schedule 40 tubular section weighing 4.64 lbs (2.11 kg) per lineal 1 ft (305 mm) formed from steel meeting requirements of ASTM A1011/A1011M.
 - d. Top And Brace Rail:
 - 1) 1.625 by 1.25 inch (41 by 32 mm) roll formed section of 45,000 psi (310 MPa) yield strength channel shaped rail with minimum theoretical bending strength of 247 lbs (112 kg) on 10 foot (3.050 m) midpoint load.
 - 2) 1.660 inch (42 mm) outside diameter Schedule 40 pipe weighing 2.27 lbs (1.03 kg) per lineal 1 ft (305 mm) meeting requirements of ASTM F1083.
 - 3) 1.660 inch 42 mm outside diameter Schedule 40 tubular section weighing 1.84 lbs (0.83 kg) per lineal 1 ft (305 mm) formed from steel meeting requirements of ASTM A1011/A1011M.
 - e. Fittings:
 - 1) Pressed steel or malleable iron, hot-dip galvanized conforming to ASTM A153/A153M.
 - 2) Tie wires shall be 12 ga (2.05 mm) minimum galvanized steel or 9 ga (3 mm) minimum aluminum wire.
 - f. Tension Wire: 7 ga (3.66 mm) minimum galvanized spring steel.
3. Gate Leafs Wider Than 6 Feet (1.80 Meters):
 - a. Fabricate perimeter frames from metal and finish to match fence framework. Assemble frames by welding or with special fittings and rivets, for rigid connections, providing security against removal or breakage connections.
 - 1) Provide same fabric as for fence. Install fabric with stretcher bars at vertical edges and at top and bottom edges. Attach stretchers bars to frame at not more than 15 inches (380 mm) on center.
 - 2) Install diagonal cross-bracing consisting of 3/8 inch (9.5 mm) diameter adjustable length truss rods to ensure frame rigidity without sag or twist.
 - b. Swing Gates: Fabricate perimeter frames of minimum 1.90 inches (48.26 mm) OD pipe.
 - c. Gate Hardware: Provide hardware and accessories for each gate, galvanized per ASTM A153/A153M, and in accordance with following:
 - 1) Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180 degree gate opening. Provide 1-1/2 pair of hinges for each leaf over 6 foot (1.80 m) nominal height.
 - 2) Latch At Paving: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.
 - d. Keeper: Provide keeper for vehicle gates, which automatically engages gate leaf and holds it in open position until manually released.
 - e. Double Gates:
 - 1) Provide gate stops for double gates, consisting of mushroom type flush plate with anchors, set in concrete, and designed to engage center drop rod or plunger bar.
 - 2) Include locking device and padlock eyes as integral part of latch, permitting both gate leaves to be locked with single padlock.
 - f. Sliding Gates: Provide Manufacturer's standard heavy-duty inverted channel track, ball-bearing hanger sheaves, overhead framing and supports, guides, stays, bracing, hardware, and accessories as required.

- B. Mixes:
 - 1. Post Foundation Concrete:
 - a. One cu ft cement, 2 cu ft (0.0566 cu m) sand, 4 cu ft (0.1132 cu m) gravel, and 5 gallons (18.93 liters) minimum to 6 gallons (22.71 liters) maximum water.
 - b. Mix thoroughly before placing.

2.2 ACCESSORIES

- A. Post Setting Grout at Sleeves:
 - 1. Commercial nonshrink grout conforming to requirements of ASTM C1107/C1107M, Type B or C.
 - 2. Type Two Approved Products:
 - a. Normal Construction Grout A by W R Bonsal, Charlotte, NC www.bonsal.com.
 - b. Advantage 1107 Grout by Dayton Superior, Miamisburg, OH www.daytonrichmond.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.fivestarproducts.com.
 - e. Duragrout by L&M Construction Chemicals Inc, Omaha, NE www.lmcc.com.
 - f. Masterflow 713 Pre-mixed Grout by Master Builders, Cleveland, OH www.masterbuilders.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 www.usspec.com.
 - i. CG-86 Grout by W R Meadows, Elgin, IL www.wrmeadows.com.
 - j. Equal as approved by Architect before use. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fence shall be installed by mechanics skilled and experienced in erecting fences of this type and in accordance with Contract Documents.
 - 1. When general ground contour is to be followed, make changes of grade in gradual, rolling manner.
 - 2. Evenly space posts in line of fence a maximum of 10 feet (3.050 meter) center to center.
- B. Post Foundations:
 - 1. Except atop retaining walls, set posts with concrete post foundations as specified below:
 - a. Line Posts:
 - 1) Diameter 8 inch (200 mm)
 - 2) Depth 36 inch (915 mm).
 - b. Gate, End, And Corner Posts:
 - 1) Diameter 12 inch (305 mm)
 - 2) Depth 42 inch (1 065 mm).
 - c. At mow strips, set top of post foundation below grade sufficient to allow for placing of mow strip. Measure post foundation depth from top of mow strip.
 - d. Where fences are incorporated into slabs, measure post foundation depth from top of slab. Extend bottom of slab footing sufficient to allow specified amount of concrete around post. At existing slabs, install fence outside perimeter of slab.
 - e. For fences on retaining walls, provide 12 inch (305 mm) long sleeves to be cast into retaining wall. Set pipe in sleeve and grout space between sleeve and post full.
- C. Fence:
 - 1. After posts have been permanently positioned and concrete cured for one (1) week minimum, install framework, braces, and top rail. Join top rail with 6 inch (150 mm) minimum couplings at not more than 21 foot (6.40 meter) centers.
 - 2. Stretch fabric by attaching one end to terminal post and supplying sufficient tension to other end of stretch so slack is removed.

- a. Fasten fabric to line posts with tie wires. Pass ties over one strand of fabric and hook under line post flange.
- b. Place one tie as close to bottom of fabric as is possible with additional ties equally spaced between top and bottom band on approximately equal spacing not to exceed 14 inches (355 mm) on center.
- c. Attach fabric to roll formed terminals by weaving fabric into integral lock loops formed in post. Attach fabric to tubular terminals with tension bars and bands.
- d. Hold fabric approximately 2 inches (50 mm) above finish grade line.
- e. On top rail, space tie wires at no more than 24 inches (610 mm) on center.
- f. Securely attach fittings and firmly tighten nuts.

3.2 CLEANING

- A. Spread dirt from foundation excavations evenly around surrounding area unless otherwise directed. Leave area free of excess dribbles of concrete, pieces of wire, and other scrap materials.

END OF SECTION

**SECTION 32 8423
UNDERGROUND SPRINKLERS - NO CONTROLLERS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Furnish and install landscape irrigation system as described in Contract Documents complete with accessories necessary for proper function.

1.02 RELATED REQUIREMENTS

- A. Section 01 4000 - Quality Requirements
- B. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.
- C. Section 26 0533.13 - Conduit for Electrical Systems.
- D. Section 31 2316 - Excavation and Trenching: Excavating for irrigation piping.
- E. Section 31 2323 - Fill and Aggregate Base: Backfilling for irrigation piping.
- F. Section 32: 8466: Underground Sprinklers: Controllers.
- G. Section 32 9001: 'Common Planting Requirements' for pre-installation conference held jointly with other common planting related sections.
- H. Section 32 9120: 'Topsoil And Placement' for topsoil evaluation and placement required for topsoil grading.
- I. Section 32 9122: 'Topsoil Grading' for preparation of topsoil and addition of amendments prior to landscaping.
- J. Section 32 9223: 'Sodding'.
- K. Section 32 9300: 'Plants'.
- L. Section 33 1416 - Site Water Utility Distribution Piping.

1.03 REFERENCE STANDARDS

- A. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series) 2015.
- B. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems 2020.
- C. ASTM F656 Standard Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.

1.04 DEFINITIONS

- A. Certified Water Audit: Irrigation system audit performed by Certified Landscape Irrigation Auditor (CLIA) as defined by Irrigation Association (<https://www.irrigation.org/>). Include water audit if required by AHJ, if installing in a high wind area, or if installing in high water cost area. Remove all references if not required.
- B. High Wind Area: Area with average sustained wind speed of over 7.5 mph (12 km/hr).
- C. Landscape Management Plan (LMP): See Section 32 9001 for definition and format.
- D. Lateral Line: Downstream from automatic control valves to application devices, heads, and emitters. Piping or tubing is under pressure during flow. In areas where potable or secondary water are used, line shall be white. In areas where non-potable or reclaimed water are used, line shall be purple.
- E. Main Line: Downstream from point of connection to automatic control valves. Piping is under water-distribution-system pressure when activated by master valve or hydrometer. In areas where potable or secondary water are used, line shall be white. In areas where non-potable or reclaimed water are used, line shall be purple.
- F. Plant Establishment Period: See Section 32 9001 for definition.

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- G. Point of Connection: Location where water enters irrigation system.
- H. Post-Plant Establishment Period: Time following Plant Establishment Period.
- I. Source Pressure Test: Test to determine water source pressure.
- J. Static Water Pressure: Pressure at point of connection when system is not in operation.
- K. System Pressure Test: Test to evaluate system pressure when pressurized.
- L. Two Wire Path: See Section 32 8466 for definition.
- M. Working Pressure: Pressure at point of connection when system is in operation.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Only specify materials approved by the AHJ.
- B. Coordination: Coordinate work with other Sections.
- C. Provide sufficient notice to the Landscape Architect and all other pertinent parties to participate in the following tasks.
 - 1. Preinstallation Meeting: Convene seven days minimum prior to commencing work of this section.
 - a. Prior to irrigation system installation review mockups, testing, inspection, certification, and submittal requirements.
 - 2. System Pressure Test: Provide two days notification prior to commencing.
 - 3. Inspections: Provide seven days notification prior to commencing.
 - 4. Substantial Completion: Provide seven days notification prior to commencing.
 - 5. Final Acceptance: Provide seven days notification prior to commencing.
 - 6. Perform Winter Shut-Down and Spring Start-Up per Part 3: Provide notification upon completion.
- D. Sequencing:
 - 1. Install sleeves and conduit before installation of cast-in-place concrete site elements and paving.

1.06 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures. Submittals may be included in more than one submittal group listed below.
- B. Submittals for Review
 - 1. Do not commence work or deliver products to site until Landscape Architect approves submittals for review.
 - 2. Product Data:
 - a. Provide manufacturer's cut sheets for each system element.
 - 3. Pressure tests:
 - a. Prior to main line burial, document pressure test results as follows:
 - 1) Take photos.
 - 2) Write description including but not limited to:
 - (a) Start time,
 - (b) Completion time,
 - (c) Processes used,
 - (d) Issues encountered
 - (e) Methods of resolving issues.
- C. Submittals for Information (Coordinate with Sections 32 8466 and 32 9000):
 - 1. Irrigation System Approval:
 - a. When irrigation system is approved, Landscape Architect will provide signed acknowledgement:
 - 1) Include name and signature of Landscape Architect, Landscape Architect's company, Landscape Architect's telephone number, and date of review.

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- 2) State to best of Landscape Architect's knowledge that the system is in full compliance with Contract Documents.
 2. Establishment Period Acknowledgement (See LMP):
 - a. Landscape Architect will provide acknowledgment of Establishment Period commencement:
 - 1) Include name and signature of Installer, Installer's company, Installer's telephone number, and date.
 - 2) Include name and signature of Owner's Representative, Owner's Representative Group name, Owner's Representative Group telephone number, and date.
 - 3) Include date when Establishment Period begins and that it extends one (1) year from that time.
 3. Training Acknowledgement (See LMP):
 - a. Landscape Architect will provide acknowledgement that training has been performed:
 - 1) Include name and signature of Installer, Installer's company, Installer's telephone number, and date.
 - 2) Include name and signature of Owner's Representative, Owner's Representative Group name, Owner's Representative Group telephone number, and date.
 - 3) Acknowledge Owner's Representative has been trained in operation and maintenance of system.
 4. Certified Water Audit - If required by AHJ.
 - a. Irrigation system zone by zone evaluation of:
 - 1) Distribution uniformity.
 - 2) Zone precipitation rates.
 - 3) Recommended run times during hottest time of year.
 - 4) Recommended system modifications.
- D. Submittals for Project Closeout
1. Operation and Maintenance Data (Digital Format Only):
 - a. Contractor's directions for system operation and maintenance:
 - 1) Winter start-up and spring shut-down,
 - 2) Seasonal modifications,
 - b. Manufacturer's printed literature for operating and maintaining elements of system.
 - 1) Manufacturer's parts catalog.
 - 2) Manufacturer's printed literature for operating and maintaining elements of system.
 - c. Contractor's recommended run times for each valve. Combine directives from Certified Water Audit (if pertinent) and directives as found in Section 32 8466.
 - d. System Pressure Test Report(s)
 2. Record Documentation:
 - a. Irrigation Drawings: Record actual locations of all concealed components. As installation occurs prepare accurate record drawings:
 - 1) Detail and dimension changes made during construction.
 - 2) Field dimension locations from permanent above grade surfaces or edges to valve boxes, manual drains, quick coupler valves, and control wire runs not in main line ditch. Field dimension to both ends of sleeves.
 - 3) Laminated
 - (a) 11 x 17 inches (275 x 425 mm).
 - (b) Show color keyed zones.
 - (c) Mount on 12 x 18 inch (300 x 450 mm) hard board drilled with two (2) 1/2 inch (13 mm) holes at top of board.
 - (d) Hang on hooks in Custodial Room or location designated by Owner's Representative.
 - 4) Un-Laminated to be included in Landscape Management Plan (LMP):
 - (a) 11 x 17 inches (275 x 425 mm).

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- (b) Show color keyed zones.
- b. Photographs: Prior to burial take photographs of key elements including but not limited to:
 - 1) Valves
 - 2) Drains
 - 3) Hydrometer
- 3. System warranty. One year minimum.
- 4. Landscape Management Plan.
 - a. Irrigation Section. Include the following:
 - 1) Operation and Maintenance Data.
 - 2) Record Documentation including Irrigation Drawings and Photographs.
 - 3) System warranty
 - 4) Establishment Period Acknowledgement
 - 5) Training acknowledgment
 - 6) Certified Water Audit.
- E. Maintenance Material Submittals: Provide the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. One (1) heavy-duty key for stop and waste or main shut-off valve.
 - 3. One (1) quick coupler key with brass hose swivel.
- F. Final payment will not be made until all submittals are received and reviewed by the Architect and Landscape Architect

1.07 **QUALITY ASSURANCE**

- A. Work and materials shall comply with AHJ requirements. Nothing within contract documents should be construed to permit work not conforming to applicable codes and requirements.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- C. Installer Qualifications:
 - 1. Irrigation Subcontractor
 - a. Company specializing in performing work of this section.
 - b. Minimum five (5) years experience in irrigation sprinkler installations.
 - c. Minimum five (5) satisfactorily completed irrigation sprinkler installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
 - d. Use trained personnel familiar with required irrigation sprinkler procedures and with Contract Documents.
 - e. Foreman or supervisor required to attend pre-installation conference.
 - 2. Irrigation Installer
 - a. Perform installation under direction of foreman or supervisor.
 - b. Minimum three (3) years experience in irrigation sprinkler installations similar in size, scope, and complexity.
 - 3. Submit documentation upon request.
- D. Mockups:
 - 1. Provide mockups of each valve box detail at staging area.
 - 2. Mockups may be assembled without solvent weld cement so components can be used in the field.
- E. Certified Water Audit - If required by AHJ.
 - 1. Performed by Certified Water Auditor

1.08 **DELIVERY, STORAGE, AND HANDLING**

- A. Storage and Handling Requirements:

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1. Protect materials from damage and prolonged exposure to sunlight.

1.09 WARRANTY

- A. In addition to standard one (1) year guarantee, warranty shall include:
 1. Filling and repairing depressions and replacing plantings due to settlement of irrigation system trenches.
 2. Repairing equipment and pipe not properly winterized.

PART 2 PRODUCTS

2.01 SYSTEM

- A. Manufacturers (for reference only, may or may not be included in project):
 1. Manufacturer Contact List:
 - a. 3M, Austin, TX www.3m.com/elpd.
 - b. Action Machining Inc, Bountiful, UT www.actionfilters.com.
 - c. Amiad www.amiadusa.com.
 - d. Carson by Oldcastle Enclosure Solutions, Auburn, WA www.oldcastleenclosures.com.
 - e. GPH Irrigation Products, Fontana, CA www.gphirrigation.com.
 - f. Harrington Corporation (Harco), Lynchburg, VA www.harcofittings.com.
 - g. Hunter Industries, San Marcos, CA www.hunterindustries.com.
 - h. Hydro-Rain, North Salt Lake, UT www.hydorain.com.
 - i. King Innovation, St Charles, MO www.kinginovation.com.
 - j. IPS Corporation, Compton, CA www.ipscorp.com.
 - k. Leemco, Colton, CA www.leemco.com.
 - l. Matco-Norca, Inc. Brewster, NY www.matco-norca.com.
 - m. Mueller Company, Atlanta, GA www.muellercompany.com.
 - n. Netafim, Inc. www.netafimusa.com.
 - o. Nibco Inc, Elkhart, IN www.nibco.com.
 - p. Northstar Industries, LLC, Riverside, CA www.suresplice.com.
 - q. Orbit Irrigation Products, Inc. Bountiful, UT www.orbitonline.com.
 - r. Paige Electric, Union, NJ www.paigewire.com.
 - s. Rain Bird Sprinkler Manufacturing Corp, Glendora, CA www.rainbird.com.
 - t. Salco by Weathermatic Irrigation Products, Garland, TX www.weathermatic.com.
 - u. Toro Company, Irrigation Div, Riverside, CA www.toro.com.
 - v. T. Christy Enterprises, Inc. (Christy's), Anaheim, CA www.tchristy.com.
 - w. VAF Filtration Systems, Arvada, CO www.vafusa.com.
 - x. Weathermatic Irrigation Products, Garland, TX www.weathermatic.com.
 - y. Wilkins a Zurn Company, Paso Robles, CA www.zurn.com.
 - B. Materials:
 1. Rock-Free Soil:
 - a. For use as backfill around PVC pipe.
 2. Pea Gravel:
 - a. For use around drains, valves, and quick couplers.
 - b. 1/2 inch (13 mm) maximum dimension, washed rock.
 3. Sand: Fine granular material naturally produced by rock disintegration and free from organic material, mica, loam, clay, and other deleterious substances.
 4. Native Material: Soil native to project site free of wood and other deleterious materials and rocks over 1-1/2 inches (38 mm).
 5. Topsoil:
 - a. Use soil as described in Section 32 9120 and Section 32 9122.
 - b. Achieve depths as described in Section 32 9120 and elevations described in Section 32 9122.
 6. Pipe, Pipe Fittings, And Connections:

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- a. General:
 - 1) Pipe shall be continuously and permanently marked with Manufacturer's name, size, schedule, type, and working pressure.
 - 2) Pipe sizes shown on Contract Drawings are minimum. Larger sizes may be substituted at no additional cost to Owner.
 - b. Piping:
 - 1) Main Line: Schedule 40 PVC.
 - 2) Lateral Lines: Schedule 40 PVC.
 - 3) Filter Assembly Piping: Galvanized steel.
 - 4) Quick Coupler Piping: Galvanized steel.
 - c. Fittings: Same material as pipe, except where otherwise detailed.
 - 1) Fittings 3 inch (76 mm) or larger: Harco or Leemco of matching size.
 - 2) Use dielectric union fittings between dissimilar metal pipes and fittings.
 - d. Sleeves:
 - 1) Under Parking Area And Driveway Paving: Schedule 40 PVC Pipe.
 - 2) All Other: Class 200 PVC Pipe.
 - 3) Sleeve diameter shall be two (2) times larger than pipe installed in sleeve.
7. Sprinkler Heads:
- a. Each type of head shall be product of single manufacturer.
 - b. Spray Heads in Lawn Areas:
 - 1) Rain Bird: 1800 SAM-PRS Series (4" and 6") with MPR nozzles.
 - c. Rotor Pop-ups:
 - 1) Rain Bird: 5000 plus PRS with MPR nozzle series.
8. Sprinkler Risers:
- a. Spray Heads (Field Manufactured Assemblies):
 - 1) Three (3) schedule 40 street ells or Marlex street ells connected to lateral tee to form an adjustable riser or pop-up riser as detailed.
 - 2) Risers for sprinkler heads 14 inches (355 mm) long minimum and 24 inches (610 mm) maximum.
 - (a) Hunter: FLEXsg tubing with HSBE spiral barbed fittings.
 - (b) Hydro-Rain: Blu-lock Swing pipe & fittings.
 - (c) Rain Bird: Swing Pipe with barbed fittings.
 - (d) Toro: Super Funny Pipe with barbed fittings, SPFA-5125, SPFA-51275.
 - b. Rotor Pop-Up Sprinklers (Pre-Manufactured Assemblies):
 - 1) 3/4 inch (19 mm) rotor pop-up sprinklers shall have an adjustable pre-assembled swing assembly riser. Swing assemblies shall be 3/4 inch x 12 inch (19 mm x 300 mm) and shall be threaded both ends. Swing assemblies shall be:
 - (a) Blu-lock: Model BLJ-075-TT-12.
 - (b) Rain Bird: Model TSJ-12075.
 - (c) Hunter: SJ-712 12 inch (305 mm) thread.
 - 2) 1 inch (25 mm) inlet rotor pop-up sprinklers shall have an adjustable pre-assembled double swing joint riser. Swing joints shall be 1 inch x 12 inch (25 mm x 300 mm) and shall be threaded both ends. Swing joint riser shall be:
 - (a) Rain Bird: Model TSJ-12075.
 - c. Rotor Pop-Up Sprinkler Heads (Field Manufactured Assemblies):
 - 1) Pop-up rotor sprinkler heads shall have adjustable riser assembly, three (3) ell swing joint assembly, unless detailed otherwise on Contract Drawings:
 - (a) These swing joint fittings shall be of schedule 40 PVC plastic and nipples schedule 80 gray PVC unless otherwise designated on Contract Drawings.
 - (b) Horizontal nipple parallel to side of lateral line shall be 8 inches (200 mm) long minimum.

- (c) All other nipples on swing joint riser shall be of length required for proper installation of sprinkler heads.
- 9. Control wiring
 - a. Traditional Control Wiring:
 - 1) Wiring
 - (a) Traditional control wire shall be UF-UL listed, color coded PE insulated copper conductor direct burial size 14. For wire runs exceeding 3,300 feet (1 005.84 meter), use 12 AWG wire. Do not use green color-coded wire.
 - (b) Aside from connectivity to automatic control valves, this material will be used to connect to master valve portion of hydrometer.
 - b. Communication:
 - 1) Communication wire between controller and flow sensor portion of hydrometer to be Paige Electric PE-39 (WeatherTRAK) or PE-54 (Rain Master). Run underground communication wire in gray electrical conduit.
 - 2) Paige Electric Cadweld Connection.
 - c. Waterproof Wire Connectors:
 - 1) Control wire connections shall consist of properly-sized wire nut inserted in waterproof grease cap:
 - (a) DBY or DBR by 3M.
 - (b) 'One Step' 20111SP by King Innovation.
 - (c) DB 57905, 57505 by Orbit.
- 10. Conduit:
 - a. Exterior applications or inside mechanical shed:
 - 1) Galvanized IMC. Where in contact with earth or concrete, wrap galvanized IMC conduit and fittings completely with vinyl tape.
 - b. Controller grounding wire conduit: commercial grade PVC Sch. 40 grey conduit.
 - c. In-ground: commercial grade grey conduit.
 - d. Size conduit as follows:
 - 1) Traditional Wiring:

Galvanized IMC Conduit						
Wire Size (AWG)						
14	7	13	22	32	47	67
12	6	8	18	25	38	59
Conduit Size	3/4 inch (9 mm)	1 inch (25 mm)	1 1/4 inch (32 mm)	1 1/2 inch (38 mm)	2 inch (50 mm)	2 1/2 inch (64 mm)
PVC Schedule 40 Conduit						
Wire Size (AWG)						
14	6	11	20	29	43	61
12	5	7	17	23	35	54
Conduit Size	3/4 inch (9 mm)	1 inch (25 mm)	1 1/4 inch (32 mm)	1 1/2 inch (38 mm)	2 inch (50 mm)	2 1/2 inch (64 mm)
PVC Schedule 80 Conduit						

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Wire Size (AWG)						
14	5	9	17	24	39	55
12	4	6	14	19	32	49
Conduit Size	3/4 inch (9 mm)	1 inch (25 mm)	1 1/4 inch (32 mm)	1 1/2 inch (38 mm)	2 inch (50 mm)	2 1/2 inch (64 mm)

11. Valves:

- a. Manual Drain Valves:
 - 1) Brass ball valve with 'T' handle.
 - (a) Mueller Company: MH20283NF FIP Curb Stop, 3/4 inch (19 mm).
- b. Automatic Control Valves:
 - 1) Rain Bird: PESB series. Provide with PRS-Dial pressure regulator if required.
- c. Isolation Valves:
 - 1) Non-rising stem gate valve, size to match pipe size (use in cold, northern climates- eco-regions 1.0, 5.0, 6.0, 7.0, 9.1, 9.2, and 10.1).
 - (a) Nibco: T-113 .
- d. Secondary Water Filter:
 - 1) Amiad: Mini-Sigma 2" with 2" Matco-Norca 754N Brass Ball Valve, 2" SCH. 80 connections.
 - 2) Enclosures (For Stand-Alone Filter):
 - (a) Design Criteria:
 - (1) Commercial grade aluminum enclosure.
 - (2) Sufficient in size to allow ease of access of components.
 - (3) Insulated in freeze susceptible areas.
- e. Hydrometer (Coordinate with Section 32 8466):
 - 1) Netafim:
 - (a) Provide normally closed hydrometer unless needed open for drinking fountain.
 - (b) HydroPoint WeatherTRAK:
 - (1) LHM15TG1- MEL (Low Accurate Flow Range – 1.8 GPM).
 - (2) LHM2TG1- MEL (Low Accurate Flow Range – 5.3 GPM).
- f. Pressure Reducing Valve:
 - 1) Secondary Water:
 - (a) Netafim: quick acting pressure relief valve.
- g. Quick Coupling Valves and Keys:
 - 1) Rain Bird: 33DRC, 33DLRC, 33DK with SH-O swivel.

12. Valve Accessories:

- a. Valve manifolds:
 - 1) Action Machining: 1800 Series, Models 18001, 18001-1-5, and 18001-2.0, 1, 1-1/2, and 2 inch (25, 38, and 50 mm) sizes.
 - 2) Hydro-Rain: HRM Series.
- b. Valve Boxes And Extensions:
 - 1) Lid Colors:
 - (a) Green: Lawn areas (potable and secondary water).
 - (b) Tan: Bare soil and rock areas (potable and secondary water).
 - (c) Purple: Reclaimed water.
 - 2) Carson:
 - (a) 12 Inch (300 mm) Model 1324-12.
 - (b) 12 Inch (300 mm) Model 1419-12.

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- (c) 10 Inch (255 mm) Model 0910.
 - c. Valve ID tags:
 - 1) Christy's: Stamped ID tag: 2.25"x2.7" yellow plastic tag with alpha-numeric labeling matching zone. Contact Christy's for local supplier.
 - 2) GPH Standard yellow ID Tag with alpha-numeric labeling matching zone.
 - d. Valve Box Supports:
 - 1) Standard size fired clay paving bricks without holes.
 - 2) Standard size 6 inch x 8 inch x 16 inch (150 mm x 200 mm x 400 mm) CMU Block.
- 13. Drip System:
 - a. Drip Valve Assembly (Coordinate zone size with hydrometer limits):
 - 1) Rain Bird:
 - (a) 0.3 to 20 GPM: X CZ-100-PRB COM. Select screen size.
 - (b) 0.3 to 20 GPM: X CZ-100-PRBR. Select screen size and provide with line-size matching ball valve.
 - (c) 15 to 62 GPM: X CZ-150-LCS. Provide with line-size matching ball valve in separate round valve box.
 - (d) 15 to 62 GPM: X CZ-150-LCDR. Reclaimed water kit. Provide with line-size matching ball valve in separate round valve box.
 - b. Distribution Tubing (from lateral lines to emitter):
 - 1) Rain Bird: SPX swing pipe with barbed fittings.
 - c. Drip Emitters:
 - 1) GPH: GPST-CV Series (2, 4, 6, 8, 10 gph emitters).
 - d. Indicator Emitter:
 - 1) Tree drip indicator:
 - (a) Rain Bird: XBCVPC, DBC-025 diffuser cap, TS-025 stake, and XQ 1/4 inch (6.4 mm) tubing.
 - e. Distribution Tubing (from lateral lines to in-line emitter tubing).
 - 1) Flexible polyethylene pipe.
 - f. In-Line Emitter Tubing:
 - 1) Netafim: Techline CV tubing, flush valves, and fittings.
 - g. Valve Boxes and Extensions:
 - 1) Lid Colors:
 - (a) Green: Lawn areas (potable and secondary water).
 - (b) Tan: Bare soil and rock areas (potable and secondary water).
 - (c) Purple: Reclaimed water.
 - 2) Carson:
 - (a) 12 Inch (300 mm) Model 1324-12.
 - (b) 12 Inch (300 mm) Model 1220-12.
 - (c) 12 Inch (300 mm) Model 1419-12.
 - (d) 10 Inch (255 mm) Model 0910.
 - h. Valve ID Tags:
 - 1) Christy's: Stamped ID tag: 2.25"x2.7" yellow plastic tag with alpha-numeric labeling matching zone. Contact Christy's for local supplier.
 - 2) GPH Standard yellow ID Tag with alpha-numeric labeling matching zone.
 - i. Valve Box Supports:
 - 1) Standard size fired clay paving bricks without holes.
 - 2) Standard size 6 inch x 8 inch x 16 inch (150 mm x 200 mm x 400 mm) CMU Block.
- 14. Solvent Cement:
 - a. Solvent Cement: ASTM D2564 for PVC pipe and fittings.
 - b. Primer:
 - 1) Low VOC emissions and compliant with LEED.

- 2) Product: Weld-On P-70 primer by IPS.
- c. PVC Solvent Cement:
 - 1) Heavy bodied, medium setting, high strength:
 - (a) Low VOC emissions and compliant with LEED.
 - (b) Product: Weld-On 711 Low VOC PVC Cement by IPS.
 - 2) Flexible, medium bodied, fast setting, high strength (flexible pipe only):
 - (a) Low VOC emissions and compliant with LEED.
 - (b) Product: Weld-On 795 Low VOC Flex PVC Cement by IPS.
- 15. Other Components:
 - a. Weed Barrier:
 - 1) DeWitt 4.1 oz (116 g) 20 year woven polypropylene weed barrier
 - 2) Hanes Pro-Platinum 4.1 oz (116 g) 20 year woven polypropylene weed barrier.
 - b. Recommended by Manufacturer and subject to Architect's review and approval before installation.
 - c. Provide components necessary to complete system and make operational.
- 16. Substitutions: See Section 01 6000 - Product Requirements.
 - a. Equals as approved by Landscape Architect prior to bid.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify location of existing utilities.
- B. Verify that required utilities are available, in proper location, and ready for use.
- C. Verify pressure.

3.02 PREPARATION

- A. Protection:
 - 1. Repair or replace work damaged during course of Work at no additional cost to Owner. If damaged work is new, installer of original work shall perform repair or replacement.
 - 2. Do not cut existing tree roots measuring over 2 inches (50 mm) in diameter in order to install irrigation lines.
- B. Surface Preparation:
 - 1. Location of heads and piping shown on Contract Drawings is approximate. Actual placement may vary slightly as is required to achieve full, even coverage without spraying onto buildings, sidewalks, fences, etc. Route piping to avoid plants, ground cover, and structures.
 - 2. During layout, consult with Architect to verify proper placement and make recommendations, where revisions are advisable.
 - 3. Minor adjustments in system layout will be permitted to avoid existing fixed obstructions.
 - 4. Include changes from Contract Documents on Record Drawings.
- C. Review layout requirements with other affected work.

3.03 TRENCHING

- A. Pulling of pipe is not permitted.
- B. Trench and backfill in accordance with Sections 31 2316 and Section 31 2323.
- C. Excavate trenches to specified depth. Remove rocks larger than 1-1/2 inch (38 mm) in any direction from bottom of trench. Separate out rocks larger than 1-1/2 inch (38 mm) in any direction uncovered in trenching operation from excavated material and remove from areas to receive landscaping.
- D. Trench to accommodate grade changes.
- E. Maintain trenches free of debris, material, or obstructions that may damage pipe.

3.04 GRADES AND DRAINING

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- A. In localities where winter shut-down is required, install piping so system can be completely drained. In addition the system should be able to be blown out with compressed air:
1. Slope pipe to drain at control valve boxes and minimum number of low points. At these locations install:
 - a. 3/4 inch (19 mm) brass ball valve for manual drain. Do not use automatic drain valves.
 - b. Install 2 inch (50 mm) Class 200 PVC pipe over top of drain and cut at finish grade.
 - c. Provide rubber valve cap marker.
 - d. Provide one cu ft (0.03 cu m) pea gravel sump at outlet of each drain.
 2. Slope pipes under parking areas or driveways to drain outside away from them.
 3. Provide and install quick-coupling valve(s) in location for easy blowout of entire system. Install quick coupler valves with 2 lineal feet (0.60 m) minimum of galvanized pipe between valve and main line.

3.05 INSTALLATION

- A. Install all components per manufacturer's recommendations.
- B. Sleeving
1. Sleeve water lines under walks and paving. Extend sleeves 6 inches (150 mm) minimum beyond walk or pavement edge. Cover sleeve ends until pipes and wires are installed to keep sleeve clean and free of dirt and debris.
 2. Position sleeves with respect to buildings and other obstructions so pipe can be easily removed.
 3. Follow the same directives for wiring in conduits.
- C. Installation of Pipe:
1. Install pipe, valves, controls, and outlets in accordance with manufacturer's instructions.
 2. Provide for thermal movement of components in system.
 3. Connect to utilities.
 4. Unless otherwise indicated on Contract Drawings, install main lines with minimum cover of 18 inches (450 mm) based on finished grade. Install lateral lines, including those connecting drip tubing, with minimum of 12 inches (300 mm) of cover based on finish grade.
 5. Install pipe and wires under driveways or parking areas in specified sleeves 18 inches (450 mm) below finish grade or as shown on Contract Drawings.
 6. Locate pipe so no sprinkler head will be closer than 12 inches (300 mm) from building foundation.
 7. Cut plastic pipe square. Remove burrs at cut ends before installation so unobstructed flow will result.
 8. Make solvent weld joints as follows:
 - a. Do not make solvent weld joints if ambient temperature is below 35 deg F (2 deg C).
 - b. Clean mating pipe and fitting with clean, dry cloth and apply one (1) coat of primer to each surface.
 - c. Apply uniform coat of solvent cement to outside of pipe.
 - d. Apply solvent cement to fitting in similar manner.
 - e. Insert pipe completely into fitting.
 - f. Give pipe or fitting quarter turn to insure even distribution of solvent and make sure pipe is inserted to full depth of fitting socket.
 - g. Allow joints to set at least twenty-four (24) hours before applying pressure to PVC pipe.
 9. Tape threaded connections with teflon tape.
 10. For pipe larger than 3 inches (75 mm), install joint restraints wherever change of direction occurs on PVC main lines.
 11. After piping is installed, but before heads and emitters are installed and backfilling commences, open valves and flush system with full head of water.

- D. Isolation Valves:
1. Install per plans and details.
- E. Automatic Control Valves And Control Valve Wiring:
1. Locate valve boxes within 12 inches (300 mm) to 24 inches (600 mm) of sidewalks and shrub bed edges with tops at detailed grades. Do not install more than one (1) valve in single box.
 2. Install equipment for ease of removal.
 3. Place 3 inches (75 mm) minimum of pea gravel below bricks supporting valve boxes to drain box. Set valve boxes over valve so all parts of valve can be reached for service. Set cover of valve box even with finish grade. Valve box cavity shall be reasonably free from dirt and debris.
 4. Arrange valve stations to operate in an easy-to-view progressive sequence around building. Tag valves with waterproof labels showing final sequence station assignments.
- F. Wiring:
1. Use waterproof wire connectors consisting of properly-sized wire nut and grease cap at splices and locate all splices within valve boxes.
 2. Traditional Wiring:
 - a. Tape control wire to side of main line every 10 feet (3.050 m). Where control wire leaves main or lateral line, enclose it in gray conduit:
 - b. Use white or gray color for common wire and other colors for all other wire. Each common wire may serve only one (1) controller.
 - c. Run one (1) spare control wire from panel continuously from valve to valve throughout system similar to common wire for use as replacement if wire fails:
 - 1) Run spare wire to each branch of system.
 - 2) Spare wire shall be different color than other wires. Use of green wire is not acceptable.
 - 3) Mark spare control wire visibly within valve box as an 'Un-Connected Wire'. Extend spare control wires 24 inches (600 mm) and leave coiled in each valve box. Mark spare wire visibly within controller as 'Un-Connected Wire'.
- G. Hydrometer:
1. Install as detailed and as per manufacturer's recommendations.
 2. If installed on secondary system, install downstream of filter.
 3. Connect communication cables to smart controller. Run cables within conduit per specification.
- H. Secondary Water Filter (Secondary Water Supply Only):
1. Install 24 inches (600 mm) minimum from building elements.
 2. Install in such manner so that when accessing and fully opening filter enclosure, plant material and built elements are not damaged.
 3. Flush out system prior to installing device.
 4. If power is required, coordinate installation with electrical.
- I. Pressure Reducing Valve:
1. Install as per details and manufacturer's recommendations.
- J. Sprinkler Heads And Rotor Pop-ups:
1. Set sprinkler heads and quick-coupling valves perpendicular to finish grade.
 2. Do not install sprinklers using side inlets. Install using base inlets only.
 3. Heads immediately adjacent to mow strips, walks, or curbs shall be one inch (25 mm) below top of mow strip, walk, or curb and have one inch (25 mm) to 3 inch (75 mm) clearance between head and mow strip, walk, or curb.
 4. Set sprinkler heads at consistent distance from walks, curbs, and other paved areas and to grade by using specified components or other method demonstrated in Pre-Construction Conference.
- K. Drip Assembly:

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1. Install pipe providing for expansion and contraction as recommended by Manufacturer.
2. Cut tubing square and remove burrs at cut ends.
3. Distribution tubing shall be between 14 inches (350 mm) minimum and 48 inches (1 200 mm) maximum long. Layout PVC lateral lines as necessary to keep distribution tubing lengths within specified tolerances.
4. Locate drip emitter on uphill side of plant within rootball zone.
5. Layout in-line tubing for trees as indicated on Contract Drawings. Layout in-line tubing for shrubs and groundcovers so plants receive water within rootball zones.
6. Locate in-line tubing on top of soil but under weed barrier fabric and bark mulch.
7. Staple in-line tubing to ground at 3 foot (900 mm) maximum intervals and within 12 inches (300 mm) of ends and intersections.
8. Assembly Using 'Funny Pipe' Type Joints:
 - a. Connect distribution tubing to lateral line using barbed ell fitting.
 - b. Connect fitting to distribution tubing using straight barbed fitting with 1/2 inch (13 mm) threaded end.

3.06 BACKFILL

- A. Backfill in accordance with Section 31 2323.
- B. Cover both top and sides of pipe with 2 inches (50 mm) of rock-free soil or sand as specified under PART 2 PRODUCTS. Remainder of backfill to meet soil requirements as specified in Sections 32 9120 and 32 9122.
- C. Do not cover pressure main, irrigation pipe, or fittings until Landscape Architect has inspected and approved system.

3.07 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 4000 - Quality Requirements.
 1. Source Pressure Test:
 - a. Perform source pressure test at stub-out on main water line provided for irrigation system, or at near-by fire hydrant.
 - b. Notify Architect if pressures over 70 psi (480 kPA) or under 55 psi (379 kPA) are found to determine if some re-design of system is necessary before beginning work on system.
 2. System Pressure Test:
 - a. By video or in the presence of Landscape Architect, pressure test main line with all valves installed.
 - b. Test pressure at 100 psi (690 kPA) minimum for two (2) hours minimum.
 - c. Verify there are no leaks.
 - d. Receive Landscape Architect approval to proceed prior to backfilling.
 - e. Following pressure test, create pressure test report.
 3. Perform Certified Water Audit if pertinent.
 4. Substantial Completion Walkthrough:
 - a. Landscape Architect or designated representative(s) will inspect site and create list of non-conforming items to be resolved prior to Landscape Final Acceptance. Date on this list will act as date of Landscape Substantial Completion.
 - b. Installations completed after water source has been turned off for season, as determined by Landscape Architect, will be inspected following spring after system can be checked for proper operation.
 5. Final Acceptance:
 - a. Inspection, no less than thirty (30) days following substantial completion, when all work has been completed, demonstrated, and approved by Landscape Architect.
 6. Irrigation Approval

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- a. Landscape Architect will approve irrigation system per Part 1 following reception of completed certified water audit (when audit is required) and when all non-conforming items have been brought into conformance.

3.08 ADJUSTING

- A. Sprinkler Heads:
 1. Adjust sprinkler heads to proper grade when turf is sufficiently established to allow walking on it without system harm. Such lowering and raising of sprinkler heads shall be part of contract with no additional cost to Owner.
 2. Adjust sprinkler heads for proper distribution and trim so spray does not fall on building.
- B. Watering Time:
 1. Adjust watering time of valves to provide proper amounts of water to plants.

3.09 CLOSEOUT ACTIVITIES

- A. Training
 1. After system is installed and approved, instruct Owner's designated personnel in complete operation and maintenance procedures using Landscape Management Plan (LMP).
 - a. Describe difference between plant establishment schedule and long-term maintenance schedule.
 - b. Describe annual and regular filter maintenance.
- B. Winter Shut-Down and Spring Start-Up:
 1. During first year of operation, Installer shall shut-down irrigation system prior to freezing temperatures and re-start irrigation system at beginning of growing season:
 - a. Winter Shut-Down is intended to remove all potentially damaging water from irrigation system. Perform following as well as any other efforts necessary to properly winterize system:
 - 1) Turn off water source at point of connection.
 - 2) Blow out system with pressurized air, turning on each valve until water is cleared out of system. Run through system twice. Only blow out components suitable to receive pressurized air. Hydrometers, for instance, should not be blown out. Do not use excessive air pressure that will damage pipes and parts.
 - 3) Turn controller off or if available turn to appropriate winterization mode.
 - 4) Open all manual drain valves.
 - 5) Drain, wrap, protect, or remove any backflow device exposed to freezing temperatures using manufacturer's recommendations and best practices. Coordinate method with Owner's Representative.
 - 6) Drain and remove pumps for Owner's Representative storage.
 - 7) Drain filters using manufacturer's recommendations.
 - 8) Check sprinkler heads to make sure they are below sidewalk and curb levels and not vulnerable to snowplow damage. Lower heads to proper elevation.
 - b. Spring Start-Up shall include following:
 - 1) Close all manual valves.
 - 2) Clean pump filters and replace if necessary.
 - 3) Remove freeze protection as required.
 - 4) Turn on water source at point of connection.
 - 5) Verify that controller(s) and rain sensor are properly operating. Change battery in controller(s) and sensor(s) as required.
 - 6) Flush entire system. Run each valve for two (2) minutes to check for damage, leaks, and coverage.
 - 7) Repair and adjust system as needed. Fine tune heads for efficient coverage.

END OF SECTION

	32 8423 - 14	Underground Sprinklers – No Controllers
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**SECTION 32 9001
COMMON PLANTING REQUIREMENTS**

PART 1 GENERAL

1.01 SUMMARY

- A. Includes But Not Limited To:
1. Common procedures and requirements for landscaping work.
 2. Provide maintenance for new landscaping as described in Contract Documents.
- B. Related Requirements:
1. Pre-Installation conferences held jointly with Section 32 9001 as described in Administrative Requirements on Part 1 of this specification section:
 2. Section 01 4000: 'Quality Assurance – Qualifications'.
 3. Section 31 0500: 'Common Earthwork Requirements'.
 4. Section 31 1000: 'Clearing and Grubbing'.
 5. Section 31 1413: 'Topsoil Stripping And Stockpiling'.
 6. Section 31 2000: 'Grading'.
 7. Section 31 2316: 'Excavation'.
 8. Section 31 2323: 'Fill'.
 9. Section 32 8423: 'Underground Sprinklers'.
 10. Section 32 9120: 'Topsoil And Placement'.
 11. Section 32 9122: 'Topsoil Grading'.
 12. Section 32 9219: 'Seeding'.
 13. Section 32 9223: 'Sodding'.
 14. Section 32 9300: 'Plants'.

1.02 REFERENCES

- A. Definitions:
1. Landscape Management Plan (LMP): LMP is an Owner's Representative's quick reference maintenance document. It combines elements from Irrigation Sections 32 8000 and Planting Sections 32 9000. The LMP document is created from Operations and Maintenance Data, Warranty Documentation, and Record Documentation. This is a digital format only document. Deliver to Church Headquarters for inclusion in "as-built" catalog. Send to mfd-asbuilt@churchofjesuschrist.org. Access sample LMP through Landscape Resources Website located at:
 - a. <https://aec.churchofjesuschrist.org/aec/landscape/>.
 2. Landscape Final Acceptance: Inspection, no less than (30) days following substantial completion, when all work has been completed, demonstrated, and approved by the Landscape Architect. Coordinate with 32 8000 and 32 9000 Sections.
 3. Plant Establishment Period: Time required for plants to successfully develop root systems into surrounding soil. Following this period, irrigation run times are typically modified. For purposes of this contract, the plant establishment period is one (1) year from date of Substantial Completion.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate work with other Sections.
- B. Pre-Installation Conference:
1. Participate in MANDATORY pre-installation conference and held jointly with following sections:
 - a. Section 32 8423: 'Underground Sprinklers'.
 - b. Section 32 9120: 'Topsoil And Placement'.
 - c. Section 32 9122: 'Topsoil Grading'.
 - d. Section 32 9223: 'Sodding'.
 - e. Section 32 9300: 'Plants'.

2. In addition to agenda items specified in Section 01 3000, review the following:
 - a. Site Visits:
 - 1) Landscape Architect to visit site five (5) times during project construction.
 - 2) If site conditions necessitate additional visits, Landscape Architect can schedule additional site visits with approval from Architect.
 - 3) During construction, additional site visits may be approved in writing by Architect or Owner for special considerations before commencement.
 - 4) Site visits caused by lack of work progress by Landscape Subcontractor shall be reimbursed to Landscape Architect by Landscape Subcontractor for the amount determined by Architect and Owner for additional site visits.
 - b. Coordination:
 - 1) Landscape Subcontractor and Landscape Architect to coordinate site visits and include Architect and General Contractor in communications.
 - c. Landscape Maintenance:
 - 1) Establish responsibility for maintenance of new landscaping during all phases of construction period.
 - d. Percolation Test:
 - 1) Discuss percolation test requirements per Section 32 9300.
 - e. Review additional agenda items as specified in related sections listed above.
3. Approved Site Visits:
 - a. Site Visit No. 1:
 - 1) Description:
 - (a) Landscape pre-installation Conference.
 - 2) Schedule: Conduct pre-installation conference after completion of Finish Grading specified in Section 31 0500 and (1) week minimum before beginning landscape work.
 - 3) Required Attendees:
 - (a) Project Manager, Facilities Manager, Architect, General Contractor, Landscape Subcontractor, Excavator, and Landscape Architect.
 - (b) Include Landscaping Subcontractor Foreman and those responsible for installation of landscaping to be in attendance.
 - 4) Related Sections:
 - (a) Section 31 0500: 'Common Earthwork Requirements'.
 - (b) Section 32 8423: 'Underground Sprinklers: No Controllers'.
 - (c) Section 32 8466: 'Underground Sprinklers: Controllers'.
 - (d) Section 32 9120: 'Topsoil And Placement'.
 - (e) Section 32 9122: 'Topsoil Grading'.
 - (f) Section 32 9223: 'Sodding'.
 - (g) Section 32 9300: 'Plants'.
 - 5) Notes:
 - (a) Verify project site conditions and review scope of work before installation begins.
 - (b) Verify appropriate sub-grades have been established.
 - b. Site Visit No. 2:
 - 1) Description:
 - (a) Irrigation system pressure test compliance, main line inspection, valve inspection.
 - 2) Schedule: Conduct site visit one (1) week minimum after notification before beginning irrigation system pressure test.
 - 3) Required Attendees:
 - (a) General Contractor, Landscape Subcontractor, Landscape Architect.
 - 4) Recommended Attendees:
 - (a) Project Manager, Facilities Manager.

- 5) Related Sections:
 - (a) Section 32 8423: 'Underground Sprinklers'.
 - (b) Section 32 9120: 'Topsoil And Placement'.
 - (c) Section 32 9122: 'Topsoil Grading'.
- 6) Notes:
 - (a) Verify finish grading in preparation for planting.
- c. Site Visit No. 3:
 - 1) Description:
 - (a) Inspect and approve plant quality, plant quantity, plant pits, plant pit backfill, planting depths, and removal of packaging/distribution materials, wire, and ties.
 - 2) Schedule: Conduct site visit one (1) week minimum after notification from Contractor before beginning site visit no. 3.
 - 3) Required Attendees:
 - (a) General Contractor, Landscape Subcontractor, Landscape Architect.
 - 4) Recommended Attendees:
 - (a) Project Manager, Facilities Manager.
 - 5) Related Sections:
 - (a) Section 32 9300: 'Plants'.
 - 6) Notes:
 - (a) Inspect irrigation system installation, inspect weed barrier fabric.
- d. Site Visit No. 4:
 - 1) Description:
 - (a) Comprehensive Substantial Completion inspection prior to beginning thirty (30) day Landscape Subcontractor maintenance period.
 - 2) Schedule: Conduct site visit one (1) week minimum after notification before beginning site visit no. 4.
 - 3) Required Attendees:
 - (a) Project Manager, Facilities Manager, Architect, General Contractor, Landscape Subcontractor, Landscape Architect.
 - 4) Related Sections:
 - (a) Section 32 8423: 'Underground Sprinklers'.
 - (b) Section 32 9300: 'Plants'.
 - 5) Notes:
 - (a) Verify contract requirements have been followed including but not limited to: planting compliance, irrigation system coverage and irrigation system operation.
- e. Site Visit No. 5:
 - 1) Description:
 - (a) At the end of thirty (30) day Landscape Subcontractor maintenance period, verify deficient items have been corrected and verify no others exist.
 - 2) Schedule: Conduct site visit one (1) week minimum after notification before beginning site visit no. 5.
 - 3) Required Attendees:
 - (a) Project Manager, Facilities Manager, Architect, General Contractor, Excavation Subcontractor, Landscape Subcontractor, Landscape Architect.
 - 4) Related Sections:
 - (a) Section 32 8423: 'Underground Sprinklers'.
 - (b) Section 32 9300: 'Plants'.
 - 5) Notes:
 - (a) Review Landscape Management Plan (LMP) with Owner's Representative. Provide landscape maintenance training.

1.04 SUBMITTALS

- A. See Section 01 3000-Administrative Requirements, for submittal procedures. Submittals may be included in more than one submittal group listed below.
- B. Submittals for Information:
 - 1. Establishment Period Acknowledgement:
 - a. Landscape Architect will provide acknowledgment of Establishment Period commencement:
 - 1) Certificate will include name and signature of Contractor, Contractor's company, Contractor's telephone number, and date.
 - 2) Certificate will include name and signature of Owner's Representative, Owner's Representative's Group name, Owner's Representative Group telephone number, and date.
 - 3) Certificate will acknowledge date when Establishment Period begins and that it extends one (1) year from that time.
- C. Submittals for Project Closeout:
 - 1. Operations and Maintenance Data:
 - a. Landscape maintenance recommendations.
 - b. Individual plant maintenance recommendations.
 - c. Plant establishment maintenance recommendations.
 - d. Post-plant establishment maintenance recommendations.
 - 2. Record Documentation:
 - a. Landscape Drawings:
 - 1) As installation occurs, prepare accurate record drawings. Submit electronic copy prior to final inspection. Drawing shall include:
 - (a) Detail and dimension changes made during construction.
 - (b) Take dimensions from permanent constructed surfaces or edges located at or above finish grade.
 - 3. Landscape Warranty - See Section 32 9300.
 - 4. Landscape Management Plan (LMP):
 - a. Landscape Section. Include the following:
 - 1) Operations and Maintenance Data:
 - 2) Record Documentation including Landscape Drawings.
 - 3) Landscape Warranty
 - 4) Establishment Period Acknowledgement

1.05 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Herbicides:
 - a. Products shall be recognized for intended use by AHJ.
 - 2. Invasive and Non-native plants:
 - a. Comply with all applicable laws governing invasive and non-native plants.
- B. Installer Qualifications:
 - 1. Landscape Subcontractor. Requirements of Section 01 4301 applies, but not limited to following:
 - a. Company specializing in performing work of this section.
 - b. Minimum five (5) years' experience in landscaping installations.
 - c. 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.
 - d. Upon request, submit documentation.
 - 2. Installer:
 - a. Planting shall be performed under direction of foreman or supervisor with minimum three (3) years' experience in landscape installations similar in size, scope, and complexity.
 - b. Foreman or supervisor required to attend pre-installation conference.

- c. Use trained personnel familiar with required planting procedures and with Contract Documents.
- 3. Submit documentation upon request.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Storage And Handling Requirements:
 - 1. Deliver packaged materials in containers showing weight, analysis, and name of Manufacturer.
 - 2. Deliver sod, plants, trees, and shrubs in healthy and vigorous condition.
 - 3. Protect materials from deterioration during delivery.
- B. Storage And Handling Requirements:
 - 1. Store in location on site where they will not be endangered and where they can be adequately watered and kept in healthy and vigorous condition.
 - 2. Protect materials from deterioration while stored at site.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification Of Conditions:
 - 1. Inspect site and Contract Documents to become thoroughly acquainted with locations of irrigation, ground lighting, and utilities.

3.02 PREPARATION

- A. Before proceeding with work, verify dimensions and quantities. Report variations between Drawings and site to Architect before proceeding with landscape work.
 - 1. Plant totals are for convenience of Contractor only and are not guaranteed. Verify amounts shown on Drawings.
 - 2. All planting indicated on Contract Documents is required unless indicated otherwise.
- B. Protection:
 - 1. Mitigate or eliminate if possible conditions that will create hazards. Post signs or barriers as required.
 - 2. Provide adequate means for protection from damage through excessive erosion, flooding, heavy rains, etc. Repair or replace damaged areas.
 - 3. Keep site well drained and landscape excavations dry.

3.03 INSTALLATION

- A. Interface With Other Work:
 - 1. Do not plant trees and shrubs until major construction operations are completed. Do not commence landscaping work until work of Section 31 2216 and Section 32 8423 has been completed and approved.
- B. Coordinate installation of planting materials during normal planting seasons for each type of plant material required.
- C. Hand excavate as required.
- D. Maintain grade stakes until parties concerned mutually agree upon removal.
- E. When conditions detrimental to plant growth are encountered, such as rubble fill or adverse drainage conditions, notify Architect before planting.

3.04 FIELD QUALITY CONTROL

- A. Field Inspection:
 - 1. Landscape Architect will inspect landscaping installation for Substantial Completion.
- B. Non-Conforming Work. Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
 - 1. Replace damaged plantings within (10) days of notification at no additional cost to Owner.

2. Repair damage to irrigation, ground lighting, utilities, paving, concrete curb and gutters and other items adjacent to landscaping caused by work of this Section or replace at no additional cost to Owner.

3.05 CLEANING

- A. Waste Management:
 1. Immediately clean up soil or debris spilled onto pavement and dispose of deleterious materials.

3.06 CLOSEOUT ACTIVITIES

- A. Instruction to Owner:
 1. Include following training:
 - a. Review Landscape Management Plan (LMP):
 - 1) Review maintenance recommendations.
 - b. Review Maintenance as specified at the end of this specification.
 2. Establishment Period Acknowledgement (coordinate with 32 8000 section(s)):
 - a. Landscape Architect will acknowledge Establishment Period commencement.

3.07 PROTECTION

- A. Protect planted areas against traffic or other use immediately after planting is completed by placing adequate warning signs and barricades.
- B. Provide adequate protection of planted areas against trespassing, erosion, and damage of any kind. Remove this protection after Architect has accepted planted areas.

3.08 MAINTENANCE

- A. General:
 1. Before beginning maintenance period, plants shall be in at least as sound, healthy, vigorous, and in approved condition as when delivered to site, unless accepted by Architect in writing at final landscape inspection.
 2. Maintain landscaping for thirty (30) continuous days minimum after Substantial Completion. If maintenance period is interrupted by non-growing season or irrigation winter shut-down, begin maintenance period after start of growing season as agreed with Architect, and continue one (1) continuous month therefrom.
 3. Replace landscaping that is dead or appears unhealthy or non-vigorous as directed by Landscape Architect before end of maintenance period. Make replacements within ten (10) days of notification. Lawn being replaced shall be guaranteed and maintained an additional thirty (30) days from date of replacement.
- B. Sodded Lawn:
 1. Maintain sodded lawn areas until lawn complies with specified requirements and throughout maintenance period.
 2. Water sodded areas in sufficient quantities and at required frequency to maintain sub-soil immediately under sod continuously moist 3 to 4 inches (75 to 100 mm) deep.
 3. Cut grass first time when it reaches 3 inches (75 mm) high. Continue to mow at least once each week throughout maintenance period. Remove clippings.
 4. Apply herbicide as necessary to maintain weed-free lawn. Apply herbicide in accordance with manufacturer's instructions during calm weather when air temperature is between 50 and 80 deg F (10 and 27 deg C).
 5. At end of thirty (30) day maintenance period, fertilize lawns as recommended in Section 32 9122.
- C. Trees, Shrubs, And Plants:
 1. Maintain by pruning, cultivating, and weeding as required for healthy growth.
 2. Restore planting basins.
 3. Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical positions as required.
 4. Spray as required to keep trees and shrubs free of insects and disease.

5. Provide supplemental water by hand as needed in addition to water from sprinkling system.

END OF SECTION

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**SECTION 32 9120
TOPSOIL AND PLACEMENT**

PART 1 GENERAL

1.01 SUMMARY

- A. Includes But Not Limited To:
 - 1. Perform topsoil evaluation and placement required prior to topsoil grading as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 31 0500: 'Common Earthwork Requirements':
 - 2. Section 31 1413: 'Topsoil Stripping And Stockpiling'.
 - 3. Section 31 2200: 'Grading'.
 - 4. Section 32 9001: 'Common Planting Requirements':
 - 5. Section 32 9122: 'Topsoil Grading'.

1.02 REFERENCES

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 - 1. Participate in MANDATORY pre-installation conference as specified in Section 32 9001.
 - 2. In addition to agenda items specified in Section 01 3100 and Section 32 9001, review following:
 - a. Review finish grade elevation and tolerance requirements.
 - b. Review surface preparation requirements including disking, tilling, ripping, or aerating.
 - c. Review Attachment 'Topsoil Testing Report' including:
 - 1) Landscape Architect, Contractor, Testing, and Soil Testing Laboratory Instructions.
 - d. Review Field Quality Control testing requirements for 'Topsoil Testing Report' including:
 - 1) Corrections required for topsoil not meeting requirements of this specification.
 - 2) Approval requirement of 'Topsoil Testing Report' by Landscape Architect.
 - 3) Submittals required as identified in Closeout Submittals.

1.04 SUBMITTALS

- A. See Section 01 3000-Administrative Requirements, for submittal procedures. Submittals may be included in more than one submittal group listed below.
- B. Submittals for Review:
 - 1. Do not commence work or deliver products to site until Landscape Architect approves submittals for review.
 - 2. Testing And Evaluation Reports:
 - a. Completed 'Topsoil Testing Report'. Follow testing directives of Part 3 of this specification.
 - 1) Access 'Topsoil Testing Report' template through:
 - (a) https://aec.churchofjesuschrist.org/aec/design_guidelines/
 - (b) Go to the Landscape sub-section.
 - 2) Owner will pay for one (1) final test.
 - 3) Additional test(s) if necessary will be paid by Contractor.
 - b. Submit report stating location of imported topsoil source and describe recent use(s).
- C. Submittals for Information
 - 1. Submit delivery slips indicating amount of topsoil delivered to Project site.
- D. Submittals for Project Closeout:
 - 1. Record Documentation:

- a. Final Landscape Architect approved 'Topsoil Testing Report'.
- b. Imported topsoil source and recent use as described above.
- 2. Landscape Management Plan (LMP):
 - a. Landscape Section. Include the following:
 - 1) 'Topsoil Testing Report'.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Topsoil:
 - 1. Design Criteria:
 - a. Topsoil used in landscaped areas, whether imported, stockpiled, or in place, shall be weed free, fertile, loose, friable soil meeting following criteria:
 - 1) Chemical Characteristics:
 - (a) 5 to 8.0.
 - (b) Soluble Salts: less than 3.0 mmhos/cm.
 - (c) Sodium Absorption Ratio (SAR): less than 6.0.
 - (d) Organic Matter: greater than one percent.
 - 2) Physical Characteristics:
 - (a) Gradation as defined by USDA triangle of physical characteristics as measured by hydrometer.
 - (b) Sand: 15 to 60 percent.
 - (c) Silt: 10 to 60 percent.
 - (d) Clay: 5 to 30 percent.
 - (e) Clean and free from toxic minerals and chemicals, noxious weeds, rocks larger than or equal to 1-1/2 inch (38 mm) in any dimension, and other objectionable materials.
 - (f) Soil (Coordinate screening as specified in Section 31 1413 'Topsoil Stripping And Stockpiling' to meet these characteristics):
 - (g) Soil shall not contain more than five (5) percent by volume of rocks measuring over 1/4 inch (6 mm) in largest size.
 - (h) Soil shall be topsoil in nature.
 - (i) Soil resembling road base or other like materials are not acceptable.
 - 2. Project Topsoil Requirements:
 - a. It is anticipated that the following percentages of material will be required to meet Project site topsoil requirements:
 - 1) Imported Topsoil: 100% percent of landscape area:
 - (a) Lawn Areas: 6% percent of imported topsoil.
 - (b) Shrub / Tree Areas: 94% percent of imported topsoil.
 - (c) Native Grass / Shrub / Tree Areas: 0% percent of imported topsoil.
 - 2) Stockpiled Topsoil: 0% percent of landscape area:
 - (a) Lawn Areas: N/A percent of stockpiled topsoil.
 - (b) Shrub / Tree Areas: N/A percent of stockpiled topsoil.
 - (c) Native Grass / Shrub / Tree Areas: N/A percent of stockpiled topsoil.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification Of Conditions:
 - 1. Do not commence work of this Section until grading tolerances specified in Section 31 2200 are met.
 - 2. Do not commence work of this Section until coordination with Section 32 9122 'Topsoil Grading'.
 - 3. Receive approval from Landscape Architect of subgrade elevations prior to commencement of this Work.

3.02 PREPARATION

- A. Protection Of In-Place Conditions:
 - 1. Protect utilities and site elements from damage.
- B. Surface Preparation:
 - 1. Surfaces to receive Imported and Stockpiled Topsoil:
 - a. Disk, till, rip, or aerate with approved agricultural aerator to depth of 6 inches (150 mm).
 - b. Place specified and approved topsoil on prepared surface.

3.03 PERFORMANCE

- A. General:
 - 1. After Surface Preparation requirements are completed, limit use of heavy equipment to areas no closer than 6 feet (1.80 meter) from building or other permanent structures. Use hand held tillers for preparation of subsoil in areas closer than 6 feet (1.80 m).
 - 2. Do not disturb existing shrub or tree roots to remain.
- B. Topsoil Depth/Quantity:
 - 1. Total topsoil depth of 5 inches (125 mm) minimum in lawn and groundcover planting areas.
 - 2. No topsoil as defined in this Section is required over tree and shrub planting areas or native grass, shrub, or tree areas as long as what is in place is not excessively rocky or otherwise unfavorable to healthy plant growth.
 - 3. Provide no less than quantity required to achieve tolerance described in Section 32 9122 'Topsoil Grading' along with additional soil amendments required. Installer of this section responsible for providing sufficient topsoil material.
- C. Imported Topsoil:
 - 1. Place tested and approved topsoil:
 - a. Before placing topsoil, remove organic material, rocks and clods greater than 1-1/2 inch (38 mm) in any dimension, and other objectionable materials.
 - b. Do not place topsoil whose moisture content makes it prone to compaction during placement process.
 - c. Do not place topsoil when subgrade is either wet or frozen enough to cause clodding.
- D. Stockpiled Topsoil:
 - 1. Redistribute tested and approved existing topsoil stored on site as result of work of Section 31 1413 'Topsoil Stripping And Stockpiling'.
 - a. Before placing topsoil, remove organic material, rocks and clods greater than 1-1/2 inch (38 mm) in any dimension, and other objectionable materials.
 - b. Do not place topsoil whose moisture content makes it prone to compaction during placement process.
 - c. Do not place topsoil when subgrade is either wet or frozen enough to cause clodding.
- E. In Place Topsoil:
 - 1. At locations where topsoil can remain in place and has been tested and approved, perform the following:
 - a. Remove existing vegetation as required in preparation for new landscaping.
 - b. Remove vegetative layer, roots, organic material, rocks and clods greater than 1-1/2 inch (38 mm) in any dimension, and other objectionable materials.
- F. Grading:
 - 1. Slope grade away from building for 12 feet (3.60 m) minimum from walls at slope of 1/2 inch in 12 inches (13 mm in 300 mm) minimum unless otherwise noted.
 - a. High point of finish grade at building foundation shall be 6 inches (150 mm) minimum below finish floor level.
 - b. Direct surface drainage in manner indicated on Contract Documents by molding surface to facilitate natural run-off of water.

- c. Fill low spots and pockets with topsoil and grade to drain properly.

3.04 FIELD QUALITY CONTROL

A. Testing And Inspections:

1. Topsoil Testing:

- a. Test topsoil for project suitability using Section 1 described 'Topsoil Testing Report':

- 1) Testing requirements:

- (a) If testing report shows topsoil does not meet topsoil Design Criteria (Section 2) and Topsoil Testing Report, 'Soil Test Data' and 'Rocks' requirements, topsoil is non-conforming. Corrections and re-testing are required until topsoil meets requirements.
- (b) Use new 'Topsoil Testing Report', each time topsoil is tested.
- (c) After topsoil is approved by Landscape Architect, submit final 'Topsoil Testing Report as specified in Part 1 'Submittals'.

B. Non-Conforming Work:

- 1. If topsoil does not meet topsoil Design Criteria and 'Topsoil Testing Report: Soil Test Data' requirements topsoil will be re-tested at no cost to Owner.

- a. Correction procedures:

- 1) Topsoil not meeting specified physical characteristics of sand, silt, and clay shall be removed from site.
- 2) Topsoil not meeting specified organic or fertility specifications may be amended in place with materials recommended in Topsoil Testing Report.
- 3) If amendments are necessary, submit proposed amendments and application rates required to bring topsoil up to minimum specified requirements.
- 4) Re-test topsoil and remove and amend as required until it meets minimum specified requirements.

- b. Submit report to Landscape Architect for approval.

- c. Receive approval from Landscape Architect prior to planting.

END OF SECTION

**SECTION 32 9122
TOPSOIL GRADING**

PART 1 GENERAL

1.01 SUMMARY

- A. Includes But Not Limited To:
1. Perform topsoil grading required to prepare site for installation of landscaping as described in Contract Documents.
 2. Perform topsoil placement and finish grading work required to prepare site for installation of landscaping as described in Contract Documents.
 3. Furnish and apply soil amendments as described in Contract Documents.
- B. Related Requirements:
1. Section 31 0500: 'Common Earthwork Requirements':
 2. Section 31 1413: 'Topsoil Stripping And Stockpiling'.
 3. Section 31 2200: 'Grading'.
 4. Section 32 9001: 'Common Planting Requirements':
 - a. Pre-installation conference held jointly with other common planting related sections.
 5. Section 32 9120: 'Topsoil And Placement'.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
1. Participate in MANDATORY pre-installation conference as specified in Section 32 9001.
 2. In addition to agenda items specified in Section 01 3000, review the following:
 - a. Review compost requirements to be within acceptable range as per Attachment 'Compost Quality Guidelines For Landscaping' and 'Compost Verification Report' in this specification.
 - b. Review soil fertility amendments and fertilizer requirements as per Attachment 'Topsoil Testing Report' in Section 32 9120.

1.03 SUBMITTALS

- A. See Section 01 3000-Administrative Requirements, for submittal procedures. Submittals may be included in more than one submittal group listed below.
- B. Submittals for Review:
1. Do not commence work or deliver products to site until Landscape Architect approves submittals for review.
 2. Product Data:
 - a. Soil Amendments and Fertilizer:
 - 1) Soil amendment and fertilizer literature and chemical / nutrient analysis.
 - 2) Proposed application rates necessary to bring topsoil up to specified requirements.
 - 3) Product source location.
 3. Samples:
 - a. Soil Amendments and Conditioners:
 - 1) 2.5 lb sample for each product delivered in resealable plastic bag(s).
 4. Testing And Evaluation Reports:
 - a. 'Compost Verification Report':
 - 1) Signed copy certifying compost meets requirements of this specification
 - (a) Access 'Compost Verification Template' through:
 - (1) https://aec.churchofjesuschrist.org/aec/design_guidelines/
 - (2) Go to the Landscape sub-section.

- C. Submittals for Information:
1. Soil Fertility Amendments and Fertilizer:

- a. Upon request submit delivery slips indicating amount of soil amendments, compost, conditioner, and fertilizer delivered to Project site.
- D. Submittals for Project Closeout:
 - 1. Landscape Management Plan (LMP):
 - a. Landscape Section. Include the following:
 - 1) Signed final Compost Verification Report.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Soil Amendments:
 - 1. Incorporate following soil amendments into topsoil used for Project:
 - a. Acceptable Soil Amendments, Soil Conditioners, And Application Rates. (Choose one):
 - 1) Soil Pep'.
 - 2) 'Compost'
 - 3) Other amendments and conditioners as specified by 'Topsoil Testing Report' such as lime, gypsum, Axis, etc.
 - 4) Substitutions: See Section 01 6000-Product Requirements.
 - (a) Equal as approved by Landscape Architect prior to bid.
 - b. Acceptable Fertilizers And Application Rates:
 - 1) As specified by Topsoil Testing Report

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification Of Conditions:
 - 1. Do not commence work of this Section until imported, stockpiled and in place topsoil are placed as specified in Section 32 9120 'Topsoil And Placement'.

3.02 PREPARATION

- A. Protection Of In-Place Conditions:
 - 1. Protect utilities and site elements from damage.
- B. Surface Preparation:
 - 1. Surfaces that meet specified topsoil elevations.
 - a. Seven (7) days maximum before beginning seeding and planting:
 - 1) Loosen topsoil 6 inch (150 mm) deep, dampen thoroughly, and cultivate to properly break up clods and lumps.
 - 2) Rake area to remove clods, rocks, weeds, roots, debris or other material 1-1/2 inches (38 mm) or more in any dimension.
 - 3) Grade and shape landscape area to bring surface to true uniform planes free from irregularities and to provide drainage and proper slope to catch basins.
 - 2. Addition of Soil Amendments:
 - a. Add specified soil amendments at specified rates to topsoil as directed by Topsoil Testing Report found in Section 32 9120 'Topsoil And Placement'.
 - b. Add specified fertilizers at specified rates into topsoil as directed by Soil Testing Laboratory.
 - c. Roto-till or otherwise mix soil amendments evenly into topsoil.
 - d. Incorporate and leach soil amendments which require leaching, such as gypsum, within such time limits that soil is sufficiently dry to allow proper application of fertilizer and soil conditioners.

3.03 PERFORMANCE

- A. General:

1. Limit use of heavy equipment to areas no closer than 6 feet (1.80 meter) from building or other permanent structures. Use hand held tillers for preparation of subsoil in areas closer than 6 feet (1.80 m).
 2. Do not expose or damage existing shrub or tree roots.
- B. Finish Grade Tolerances (As shown on General Planting Details in Contract Documents):
1. Finish topsoil grade of planting areas before planting and after addition of soil additives shall be specified distances below top of adjacent pavement of any kind:
 - a. Ground Cover Areas: 2 inches (50 mm) below.
 - b. Seeded Areas: One inch (25 mm) below.
 - c. Sodded Areas: 2 inches (50 mm) below.
 - d. Tree and Shrub Areas (not individual trees): 4 inches (100 mm) below.
- C. Placed Topsoil:
1. At locations where topsoil has been placed as per Section 32 9120 'Topsoil And Placement', perform the following:
 - a. Remove existing vegetation as required in preparation for new landscaping.
 - b. Remove organic material, rocks and clods greater than 1-1/2 inch (38 mm) in any dimension, and other objectionable materials.
- D. Grading:
1. Coordinate grading as described in Section 32 9120 'Topsoil And Placement'.
- E. Immediately before planting lawn and with topsoil in semi-dry condition, roll areas that are to receive lawn in two directions at approximately right angles with water ballast roller weighing 100 to 300 lbs (45 to 135 kg), depending on soil type.
- F. Rake or scarify and cut or fill irregularities that develop as required until area is true and uniform, free from lumps, depressions, and irregularities.

3.04 PROTECTION

- A. After landscape areas have been prepared, take no heavy objects over them except lawn rollers.

END OF SECTION

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**SECTION 32 9223
SODDING****PART 1 GENERAL****1.01 SUMMARY**

- A. Includes But Not Limited To:
1. Furnish and install sodded lawn as described in Contract Documents.

1.02 RELATED REQUIREMENTS

- A. Section 32 8423: Irrigation System - No Controllers.
- B. Section 32 8466: Irrigation System - Controllers
- C. Section 32 9001: Common Planting Requirements:
1. Pre-installation conference held jointly with other common planting related sections.
- D. Section 32 9120: 'Topsoil And Placement'.
- E. Section 32 9122: 'Topsoil Grading'.

1.03 REFERENCES

- A. TPI (SPEC) Certificate: Certify grass species and location of sod source.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
1. Participate in pre-installation conference as specified in Section 32 9001.

1.05 SUBMITTALS

- A. Submittals for Information:
1. Sod Seed Mix:
 - a. Written certification confirming sod seed mix and quality:
 - 1) Include species used.
 - 2) Include supplier name and contact information.
- B. Submittals for Closeout:
1. Operations And Maintenance Data:
 - a. Sod Seed Mix.
 2. Landscape Management Plan (LMP):
 - a. Landscape Section:
 - 1) Sod Seed Mix.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Approval Requirements:
1. Harvest, deliver, store, and handle sod in accordance with requirements of Turfgrass Producers International (TPI) (formally American Sod Producers Association) Specifications for Turfgrass Sod Materials and Transplanting / Installing.
 2. Schedule deliveries to coincide with topsoil operations and laying. Keep storage at job site to minimum without causing delays.
 - a. Deliver, unload, and store sod on pallets within 24 hours of being lifted.
 - b. Do not deliver small, irregular, or broken pieces of sod.
- B. Storage And Handling Requirements:
1. Cut sod in pieces approximately 3/4 to one inch (19 to 25 mm) thick. Roll or fold sod so it may be lifted and handled without breaking or tearing and without loss of soil.
 2. During wet weather, allow sod to dry sufficiently to prevent tearing during lifting and handling.
 3. During dry weather, protect sod from drying before installation. Water as necessary to insure vitality and to prevent excess loss of soil in handling. Sod that dries out before installation will be rejected.

PART 2 PRODUCTS**2.01 MATERIALS****A. Description:**

1. Superior sod grown from certified, high quality, seed of known origin or from plantings of certified grass seedlings or stolons:
 - a. Assure satisfactory genetic identity and purity.
 - b. Assure over-all high quality and freedom from noxious weeds or an excessive amount of other crop and weedy plants at time of harvest.
2. Sod shall be composed of three separate varieties. Varieties should include the following attributes:
 - a. High traffic tolerance.
 - b. Superior color.
 - c. Low-water requirement.
 - d. Drought tolerance.

PART 3 EXECUTION**3.01 INSTALLATION****A. Interface With Other Work:**

1. Do not commence work of this Section until work of Sections 32 9122 and 32 9300 has been completed and approved.

B. Tolerances:

1. Final grade of soil after sodding of lawn areas is complete shall be one inch (25 mm) below top of adjacent pavement of any kind.

C. Laying of Sod:

1. Lay sod during growing season and within 48 hours of being lifted.
2. Lay sod while top 6 inches (150 mm) of soil is damp, but not muddy. Sodding during freezing temperatures or over frozen soil is not acceptable.
3. Lay sod in rows perpendicular to slope with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with a sharp knife.
4. Lay sod flush with adjoining existing sodded surfaces.
5. Do not sod slopes steeper than 3:1. Consult with Architect for alternate treatment.

D. After Laying of Sod Is Complete:

1. Roll horizontal surface areas in two directions perpendicular to each other.
2. Repair and re-roll areas with depressions, lumps, or other irregularities. Heavy rolling to correct irregularities in grade will not be permitted.
3. Water sodded areas immediately after laying sod to obtain moisture penetration through sod into top 6 inches (150 mm) of topsoil.

3.02 FIELD QUALITY CONTROL**A. Field Inspection:**

1. Sodded areas will be accepted at Project closeout if:
 - a. Sodded areas are properly established.
 - b. Sod is free of bare and dead spots and is without weeds.
 - c. No surface soil is visible when grass has been cut to height of 2 inches (50 mm).
2. Sodded areas have been mowed a minimum of twice.

END OF SECTION

**SECTION 32 9300
PLANTS****PART 1 GENERAL****1.01 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install landscaping plants as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 32 8423: 'Underground Sprinklers: No Controllers' for irrigation system.
 - 2. Section 32 8466: 'Underground Sprinklers: Controllers' for irrigation system controllers.
 - 3. Section 32 9001: 'Common Planting Requirements' for:
 - a. Pre-installation conference held jointly with other common planting related sections.
 - 4. Section 32 9120: 'Topsoil And Placement'.
 - 5. Section 32 9122: 'Topsoil Grading'.
 - 6. Section 32 9219: 'Seeding'.
 - 7. Section 32 9223: 'Sodding'.

1.02 REFERENCES

- A. Definitions:
 - 1. Landscape Management Plan (LMP): See Section 32 9001 for definition.
 - 2. Plant Establishment Period: See Section 32 9001 for definition.
- B. ANSI/AHIA Z60.1 - American National Standard for Nursery Stock; 2014
- C. ANSI A300 Part 1 - American National Standard for Tree Care Operations -- Tree, Shrub and Other Woody Plant Maintenance -- Standard Practices; 2017

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
 - 1. Participate in MANDATORY pre-installation conference as specified in Section 32 9001.

1.04 SUBMITTALS

- A. See Section 01 3000-Administrative Requirements, for submittal procedures. Submittals may be included in more than one submittal group listed below.
- B. Submittals for Review:
 - 1. Do not commence work or deliver products to site until Landscape Architect approves submittals for review.
 - 2. Testing and Evaluation Reports
 - a. Percolation Test Report:
 - 1) Submit written report based on testing described in Part 3.
 - 3. Samples:
 - a. Tree staking systems.
 - b. Weed barrier
 - c. Organic mulch.
 - d. Rock mulch.
- C. Submittals for Information:
 - 1. Establishment Period Acknowledgement. See Section 32 9001:
- D. Submittals for Closeout:
 - 1. Operations and Maintenance Data:
 - a. See Section 32 9001.
 - 2. Record Documentation
 - a. See Section 32 9001.
 - 3. Landscape Warranty. See 'Warranty' below.
 - 4. Landscape Management Plan (LMP):

- a. Landscape Section. See Section 32 9001.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Delivery And Acceptance Requirements:
 1. Deliver trees, shrubs, ground covers, and plants after preparations for planting have been completed and install immediately.
 2. Do not prune before delivery, except as approved by Landscape Architect.
 3. Protect bark, branches, and root systems from sun scald, drying, whipping, and other handling and tying damage.
 4. Do not bend or bind-tie trees or shrubs in such a manner as to destroy natural shape.
 5. Provide protective covering during delivery.
- B. Storage And Handling Requirements;
 1. Handle balled stock by root ball or container. Do not drop trees and shrubs during delivery.
 2. If planting is delayed more than six hours after delivery, set planting materials in shade and protect from weather and mechanical damage.
 3. Set balled stock on ground and cover ball with soil, saw dust, or other acceptable material approved by Landscape Architect.
 4. Do not remove container-grown stock from containers before time of planting.
 5. Do not store plant material on pavement.
 6. Water root systems of trees and shrubs stored on site with fine spray. Water as often as necessary to maintain root systems in moist condition. Do not allow plant foliage to dry out.

1.06 WARRANTY

- A. Special Warranty:
 1. Provide written warranties as follows:
 - a. Warranty will extend thirty (30) continuous days minimum after Substantial Completion. If a continuous first thirty (30) days of the warranty period is interrupted by non-growing season or irrigation winter shut-down, begin warranty period after start of growing season as agreed on with Architect. Thereafter, continue warranty per the period described herein.
 - b. Warranty shrubs, ground covers, and vines to live and remain in strong, vigorous, and healthy condition for 90 days minimum from date of Substantial Completion and meet or exceed material standards set forth in Materials heading of Part 2 of this specification.
 - c. Warranty trees to live and remain in strong, vigorous, and healthy condition and meet or exceed material standards set forth in Materials heading of Part 2 of this specification for one year from date of Substantial Completion.
 - d. When trees are completely accepted at end of warranty period, remove staking.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Plants:
 1. Conform to requirements of Plant List and Key on Contract Documents and to ANSI/AHIA Z60.1.
 2. Nomenclature:
 - a. Plant names used in Plant List conform to 'Standardized Plant Names' by American Joint Committee on Horticultural Nomenclature except in cases not covered. In these instances, follow custom of nursery trade. Plants shall bear tag showing genus, species, and variety of at least 10 percent of each species delivered to site.
 3. Quality:
 - a. Plants shall be sound, healthy, vigorous, free from plant disease, insect pests or their eggs, noxious weeds, and have healthy, normal root systems. Container stock shall be well established and free of excessive root-bound conditions.

- b. Do not prune plants or top trees prior to delivery.
- c. Plant materials shall be subject to approval by Landscape Architect as to size, health, quality, and character.
- d. Bare root trees are not acceptable.
- e. Provide plant materials from licensed nursery or grower.
- 4. Measurements:
 - a. Measure height and spread of specimen plant materials with branches in their normal position as indicated on Contract Documents or Plant List.
 - b. Measurement should be average of plant, not greatest diameter. For example, plant measuring 15 inches (375 mm) in widest direction and 9 inches (225 mm) in narrowest would be classified as 12 inch (300 mm) stock.
 - c. Plants properly trimmed and transplanted should measure same in every direction.
 - d. Measure caliper of trees 6 inches (150 mm) above surface of ground.
 - e. Where caliper or other dimensions of plant materials are omitted from Plant List, plant materials shall be normal stock for type listed.
 - f. Plant materials larger than those specified may be supplied, with prior written approval of Landscape Architect, and:
 - 1) If complying with Contract Document requirements in all other respects.
 - 2) If at no additional cost to Owner.
 - 3) If sizes of roots or balls are increased proportionately.
- 5. Shape and Form:
 - a. Plant materials shall be symmetrical or typical for variety and species and conform to measurements specified in Plant List.
 - b. Well grown material will generally have height equal to or greater than spread. However, spread shall not be less than 2/3's of height.

2.02 ACCESSORIES

- A. Planting Mix:
 - 1. Mixture of three (3) parts excavated soil and one part well rotted composted manure, approved commercial mix, or other amendment recommended in 'Topsoil Testing Report'.
- B. Fertilizer:
 - 1. Fertilizer as recommended in 'Topsoil Testing Report'.
- C. Tree Stakes:
 - 1. 2 inch (50 mm) diameter Lodgepole Pine, Douglas Fir, White Fir, or Hemlock Fir.
- D. Tree Staking Ties:
 - 1. 3/2 inch (800 mm) Cinch-Tie tree ties by V.I.T. Products Inc, Escondido, CA www.vitproducts.com.
- E. Tree Guys:
 - 1. Duckbill Model 68DTS guying kit.
- F. Pre-Emergent Herbicide:
 - 1. Chipco Dimension Granular by The Andersons Inc, Maumee, IL www.andersonsinc.com.
 - 2. Elanco XL2G granular by Crop Data Management Systems, Marysville, CA www.cdms.net.
 - 3. Ronstar G granular by Bayer Crop Science, Monheim, Germany www.bayercropscience.com.
 - 4. Surflan AS liquid by United Phosphorous Inc, Trenton, NJ www.upi-usa.com.
 - 5. Oryzalin 4 A.S. liquid by FarmSaver, Seattle, WA www.farmsaver.com.
- G. Weed Barrier:
 - 1. DeWitt 4.1 oz (116 g) 20 year woven polypropylene weed barrier.
 - 2. Hanes Pro-Platinum 4.1 oz (116 g) 20 year woven polypropylene weed barrier.
- H. Organic Mulch:
 - 1. Medium size Fir bark.

2. Medium or large size Redwood bark.
 3. Shredded pine bark.
 4. Shredded Cedar.
- I. Rock Mulch:
1. Rock mulch.
 - a. Size:
 - 1) No rock should be less than 3/4 inch (19 mm) in size.
 - 2) For slopes 3:1 or less 3/4 inch (19 mm) to 1-1/2 inches (38 mm).
 - 3) For steep slopes greater than 3:1: Size can be larger than 1-1/2 inches (38 mm).
- J. Substitutions: See Section 01 6000 - Product Requirements.
1. Equals as approved by Landscape Architect prior to bid.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Evaluation And Assessment:
1. Before proceeding with work, check and verify dimensions and quantities. Report variations between Drawings and site to Landscape Architect before proceeding with work of this Section.
 2. Plant totals are for convenience only and are not guaranteed. Verify amounts shown on Contract Documents. All planting indicated on Contract Documents is required unless indicated otherwise.
 3. Do not commence with this Work until all work including grading tolerances specified in Section 32 9122 'Topsoil Grading' are completed and approved.

3.02 PREPARATION

- A. Plant Approval:
1. Compliance:
 - a. Prior to any plant installation, evaluate plants for compliance with material standards.
 - b. Remove plants from site that do not comply.
 2. Inspection:
 - a. Prior to any tree installation, inspect one (1) extra deciduous tree and one (1) extra evergreen tree for root health.
 - b. In presence of Landscape Architect or by video recording, remove root container/packing material and inspect root balls for soil depth, firmness and root structure by washing soil off of roots.
 - c. If delivered plants exhibit soil 1 inch (25 mm) or more above root collar, demonstrate that all trees have had excess soil removed prior to planting or that they meet standard.
 - d. Remove and replace tree plant material if roots are loose, significantly circling, significantly asymmetrical or damaged.
 - e. Continue inspection process until trees meet standard.
- B. Layout individual tree and shrub locations and areas for multiple plantings:
1. Stake locations and outline areas.
 2. Secure Landscape Architect's approval before planting.
 3. Make minor adjustments as may be requested.

3.03 INSTALLATION

- A. Excavation:
1. If underground construction work or obstructions are encountered in excavation of planting holes, Landscape Architect will select alternate locations.
 2. Plant Excavation Size:
 - a. Diameter: Twice diameter of root ball or container minimum.
 - b. Depth: Equal to container or root ball depth.

3. Unless excavated material meets topsoil requirements as specified in Section 32 9120, remove from landscape areas and do not use for landscaping purposes.
 4. Roughen sides and bottoms of excavations.
 5. Perform percolation test and create report.
 - a. With approval of Landscape Architect, select five (5) typical planting excavations throughout site for drainage testing.
 - 1) Fill selected excavations with water and verify that water drains away at rate of 3 inches (75 mm) per hour minimum.
 - 2) If it doesn't, select three (3) excavations approximately 5 feet (1 500 mm) away from each non-draining excavation and repeat tests. Continue testing process until non-draining areas have been identified.
 - 3) Within excavations located in identified non-draining areas, auger 6 inch (150 mm) diameter hole 4 feet (1 200 mm) deep in low point of each excavation and fill with tamped planting mix.
 - b. Create report identifying area where water did not drain properly and describe corrective measures taken.
 - c. Do not plant trees or shrubs in holes that do not properly drain.
- B. Planting:
1. Removing Binders And Containers:
 - a. Remove top one / third of wire basket and burlap binders.
 - b. Remove plastic and twine binders from around root ball and tree trunk.
 - c. Remove plastic containers.
 - d. Remove wood boxes from around root ball. Remove box bottoms before positioning plant in hole. After plant is partially planted, remove remainder of box without injuring root ball.
 2. Plant immediately after removing binding material and containers:
 - a. Place tree and shrub root balls on undisturbed soil.
 - b. After watering and settling, top of tree root balls shall be approximately two inches (50 mm) higher than finished grade and trunk flare is visible.
 - c. Shrub root balls shall be approximately one inch (25 mm) higher than finished grade.
 3. Properly cut off broken or frayed roots.
 4. Center plant in hole, remove remaining wire basket and burlap taking care not to damage root ball:
 - a. Replace damaged material.
 - b. Backfill with specified planting mix.
 - c. Except in heavy clay soils, make ring of mounded soil around hole perimeter to form watering basin.
 5. Add fertilizer in plant pit as per 'Topsoil Testing Report' and during proper season.
 6. Fill landscape excavations with tamped planting mix and recommended fertilizer:
 - a. Compact in 6 inch (150 mm) lifts.
 - b. Settle by watering to ensure top of root ball is 2 inches (50 mm) higher for trees and one inch (25 mm) higher for shrubs than surrounding soil following compaction and settling.
 7. Do not use muddy soil for backfilling.
 8. Make adjustments in positions of plants as directed by Landscape Architect.
 9. Thoroughly water trees and shrubs immediately after planting.
 10. At base of each tree, leave 36 inch (900 mm) diameter circle free of any grass.
- C. Tree and Shrub Pruning:
1. Prune trees and shrubs to remove dead, broken, and split branches in conformance with ANSI A300 (Part 1) Pruning.
- D. Supports for New Trees:
1. Provide new supports for trees noted on Contract Documents to be staked.
 - a. Remove nursery stakes delivered with and attached to trees.

- b. Support shall consist of at least two (2) tree stakes driven into hole base before backfill so roots are not damaged. Place stakes vertically and run parallel to tree trunk. Install stakes so 3 feet (900 mm) of stake length is below finish grade.
 - c. Deciduous Trees:
 - 1) Place tree ties 6 to 12 inches (150 to 300 mm) below crotch of main tree canopy. Second set of tree ties may be required 18 to 24 inches (450 to 600 mm) above finish grade, if directed by Landscape Architect.
 - 2) Remove tops of tree stakes so top of stake is 6 inches (150 mm) below main tree canopy to prevent damage to tree branches and canopy growth.
 - d. Evergreen Trees:
 - 1) Place tree ties 2/3's of height of tree up from root ball.
 - 2. Provide root guying kits to support 24 inch (600 mm) box, 3 inch (75 mm) caliper and larger trees.
 - 3. Staking and guying should allow some tree movement.
- E. Vines:
- 1. Remove from stakes, untie, and securely fasten to wall or fence next to which they are planted.
- F. Ground Covers:
- 1. Container-grown unless otherwise specified on Contract Documents. Space evenly to produce a uniform effect, staggered in rows and intervals shown.
- G. Post Planting Weed Control:
- 1. Apply specified pre-emergent herbicide to shrub and ground cover planting areas and grass-free areas at tree bases after completion of planting.
 - 2. Areas shall be weed free prior to Landscape Final Acceptance.
- H. Weed Barrier Fabric:
- 1. After planting and application of herbicide in shrub beds, apply covering of specified weed barrier fabric.
 - 2. Achieve 100 percent coverage over ground areas away from root ball.
 - 3. Overlap seams 6 inches (150 mm) minimum.
 - 4. Staple at 5 feet (1500 mm) on center each way and within 3 inches (75 mm) of edge of shrub bed, with two (2) at each corner.
- I. Mulching:
- 1. After application of herbicide, mulch shrub and ground cover planting areas with 3 inches (75 mm) deep layer of specified organic or rock mulch.
 - 2. Cover grass-free area at tree bases with 3 inches (75 mm) of organic mulch where applicable.
 - 3. Place mulch to uniform depth and rake to neat finished appearance.

END OF SECTION

**SECTION 33 1113
FACILITY WATER DISTRIBUTION PIPING**

PART 1 GENERAL**1.01 SUMMARY**

- A. This Section includes water-distribution piping and related components outside the building for water service and fire-service mains.
- B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

1.02 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Pipe Materials, Valves, Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
- C. Operation and maintenance data.

1.03 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
 - 2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
 - 3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.
- B. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- C. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.
- D. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.
- E. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

1.04 PROJECT CONDITIONS

- A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:
 - 1. Notify Owner no fewer than two days in advance of proposed interruption of service.
 - 2. Do not proceed with interruption of water-distribution service without Owner's written permission.

1.05 COORDINATION

- A. Coordinate connection to water main with utility company.

PART 2 PRODUCTS**2.01 PIPE AND FITTINGS**

- A. Ductile-Iron Pipe: AWWA C151, Class 52, bell- and plain-spigot end unless grooved or flanged ends are indicated.
 - 1. Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - 2. Glands, Gaskets, and Bolts for Mechanical Joints: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
 - 3. Gaskets for Push-on Joints: AWWA C111, rubber.

2.02 GATE VALVES

- A. AWWA, Cast-Iron Gate Valves:
 - 1. Non-rising-Stem, Resilient-Seated Gate Valves:
 - a. Description: Gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut.
 - 1) Standard: AWWA C509.
 - 2) Minimum Pressure Rating: 200 psig.
 - 3) End Connections: Mechanical joint.
 - 4) Interior Coating: Complying with AWWA C550.

2.03 GATE VALVE ACCESSORIES AND SPECIALTIES

- A. Tapping-Sleeve Assemblies:
 - 1. Description: Sleeve and valve compatible with drilling machine.
 - a. Standard: MSS SP-60.

- b. Tapping Sleeve: Cast- or ductile-iron or stainless-steel, two-piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.
 - c. Valve: AWWA, cast-iron, non-rising-stem, resilient-seated gate valve with one raised face flange mating tapping-sleeve flange.
 - B. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over valve and with a barrel approximately 5 inches in diameter.
 - 1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.
- 2.04 WATER METERS**
 - A. Water meters will be furnished by utility company.
- 2.05 CONCRETE METER VAULT**
 - A. Description: Precast, reinforced-concrete vault, per APWA Plan 505.
- 2.06 FIRE HYDRANTS**
 - A. Dry-Barrel Fire Hydrants:
 - 1. Description: Freestanding, with one NPS 4-1/2 and two NPS 2-1/2 outlets, 5-1/4-inch main valve, drain valve, and NPS 6 mechanical-joint inlet. Include interior coating according to AWWA C550. Hydrant shall have cast-iron body, compression-type valve opening against pressure and closing with pressure.
 - a. Standard: AWWA C502.
 - b. Pressure Rating: 150 psig minimum.

PART 3 EXECUTION

- 3.01 EARTHWORK**
 - A. Refer to Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.
- 3.02 PIPING APPLICATIONS**
 - A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.
 - B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.
 - C. Flanges, unions, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.
- 3.03 VALVE APPLICATIONS**
 - A. General Application: Use mechanical-joint-end valves for NPS 3 and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, non-rising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 and smaller installation.
 - B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 - 1. Underground Valves, NPS 3 and Larger: AWWA, cast-iron, non-rising-stem, resilient-seated gate valves with valve box.
 - 2. Underground Valves, NPS 4 and Larger, for Indicator Posts: UL/FMG, cast-iron, non-rising-stem gate valves with indicator post.
- 3.04 PIPING INSTALLATION**
 - A. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main.
 - B. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.
 - C. Make connections larger than NPS 2 with tapping machine according to the following:
 - 1. Install tapping sleeve and tapping valve according to MSS SP-60.
 - 2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
 - 3. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.
 - 4. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.
 - D. Comply with NFPA 24 for fire-service-main piping materials and installation.
 - E. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.
 - F. Bury piping with depth of cover over top at least 60 inches, with top at least 12 inches below level of maximum frost penetration.

- G. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.
 - 1. Terminate water-service piping until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.
- H. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

3.05 ANCHORAGE INSTALLATION

- A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:
 - 1. Concrete thrust blocks.
 - 2. Locking mechanical joints.
 - 3. Set-screw mechanical retainer glands.
 - 4. Bolted flanged joints.
 - 5. Pipe clamps and tie rods.
- B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches.
- C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.06 VALVE INSTALLATION

- A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
- B. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.

3.07 WATER METER INSTALLATION

- A. Install water meters, piping, and specialties according to utility company's written instructions.

3.08 WATER METER BOX INSTALLATION

- A. Install water meter boxes flush with surface.

3.09 FIRE HYDRANT INSTALLATION

- A. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.
- B. AWWA Fire Hydrants: Comply with AWWA M17.

3.010 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect water-distribution piping to existing water main using tapping sleeve and tapping valve.
- C. Connect water-distribution piping to interior domestic water and fire-suppression piping.

3.011 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water. Complete tests in accordance with Provo City requirements.
- B. Prepare reports of testing activities.

3.012 IDENTIFICATION

- A. Install continuous underground detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Division 31 Section "Earth Moving."
- B. Permanently attach equipment nameplate or marker indicating plastic water-service piping, on main electrical meter panel. See Division 22 Section "Common Work Results for Plumbing" for identifying devices.

3.013 CLEANING

- A. Clean and disinfect water-distribution piping as follows:
 - 1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
 - 2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
 - 3. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:

- a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
 - b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
 - c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.
- B. Prepare reports of purging and disinfecting activities.

END OF SECTION
