The Church of Jesus Christ of Latter-day Saints
COBBLE CREEK CAMP
SOLAR

SOUTH FORK CANYON
8 MILES EAST HWY 39 (NORTH COBBLE CREEK ROAD)
HUNTSVILLE, UT

PROJECT MANUAL
& SPECIFICATIONS

August 28, 2025

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240 East Morris Ave., Suite 200
Salt Lake City, Utah 84115
801.534.1130

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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, Ram Construction, Sanders Construction, Gardner Energy

2. PROJECT:

Cobble Creek Camp - Solar

3. LOCATION:

South Fork Canyon 8 Miles East HWY 39 (North Cobble Creek Road)
Huntsville, UT 84317

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:

Envision Engineering

6. DESCRIPTION OF PROJECT:

A. New Soalr System for site buildings.

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 60 calendar days and will be as noted in the Agreement.

9. BID OPENING: Bids will be received by Owners preferred method at 2:00pm September 9, 2025. Bids will be publicly opened at 2:00pm on Conslog.

10. BIDDING DOCUMENTS:

A. 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 will be held on Wednesday September 3, 2025 at 10:00 am at the project site.

END OF DOCUMENT

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:
    a. The name or address of any affiliate, customer or contractor of Owner or any information concerning the transactions of any such person with Owner;
    b. Any contracts, agreements, business plans, budgets or other financial information, renderings, photographs, and materials provided by Owner, relating to the Work or any improvement on the Project Site to the extent such has not been made available to the public by the Owner;
    c. Any other information that is marked or noted as confidential at the time of its disclosure.

28. **No Commercial Use of 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:
    a. By referring to the Owner or Project verbally or in any sales, marketing or other literature, letters, client lists, press releases, brochures or other written materials except as may be necessary for Contractor to perform Contractor's obligations under the terms of this Agreement;
    b. By using or allowing the use of any photographs of the Work or Project or any part thereof, or of any service marks, trademarks or trade names or other intellectual property now or which may hereafter be associated with, owned by or licensed by Owner, in connection with any work, service or product; or
    c. By contracting with or receiving money or anything of value from any person or commercial entity to facilitate such person or entity obtaining any type of commercial identification, advertising or visibility in connection with the Owner or Project.

    Notwithstanding the foregoing, Contractor may include a reference to Owner or the Project in a professional résumé or other similar listing of Contractor's references without seeking Owner's written consent in each instance, provided that such reference to Owner or the Project is included with at least several other similar references to projects of different owners and is given no more prominence than such other references.

29. **Entire Agreement.** This Agreement contains the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral, relating to the

Project. This Agreement may be amended only by a writing signed by both parties. This Agreement will not be construed to create a contractual relationship of any kind between any persons or entities other than Owner and Contractor.

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

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

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

OWNER:	**CONTRACTOR:**
The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole	
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:

INFORMATION AVAILABLE TO BIDDERS (U.S.)

1. ASBESTOS-CONTAINING MATERIAL (ACM)

A. The building upon which work is being performed has been examined for asbestos-containing material. The following have been identified as containing asbestos in the areas of the building being worked on as part of this Project:

1) If asbestos is found it will be removed by the owner.

END OF DOCUMENT

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CONSTRUCTION MATERIAL ASBESTOS STATEMENT (U.S.)

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

Building Name: _____

Building Plan Type: _____

Building Address: _____

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

Project Number: _____

Completion Date: _____

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

_____ _____
Project Consultant and Principal in Charge (signature) Date

_____
Company Name

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

_____ _____
General Contractor (signature) Date

_____
Company Name

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SUPPLEMENTARY CONDITIONS

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

ITEM 1 - GENERAL

1. Conditions of the Small Project Agreement Between Owner and Contractor (U.S.) apply to each Division of the Specifications.

2. Provisions contained in Division 01 apply to all Divisions of the Specifications.

ITEM 2 - LIQUIDATED DAMAGES PAYABLE TO OWNER

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

Delay in Completion of the Work. For each day after the expiration of the designated Time of Completion that Contractor has not completed the Work, Contractor will pay Owner the amount of One Hundred Fifty dollars ($150) 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

Alabama

N/A

Alaska

N/A

Arizona

Replace section 5.b. of the Agreement with the following:

b. Not more than once each month, Contractor will submit a payment request to Owner. Owner will pay Contractor for Work completed within seven (7) days after:
   1. Contractor submits to Owner Contractor's payment request for Work to date;
   2. Contractor provides to Owner 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;
   3. Contractor has obtained 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; and
   4. Owner has certified and approved all or part of the payment request and notified Contractor in writing (which Owner must do within 14 days of Contractor's submission of the payment request to Owner).

   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.

Arkansas

N/A

California

N/A

Colorado

COLORADO STATE SALES TAX:

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

1. Contractor will make an application to State Department of Revenue for certificate of exemption to permit purchase of building materials for construction of this Project without payment of Sales Tax. Applications and certificates will be on forms provided by the Department of Revenue.

2. Prior to start of construction, Contractor will furnish to the Owner copies of the applications submitted and certificates obtained. Upon receipt of the certificate Contractor shall make a copy for each subcontractor involved in the Project and complete it by filling in the subcontractor's name and address and signing it. The original certificate and copies of all certificates that the Contractor issues to subcontractors should be kept at the Contractor's place of business for a minimum of three years.

3. The Owner's sales tax exemption number for the State of Colorado is 98-01587.

Connecticut

CONNECTICUT STATE SALES TAX:

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

1. Sales of materials and supplies that will be physically and permanently incorporated into the construction project should be exempt from Connecticut state sales tax. The Owner's sales tax exemption number for the State of Connecticut is E-9613.

Delaware

N/A

District of Columbia

WASHINGTON D.C. SALES TAX:

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

1. Materials that will be physically incorporated into and made a part of the Owner's real property may be purchased by the Contractor free of Washington D.C. sales tax.

2. The Owner's tax exempt number is 8661-0185848-001.

3. Contractor is responsible for submitting the Tax Exempt Purchase Certificate Form for real property projects on behalf of the Owner.

Florida

NOTICE OF COMMENCEMENT

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

Before commencing the Project, Contractor shall record a notice of commencement in the clerk's

office and post a certified copy thereof. The notice of commencement shall substantially comply with the form in Florida Statutes 713.13 and contain the following information:

1. A description sufficient for identification of the real property to be improved. The description should include the legal description of the property and also should include the street address and tax folio number of the property if available or, if there is no street address available, such additional information as will describe the physical location of the real property to be improved.
2. A general description of the improvement.
3. The name and address of the owner, the owner's interest in the site of the improvement, and the name and address of the fee simple titleholder, if other than such owner. A lessee who contracts for the improvements is an owner as defined under Florida Statutes s. 713.01(23) and must be listed as the owner together with a statement that the ownership interest is a leasehold interest.
4. The name and address of the contractor.
5. The name and address of the surety on the payment bond under Florida Statutes s. 713.23, if any, and the amount of such bond.
6. The name and address of any person making a loan for the construction of the improvements.
7. The name and address within the state of a person other than himself or herself who may be designated by the owner as the person upon whom notices or other documents may be served under this part; and service upon the person so designated constitutes service upon the owner.

Georgia

N/A

Hawaii

N/A

Idaho

N/A

Illinois

ILLINOIS STATE CONTRACTOR TO PROVIDE NOTICE OF SUBCONTRACTORS:

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

Contractor shall provide to Owner a statement of names and addresses of all those furnishing for this Project labor, services, material, fixtures, apparatus or machinery, and form or forms work, as well as the amounts due or to become due to such persons / entities. Such notice shall be in writing and under oath or verified by affidavit. Notwithstanding any provision to the contrary, Owner is not required to make payments to Contractor until Contractor provides Owner sufficient evidence of Contractor's compliance with this notice requirement.

ILLINOIS STATE SALES TAX:

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

1. Sales of materials to construction contractors for incorporation into the Owner's real estate may be exempt from Illinois state sales tax. (Sales of tools, fuel, lumber for forms, and other end use or consumption items to contractors who do not incorporate these items into real estate are subject to Illinois state sales tax.)

2. Contractor will obtain and provide subcontractors and suppliers with a certificate that
    - States the construction contractor's purchases are for conversion into real estate under a contract with the Owner;
    - Identifies the Owner by name and address; and

- States on what date the contract was entered into.

The Contractor will also provide subcontractors and suppliers with the sales tax exemption number for Owner. The Owner's sales tax exemption number for the State of Illinois is E9986-4045-06.

Indiana

INDIANA STATE SALES TAX:

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

1. Purchase of materials and supplies might be exempt from Indiana state sales tax. In the event that the Project qualifies for a sales and use tax exemption, the Owner's sales tax exemption number for the State of Indiana is 7343965.

Iowa

N/A

Kansas

KANSAS STATE SALES TAX:

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

1. Upon obtaining a certificate of tax exemption for the project, an exemption from Kansas state sales tax should be allowed for tangible personal property and services purchased by Contractor for the project. Purchases of construction machinery, equipment or tools for the project are not exempt but rather are subject to state sales tax.

2. Prior to beginning work on the project, Contractor will assist the Owner in making a timely application to the State for a certificate of tax exemption for the project. After the certificate of tax exemption is obtained from the State, Contractor will furnish the number of the certificate to all suppliers from whom it makes purchases; and all such suppliers shall execute invoices covering the items purchased bearing the number of such certificate. In addition, upon completion of the project, Contractor will timely furnish to Owner a sworn statement (on the form provided by the Kansas Director of Taxation) that all purchases made under such exemption certificate were entitled to the tax exemption. All invoices for such tax exempt purchases shall be held by Contactor for a period of five years.

Kentucky

N/A

Louisiana

N/A

Maine

MAINE STATE SALES TAX:

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

1. The General Contractor should be exempt from Maine state sales tax on its purchases for this project.

2. The Owner's tax exempt number is 20460.

Maryland

MARYLAND STATE SALES TAX:

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

1. The General Contractor should be exempt from Maryland state sales tax on its purchases for this project.

2. The Owner's tax exempt number is 29020063.

Massachusetts

MASSACHUSETTS STATE SALES TAX:

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

1. The General Contractor and its subcontractors should be exempt from Massachusetts state sales tax on purchases for this project. Contractors will obtain and complete state form ST-5C and submit it to Owner for signature and return. Contractor will then use the completed Purchase Certificate in making purchases for this Project.

2. The Owner's tax exempt number is E870-234-341.

Michigan

NOTICE OF COMMENCEMENT

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

Before commencing the Project, Contractor shall record a Notice of Commencement in the office of the register of deeds for each county in which the real property to be improved is located and post a copy thereof in a conspicuous place on the property. The notice of commencement shall substantially comply with the form in Michigan Compiled Laws 570.1108 and contain the following information:

1. The legal description of the real property on which the improvement is to be made conforming with Michigan Compiled Laws sections 560.212 and 560.255.
2. The name, address, and capacity of the signor for the Owner.
3. The name and address of Owner's designee signing on behalf of Owner.
4. The name and address of the general contractor, if any.
5. The following statement:

   To lien claimants and subsequent purchasers:

   Take notice that work is about to commence on an improvement to the real property described in this instrument. A person having a construction lien may preserve the lien by providing a notice of furnishing to the above-named designee and the general contractor, if any, and by timely recording a claim of lien, in accordance with law.

   A person having a construction lien arising by virtue of work performed on this improvement should refer to the name of the Owner or lessee and the legal description appearing in this Notice. A person subsequently acquiring an interest in the land described is not required to be named in a claim of lien.

   A copy of this Notice with an attached form for notice of furnishing may be obtained upon making a written request by certified mail to the above-named Owner or lessee; the designee; or the person with whom you have contracted.
6. The name and address of the person preparing the Notice.
7. An affidavit of the Owner or the agent of the Owner which verifies the Notice.

Contractor must provide to Owner a copy of the Notice as well as prepare and provide to Owner the Affidavit verifying the Notice for Owner's signature no later than seven (7) days prior to the time Contractor needs to receive the Affidavit back from Owner in order for Contractor to timely finalize and record the Notice of Commencement with its attachments.

In addition to recording and posting the Notice of Commencement, Contractor shall provide the Notice of

Commencement and a blank notice of furnishing (described in Michigan Compiled Laws 570.1108), from time to time, to the property Owner as well as all subcontractors, laborers, or suppliers who request the Notice of Commencement.

CONTRACTOR TO PROVIDE SWORN STATEMENTS

Notwithstanding all other terms and conditions of the Contract Documents, Owner has the right (but no obligation) to require Contractor to submit to Owner a sworn statement that complies with Michigan Compiled Laws 570.1110 prior to the time payment is due or otherwise from time to time.

Minnesota

N/A

Mississippi

N/A

Missouri

MISSOURI STATE SALES TAX:

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

1. The Church of Jesus Christ of Latter-day Saints is a Religious Organization exempt from sales tax in accordance with Section 144.062 RSMO as modified by the 1994 Missouri General Assembly.

2. The Owner will furnish a 'Missouri Project Exemption Certificate' and a MO Tax Exemption Letter' to the Contractor.

3. The Owner's tax exempt number is 12473863.

Montana

N/A

Nebraska

NEBRASKA STATE SALES TAX:

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

1. Pursuant to applicable laws, Contractor will make application to The Nebraska Department of Revenue to act as prime contractor for approval to use Owner's tax exempt number to permit the purchase of building materials for construction of this Project without payment of sales and use tax. Contractor may delegate its authority to its subcontractors as allowed by law to act as the purchasing agent for tax exemption purposes. Subcontractors shall follow the same application and compliance requirements as the Contractor. Applications will be on forms provided by The Nebraska Department of Revenue.

2. Prior to start of construction, Contractor will furnish copies of the submitted application forms to Owner.

Nevada

NEVADA 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 108.228 Nevada Revised Statutes, Contractor shall, on behalf of the Owner, file with the office of the county recorder of the county where the property is located, and copy to Owner, a notice

of completion which shall include, without limitation, the following:

1. The date of completion of the work of improvement;
2. The owner's name, the address of the owner, and the nature of the title of any person signing the notice;
3. A description of the property sufficient for identification;
4. The name of the prime contractor or contractors, if any.

Contractor shall verify the notice of completion on the Owner's behalf.

B. Upon recording the notice, Contractor shall within ten (10) days deliver a copy of the notice by certified mail to each prime contractor and each potential lien claimant who, before the notice was recorded, either submitted a request to the owner to receive the notice or delivered a preliminary notice of right to lien.

C. 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.

N/A

New Hampshire

N/A

New Jersey

NEW JERSEY STATE SALES TAX:

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

1. The General Contractor should be exempt from New Jersey state sales tax on its purchases for this project.

2. The Owner's tax exempt number is EO-237-300-405.

New Mexico

NEW MEXICO STATE PROGRESS PAYMENT AND FINAL PAYMENT:

Replace section 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. Not more than once each month, Contractor will submit a payment request to Owner. Owner will pay Contractor for work completed within twenty-one (21) days after the following:
   (1) Owner receives Contractor's undisputed payment request for work to date;
   (2) Owner receives 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) Contractor has obtained releases of all mechanics' liens and claims of subcontractors, laborers, or material suppliers who supplied labor and/or materials for the Work covered by the payment request.

c. Owner may modify or reject the payment request if, in Owner's opinion, the Work for which payment is requested is not acceptable or is less complete than represented on the payment request.

d. Owner will make full and final payment within twenty-one (21) days of the completion of all of the following requirements:
    1. Contractor has submitted to Owner Contractor's final payment request;
    2. Architect, if any, has declared to Owner in writing that the Work is complete; and
    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 provided to Owner all manufacturers' and other warranties and guaranties, properly signed and endorsed to Owner. (Delivery of such guaranties and warranties will not relieve Contractor of any obligation assumed under any other provision of the Contract Documents.)

NEW MEXICO STATE PAYMENT OF SUBCONTRACTORS AND MATERIALMEN:

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

11. **Payment of Subcontractors and Materialmen.** Contractor will promptly pay for all labor, materials, and equipment used to perform the Work. Contractor agrees to make prompt payment to its subcontractors within seven (7) days of Contractor's 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 payment was made by Owner. Failure of Contractor to make payment within that seven (7) day period will subject Contractor to pay interest to its subcontractors on the undisputed amount at one and one-half percent per month or fraction of a month until payment is issued. Contractor agrees to require of its subcontractors that they make prompt payment to their subcontractors within seven (7) days of their receipt of payment from the Contractor for that portion of the funds received which represents their subcontractor's portion of the Work completed and to be subject to interest at one and one-half percent per month on undisputed amounts not paid to their subcontractors within that seven (7) day period.

New York

NEW YORK STATE SALES TAX:

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

1. Exemption from tax is allowed for materials sold to the Contractor for this project. For equipment rentals as well as any materials not used in the building, the Contractor is subject to New York sales tax.

2. The Owner's tax exempt number is 105318.

North Carolina

NORTH CAROLINA STATE SALES TAX:

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

1. At end of each calendar quarter, Contractor will provide Owner with the following information from invoices for materials and sub-contract work where North Carolina sales tax has been paid:
    a. Date of invoice
    b. Amount of tax
    c. Name and address of person or company.

LIEN AGENT

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

Where the Contract Sum exceeds Thirty Thousand Dollars ($30,000), Contractor on behalf of Owner

shall, simultaneous with the execution of the Agreement and at Contractor's sole expense, obtain and maintain throughout the duration of the Project a lien agent for the Project in satisfaction of North Carolina statutes G.S. § 44A-11.1 & § 44A-11.2. In addition, Contractor shall satisfy all notice requirements under applicable law regarding the lien agent, including, without limitation, providing written information of the lien agent in the building permit and/or on a sign posted and maintained on the Project Site.

North Dakota

N/A

Ohio

OHIO STATE SALES TAX:

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

1. Contractor's purchases of materials to be used for this project should be exempt from Ohio state sales tax. Contractor will issue exemption certificates to suppliers.

OHIO STATE NOTICE OF COMMENCEMENT:

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

1. In accordance with State of Ohio lien laws, Owner may file Notice of Commencement with the County Recorder of the county in which the Project is located and provide a copy of that notice to Contractor. Contractor will be responsible for distributing notice to subcontractors and suppliers.

Oklahoma

OKLAHOMA STATE SALES TAX

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

1. The General Contractor and its subcontractors should be exempt from Oklahoma state sales tax on purchases for this project.
2. The Owner will provide a copy of its exemption documentation.
3. In compliance with Oklahoma Rule 710:65-7-13, Contractor will, on the face of each invoice or sales receipt, set out the name of the Owner, that the purchases are being made on behalf of the Owner, and that the purchases are necessary for the completion of the Agreement.

Oregon

N/A

Pennsylvania

PENNSYLVANIA STATE SALES TAX:

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

1. Sales of certain materials to construction contractors for incorporation into the Owner's real estate may be exempt from Pennsylvania state sales tax. Pennsylvania law 72 P.S. § 7201 allows construction contractors to claim the Owner's sales tax exemption for "Building Machinery and Equipment" that is transferred pursuant to the construction contract to the Owner. "Building Machinery and Equipment" is "[g]eneration equipment, storage equipment, conditioning equipment, distribution equipment and termination equipment" limited to the following:
    i. air conditioning limited to heating, cooling, purification, humidification, dehumidification and ventilation;

ii. electrical;
iii. plumbing;
iv. communications limited to voice, video, data, sound, master clock and noise abatement;
v. alarms limited to fire, security and detection;
vi. control system limited to energy management, traffic and parking lot and building access;
vii. medical system limited to diagnosis and treatment equipment, medical gas, nurse call and doctor paging;
viii. laboratory system;
ix. cathodic protection system; or
x. furniture, cabinetry and kitchen equipment.

The definition also explicitly includes: boilers, chillers, air cleaners, humidifiers, fans, switchgear, pumps, telephones, speakers, horns, motion detectors, dampers, actuators, grills, registers, traffic signals, sensors, card access devices, guardrails, medial devices, floor troughs and grates and laundry equipment, together with integral coverings and enclosures, whether or not the item constitutes a fixture or is otherwise affixed to the real estate whether or not damage would be done to the item or its surroundings upon removal or whether or not the item is physically located within a real estate structure.

However, the term "building machinery and equipment" shall not include guardrail posts, pipes, fittings, pipe supports and hangers, valves, underground tanks, wire, conduit, receptacle and junction boxes, insulation, ductwork and coverings thereof.

2. Contractor will obtain and provide subcontractors with Pennsylvania Exemption Certificates—Pennsylvania Form Rev-1220 AS—to be filled out and used when purchasing tax-exempt “Building Machinery and Equipment” for the project. For purposes of filling out Form Rev-1220 AS, the Owner’s tax exempt number is 75-259-773.

3. If Contractor or any subcontractor fails to obtain a sales-tax exemption when purchasing “Building Machinery and Equipment,” the Contractor or subcontractor shall be responsible for seeking its own refund of sales tax expending by filing a Refund Petition with the Pennsylvania Department of Revenue Board of Appeals.

Rhode Island

RHODE ISLAND STATE SALES TAX:

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

1. Exemption from Rhode Island state sales tax should be allowed for materials purchased by Contractor for this project. Equipment rentals as well as materials not used in the building are subject to state sales tax.

2. The Owner’s tax exempt number is 11034.

South Carolina

N/A

South Dakota

N/A

Tennessee

N/A

Texas

TEXAS STATE SALES TAX:

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

1. The Church of Jesus Christ of Latter-day Saints is a Religious Organization exempt from sales tax under Texas Tax Code §151.310. The general Contractor, when purchasing materials and equipment for this Project, should advise the vendors that Owner is an exempt organization and that no sales tax will be paid.

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.

Vermont

VERMONT STATE SALES TAX:

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

1. Purchases of building materials and supplies should be exempt from Vermont state sales tax if those materials and supplies are consumed in the construction of this Project.

2. The Owner’s tax exempt number is 450-870234341F-01.

Virginia

N/A

Washington

WASHINGTON STATE CONTRACTOR DISCLOSURE NOTICE:

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

1. For Projects in state of Washington, the Contractor will provide a 'job site' disclosure notice in accordance with Statute 60.04.230. Contractor will post this notice at the job site. This notice will detail the following:
   a. Legal description and street address of the construction site.
   b. Property Owner's name address, and phone number as shown in the Contract Documents.
   c. Contractor's registration number and identification.
   d. Contractor's business name, address, and telephone number.

West Virginia

N/A

Wisconsin

N/A

Wyoming

N/A

END OF DOCUMENT

DIVISION 01

SECTION 01 0000

GENERAL REQUIREMENTS: R&I PROJECT

SECTION 01 1000 SUMMARY

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

SECTION 01 1200 MULTIPLE CONTRACT SUMMARY

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

SECTION 01 1400 WORK RESTRICTIONS

A. Project Conditions:
   1. During construction period, Contractor will have use of premises for construction operations. Contractor will ensure that Contractor, its employees, subcontractors, and employees comply with following requirements:
      a. Confine operations to areas within Contract limits shown on Drawings. Do not disturb portions of site beyond Contract limits.
      b. Do not allow alcoholic beverages, illegal drugs, or persons under their influence on Project Site.
      c. Do not allow use of tobacco in any form on Project Site.
      d. Do not allow pornographic or other indecent materials on site.
      e. Do not allow work on Project Site on Sundays except for emergency work.
      f. Refrain from using profanity or being discourteous or uncivil to others on Project Site or while performing The Work.
      g. Wear shirts with sleeves, wear shoes, and refrain from wearing immodest, offensive, or obnoxious clothing, while on Project Site.
      h. Do not allow playing of obnoxious and loud music on Project Site. Do not allow playing of any music within existing facilities.
      i. Do not build fires on Project Site.
      j. Do not allow weapons on Project Site, except those carried by law enforcement officers and/or other uniformed security personnel who have been retained by Owner or Contractor to provide security services.
   2. Existing Facilities:
      a. If Owner will occupy existing building, reasonably accommodate use of existing facilities by Owner.

SECTION 01 3100 PROJECT MANAGEMENT AND COORDINATION

A. Multiple Contract Coordination:
   1. Contractor shall be responsible for coordination of Temporary Facilities and Controls, Construction Waste Management and Disposal services, and Final Cleaning for entire Project unless directed otherwise by

Owner's Representative for those who perform work on Project from Notice to Proceed to date of Substantial Completion.

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

SECTION 01 3300 SUBMITTAL PROCEDURES

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

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

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

D. Closeout Submittals:
   1. Submittals that occur during project closeout.

SECTION 01 3500 SPECIAL PROCEDURES

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

SECTION 01 4000 QUALITY REQUIREMENTS

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

a. Quantity or quality level shown or specified shall be the minimum provided or performed. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits.

3. Submit to Owner permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records establishing compliance with standards and regulations bearing upon performance of the Work.

B. Quality Assurance:
1. Testing and inspecting services are used to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
2. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to verify compliance and guard against defects and deficiencies and substantiate that proposed construction will comply with requirements. Owner or Owner's designated representative(s) will perform quality assurance to verify compliance with Contract Documents.
3. Notify Owner immediately if asbestos-containing materials or other hazardous materials are encountered while performing the Work.

C. Quality Control:
1. Quality Control Services:
a. Quality Control will be sole responsibility of Contractor.
1) Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements performed by Contractor.
a) They do not include inspections, tests or related actions performed by Architect or Owner Representative, governing authorities or independent agencies hired by Owner or Architect.
b) Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
2) Where services are indicated as Contractor's responsibility, engage qualified Testing Agency to perform these quality control services:
a) Contractor will not employ same testing entity engaged by Owner, without Owner's written approval.

D. Repair And Protection:
1. On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
2. Protect construction exposed by or for Quality Assurance and Quality Control activities.
3. Repair and protection are Contractor's responsibility, regardless of assignment of responsibility for Quality Assurance and Quality Control Services.

SECTION 01 4301 QUALITY ASSURANCE - QUALIFICATIONS

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

a. Authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

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

SECTION 01 4523 TESTING AND INSPECTION SERVICES

A. Submittals:
   1. Certificates: Testing Agency will submit certified written report of each inspection, test, or similar service.
   2. Tests and Evaluation Reports:
      a. Testing Agency or Agencies will prepare logs, test reports, and certificates applicable to specific tests and inspections and deliver copies to Owner's Representative and to each of following if involved on project: Architect, Consulting Engineers (Engineer of Record), General Contractor, Authorities Having Jurisdiction (if required).
   3. Testing Agency:
      a. Qualifications of Testing Agency management, personnel, inspector and technicians designated to project.
      b. Provide procedures for non-destructive testing, equipment calibration records, personnel training records, welding inspection, bolting inspection, shear connector stud inspection, and seismic connection inspections.

B. Quality Assurance:
   1. Owner or Owner's designated representative(s) will perform quality assurance. Owner's quality assurance procedures may include observations, inspections, testing, verification, monitoring and any other procedures deemed necessary by Owner to verify compliance with Contract Documents.

2. Owner will employ independent Testing Agencies to perform certain specified testing, as Owner deems necessary.
3. Certification:
   a. Product producers and associations, which have instituted approved systems of quality control and which have been approved by document approval agencies, are not required to have further testing.
   b. Concrete mixing plants, plants producing fabricated concrete and wood or plywood products certified by agency, lumber, plywood grade marked by approved associates, and materials or equipment bearing underwriters' laboratory labels require no further testing and inspection.
4. Written Practice for Quality Assurance:
   a. Testing Agency will maintain written practice for selection and administration of inspection personnel, describing training, experience, and examination requirements for qualification and certification of inspection personnel.
   b. Written practice will describe testing agency procedures for determining acceptability of structure in accordance with applicable codes, standards, and specifications.
   c. Written practice will describe Testing Agency inspection procedures, including general inspection, material controls, visual welding inspection, and bolting inspection.

C. Quality Control:
1. Quality Control will be sole responsibility of Contractor. Contractor will be responsible for testing, coordination, start-up, operational checkout, and commissioning of all items of the Work included in Project. All costs for these services will be included in Contractor's cost of the Work.
2. Notify results of all Testing and Inspection performed by Contractor's independent Testing Agencies to Architect and/or Owner's Representative within 24 hours of test or inspection having been performed:
   a. Testing and Inspection Reports will be distributed as follows:
      1) 1 copy to Owner's Representative.
      2) 1 copy to Architect.
      3) 1 copy to Consulting Engineer(s) (Engineer of Record).
      4) 1 copy to Authorities Having Jurisdiction (if required).
3. Contractor's Responsibility:
   a. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents.
   b. Tests and inspections that are not explicitly assigned to Owner are responsibility of Contractor.
   c. Cooperate with Testing Agency(s) performing required inspections, tests, and similar services and provide reasonable auxiliary services as requested. Notify Testing Agency before operations to allow assignment of personnel. Auxiliary services required include but are not limited to:
      1) Providing access to the Work and furnishing incidental labor, equipment, and facilities deemed necessary by Testing Agency to facilitate inspections and tests at no additional cost to Owner.
      2) Taking adequate quantities of representative samples of materials that require testing or helping Testing Agency in taking samples.
      3) Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
      4) Providing Testing Agency with preliminary design mix proposed for use for materials mixes that require control by Testing Agency.
   d. For any requested inspection, Contractor will complete prior inspections to ensure that items are ready for inspection.
   e. All Work is subject to testing and inspection and verification of correct operation.
   f. Comply:
      1) Upon completion of Testing Agency's inspection, testing, sample-taking, and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
      2) Comply with Contract Documents in making such repairs.
   g. Data:
      1) Furnish records, drawings, certificates, and similar data as may be required by testing and inspection personnel to assure compliance with Contract Documents.
   h. Defective Work (Non-Conforming Work): Non-conforming Work as covered in General Conditions applies, but is not limited to following requirements Protection:
      1) Where results of inspections, tests, or similar services show that the Work does not comply with Contract Document requirements, correct deficiencies in the Work promptly to avoid work delays.
      2) Where testing personnel take cores or cut-outs to verify compliance, repair prior to acceptance.

3) Contractor will be responsible for any and all costs incurred resulting from inspection that was scheduled prematurely or retesting due to failed tests.
4) Remove and replace any Work found defective or not complying with contract document requirements at no additional cost to Owner.
5) Should test return unacceptable results, Contractor will bear all costs of retesting and re-inspection as well as cost of all material consumed by testing, and replacement of unsatisfactory material and/or workmanship.

i. Protection:
1) Protect construction exposed by or for quality assurance and quality control service activities, and protect repaired construction.

j. Scheduling: Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities:
1) Schedule testing and inspections in advance so as not to delay the Work and to eliminate any need to uncover the Work for testing or inspection.
2) Notify Testing Agency and Architect or Owner as noted in Sections in Division 01 thru Division 50 prior to any time required for such services.
3) Incorporate adequate time for performance of all inspections and correction of noted deficiencies.
4) Schedule sequence of activities to accommodate required services with minimum of delay.
5) Schedule sequence of activities to avoid necessity of removing and replacing construction to accommodate testing and inspections.

k. Test and Inspection Log:
1) Provide system of tracking all field reports, describing items noted, and resolution of each item. Prepare record of tests and inspections. Include following requirements:
(a) Date test or inspection was conducted.
(b) Description of the Work tested or inspected.
(c) Date test or inspection results were transmitted to Architect or Owner Representative.
(d) Identification of Testing Agency or inspector conducting test or inspection.
2) Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's or Owner’s reference during normal working hours.

D. Tests And Inspections - General:
1. Testing specifically identified to be conducted by Owner, will be performed by an independent entity and will be arranged and paid for by Owner.
2. Individual Sections in Division 01 through Division 50 indicate if Owner will provide testing and inspection of the Work of that Section.
3. Owner may engage additional consultants for testing, air balancing, commissioning, or other special services:
a. Activities of any such Owner consultants are in addition to Contractor testing of materials or systems necessary to prove that performance is in compliance with Contract requirements.
b. Contractor must cooperate with persons and firms engaged in these activities.
4. Tests include but not limited to those described in detail in 'Field Quality Control' in Part 3 of Individual Sections in Divisions 01 through Division 50.
5. Taking Specimens:
a. Only testing laboratory shall secure, handle, transport, or store any samples and specimens for testing.
6. Scheduling Testing Agency:
a. Contractor will coordinate the Work and facilitate timeliness of such testing and inspecting services so as not to delay the Work.
b. Contractor will notify Testing Agency and Architect or Owner Representative to schedule tests and / or inspections.

E. Testing Agency Services And Responsibility:
1. Testing Agency, including independent testing laboratories, will be licensed and authorized to operate in jurisdiction in which Project is located:
a. Approved Testing Agency Qualifications: Requirements of Section 01 4301 apply.
2. Testing and Inspection Services:
a. Testing Agency will not release, revoke, alter, or increase Contract Document requirements or approve or accept any portion of the Work.
b. Testing Agency will not give direction or instruction to Contractor.

c. Testing Agency will have full authority to see that the Work is performed in strict accordance with requirements of Contract Documents and directions of Owner's Representative and/or Architect.
d. Testing Agency will not provide additional testing and inspection services beyond scope of the Work without prior approval of Owner's Representative and/or Architect.

3. Testing Agency Duties:
   a. Independent Testing Agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual specification Sections will cooperate with Architect or Owner Representative and Contractor in performance of its duties and will provide qualified personnel to perform required inspections and tests.
   b. Testing Agency will test or obtain certificates of tests of materials and methods of construction, as described herein or elsewhere in technical specification.
   c. Testing Agency will provide management, personnel, equipment, and services necessary to perform testing functions as outlined in this section.
   d. Testing Agency must have experience and capability to conduct testing and inspecting indicated by ASTM standards and that specializes in types of tests and inspections to be performed.
   e. Testing Agency will comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, ASTM D3666, ASTM D3740, and other relevant ASTM standards.
   f. Testing Agency must calibrate all testing equipment at reasonable intervals (minimum yearly) with accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.
   g. Welding Procedure Review: Testing Agency will provide review and approval or rejection of all welding procedures to be used and verify compliance with all reference standard requirements.
4. Testing and Inspection Reports:
   a. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
   b. Laboratory Reports: Testing Agency will furnish reports of materials and construction as required, including:
      1) Description of method of test.
      2) Identification of sample and portion of the Work tested:
         (a) Description of location in the Work of sample.
         (b) Time and date when sample was obtained.
         (c) Weather and climatic conditions at time when sample was obtained.
      3) Evaluation of results of tests including recommendations for action.
   c. Inspection Reports:
      1) Testing Agency will furnish "Inspection at Site" reports for each site visit documenting activities, observations, and inspections.
      2) Include notation of weather and climatic conditions, time and date conditions and status of the Work, actions taken, and recommendations or evaluation of the Work.
   d. Reporting Testing and Inspection (Conforming Work):
      1) Submit testing and inspection reports as required within twenty four (24) hours of test or inspection having been performed.
   e. Reporting Testing and Inspection Defective Work (Non-Conforming Work):
      1) Testing Agency, upon determination of irregularities, deficiencies observed or test failure(s) observed in the Work during performance of its services of test or inspection having been performed, will:
         (a) Verbally notify results to Architect, Contractor, and Owner's Representative within one hour of test or inspection having been performed (if Defective Work (Non-Conforming Work) is incorporated into project).
         (b) Submit written inspection report and test results as required within twenty four (24) hours of test or inspection having been performed.
   f. Final Report:
      1) Submit final report of tests and inspections at Substantial Completion, which identify unresolved deficiencies.

F. Architect's Responsibility:
   1. Architect Duties:
      a. Notify Owner's Representative before each test and/or inspection:

G. Field Quality Control:
   1. Field Tests And Inspections:

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

SECTION 01 6100 COMMON PRODUCT REQUIREMENTS

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

SECTION 01 6200 PRODUCT OPTIONS

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

SECTION 01 6600 DELIVERY, STORAGE, AND HANDLING REQUIREMENTS

A. Administrative Requirements:
   1. Deliver, store, and handle products according to manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.

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

SECTION 01 7000 EXECUTION REQUIREMENTS

A. Administrative Requirements:
   1. Require installer of each major component to inspect both substrate and conditions under which the Work is to be done:
      a. Notify Owner in writing of unsatisfactory conditions.
      b. Do not proceed until unsatisfactory conditions have been corrected.

B. Common Installation Provisions:
   1. Provide attachment and connection devices and methods necessary for securing the Work:
      a. Secure the Work true to line and level.
      b. Allow for expansion and building movement.
   2. Recheck measurements and dimensions before starting each installation.
   3. Design, furnish, and install all shoring, bracing, and sheathing as required for safety and for proper execution of the Work and, unless otherwise required, remove same when the Work is completed.
   4. Where mounting heights are not shown, install individual components at standard mounting heights recognized within industry or local codes for that application. Refer questionable mounting height decisions to Owner for final decision.

C. Protection:
   1. Cover and protect furniture, equipment, and fixtures from soiling and damage when demolition the Work is performed in rooms and areas from which such items have not been removed.

D. Completion Inspection:
   1. Upon 100 percent completion of Project, Contractor will request Substantial Completion Inspection.
   2. Owner will conduct Substantial Completion Inspection in presence of Contractor and furnish list of items to be corrected.
   3. Contractor will notify Owner in writing when items have been corrected.

SECTION 01 7400 CLEANING AND WASTE MANAGEMENT

A. Disposal Of Waste:
   1. Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in landfill or incinerator acceptable to authorities having jurisdiction:

a. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
b. Remove and transport debris in manner that will prevent spillage on adjacent surfaces and areas.
2. Burning: Do not burn waste materials.
3. Disposal: Transport waste materials off Owner's property and legally dispose of them.

B. Progress Cleaning:
1. Keep premises broom-clean during progress of the Work.
2. During handling and installation, protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from soiling, damage, or deterioration until Substantial Completion.
3. Clean and maintain completed construction as frequently as necessary throughout construction period.
4. Remove waste materials and rubbish caused by employees, subcontractors, and contractors under separate contract with Owner and dispose of legally.

C. Final Cleaning:
1. Clean each surface or unit to condition expected in normal, commercial-building cleaning and maintenance program. Comply with manufacturer's instructions. Remove all rubbish from under and about building and leave building clean and habitable.
2. In addition to general cleaning noted above, perform cleaning for all trades at completion of the Work in areas where construction activities have occurred.
3. If Contractor fails to clean up, Owner may do so and charge cost to Contractor.

SECTION 01 7700 CLOSEOUT PROCEDURES

A. General:
1. Closeout process consists of three specific project closeout inspections. Contractor shall plan sufficient time in construction schedule to allow for required inspections before expiration of Contract Time.
2. Contractor shall conduct his own inspections of The Work and shall not request closeout inspections until The Work of the contract is reasonably complete and correction of obvious defects or omissions are complete or imminent.
3. Date of Substantial Completion shall not occur until completion of construction work, unless agreed to by Architect / Owner's Representative and included on Certificate of Substantial Completion.

B. Preliminary Closeout Review:
1. When Architect, Owner and Contractor agree that project is ready for closeout, Pre-Substantial Inspection shall be scheduled. Preparation of floor substrate to receive carpeting and any work which could conceivably damage or stain carpet must be completed, as carpet installation will be scheduled immediately following this inspection.
2. Prior to this inspection, completed test and evaluation reports for HVAC system and font, where one occurs, are to be provided to Project Manager, Architect, and applicable consultants.
3. Architect, Owner and Contractor review completion of punch list items. When Owner and Architect confirm that Contractor has achieved Substantial Completion of The Work, Owner, Architect and Contractor will execute Certificate of Substantial Completion that contains:
a. Punch list of items requiring completion and correction will be created.
b. Time frame for completion of punch list items will be established, and date for Substantial Completion Inspection shall be set.

C. Substantial Completion Inspection:
1. When Architect, Owner and Contractor agree that project is ready for Substantial Completion, an inspection is held. Punch list created at Pre-Substantial Inspection is to be substantially complete.
2. Prior to this inspection, Contractor shall discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups and similar elements.
3. Architect, Owner and Contractor review completion of punch list items. When Owner and Architect confirm that Contractor has achieved Substantial Completion of The Work, Owner, Architect and Contractor will execute Certificate of Substantial Completion that contains:
a. Date of Substantial Completion.
b. Punch List Work not yet completed, including seasonal and long lead items.
c. Amount to be withheld for completion of Punch List Work.
d. Time period for completion of Punch List Work.

e. Amount of liquidated damages set forth in Supplementary Conditions to be assessed if Contractor fails to complete Punch List Work within time set forth in Certificate.

4. Contractor shall present Closeout Submittals to Architect and place tools, spare parts, extra stock, and similar items required by Contract Documents in locations as directed by Facilities Manager.

D. Final Acceptance Meeting:
1. When punch list items except for any seasonal items or long lead items which will not prohibit occupancy are completed, Final Acceptance Meeting is held.
2. Owner, Architect and Contractor execute Owner's Project Closeout - Final Acceptance form, and verify:
a. All seasonal and long lead items not prohibiting occupancy, if any, are identified, with committed to completion date and amount to be withheld until completion.
b. Owner's maintenance personnel have been instructed on all system operation and maintenance as required by the Contract Documents.
c. Final cleaning requirements have been completed.
3. If applicable, once any seasonal and long lead items are completed, Closeout Inspection is held where Owner and Architect verify that The Work has been satisfactorily completed, and Owner, Architect and Contractor execute Closeout portion of the Project Closeout - Final Acceptance form.
4. When Owner and Architect confirm that The Work is satisfactorily completed, Architect will authorize final payment.

SECTION 01 7800 CLOSEOUT SUBMITTALS

A. Administrative Requirements:
1. Project Record Documents:
a. Do not use record documents for construction purposes:
1) Protect from deterioration and loss in secure, fire-resistive location.
2) Provide access to record documents for reference during normal Working hours.
b. Maintain clean, undamaged set of Drawings. Mark set to show actual installation where installation varies from the Work as originally shown. Give particular attention to concealed elements that would be difficult to measure and record at later date:
1) Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
2) Mark new information that is important to Owner, but was not shown on Contract Drawings.
3) Note related Change Order numbers where applicable.
2. As Built Record Drawings:
a. Provide two full-size sets of prints and PDF file of As Built Record Drawings to Facilities Management Office, printed from the updated AutoCAD drawing files or updated Revit model files, as specified by Owner, that have been modified to show actual dimensions and location of equipment, material, utility lines, and other work as actually constructed, based upon information provided by Contractor. Architect will submit updated As Built Record Drawings in PDF (ISO32000 format) to Owner. In addition, Architect will submit to Owner updated AutoCAD as built record drawing files with associated plot style tables or the Revit as built record model files, as specified by Owner.

B. Operations And Maintenance Manual:
1. General:
a. Include closeout submittal documentation as required by Contract Documentation. Include only closeout submittals as defined in individual specification section.
b. Submittal Format: Digital copies unless otherwise noted, required for each individual specification section that include 'Closeout Submittals'.
2. Project Manual:
c. Copy of complete Project Manual including Addenda, Modifications as defined in General Conditions, and other interpretations issued during construction:
(1) Mark these documents to show variations in actual Work performed in comparison with text of specifications and Modifications.
(2) Show substitutions, selection of options, and similar information, particularly on elements that are concealed or cannot otherwise be readily discerned later by direct observation.
3. Maintenance Contracts: (digital format only).
4. Operations and Maintenance Data (digital format only):

a. Operations and maintenance submittals includies cleaning instructions, maintenance instructions, operations instructions, equipment list, and parts lists.
5. Warranty Documentation: Digital format of final, executed warranties.
6. Record Documentation:
   a. Documentation includes Certifications, color and pattern selections, Design Date, Geotechnical Evaluation Reports (soils reports), Manufacture Reports, Literature or cut sheets, Shop Drawings, Source Quality Control, Special Procedures, and Testing and Inspection Reports.
7. Software: Audio and Video System software, programming and set-files.
8. Irrigation Plan: Laminated and un-laminated reduced sized hard copies.
9. Landscape Management Plan (LMP):
   a. Irrigation Section:
      (1) Documentation required by Sections under 32 8000 Heading: Irrigation.
   b. Landscaping Section:
      (1) Documentation required by Sections under 32 8000 Heading: Irrigation.

C. Warranties:
1. When written guarantees beyond one (1) year after substantial completion are required by Contract Documents, secure such guarantees and warranties properly addressed and signed in favor of Owner. Include these documents in Operations & Maintenance Manual(s) specified above.
2. Delivery of guarantees and warranties will not relieve Contractor from obligations assumed under other provisions of Contract Documents.

END OF SECTION

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete formwork.

B. Concrete reinforcement.

C. Joint devices associated with concrete work.

D. Concrete curing.

1.02 REFERENCE STANDARDS

A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).

B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).

C. ACI 301 - Specifications for Structural Concrete 2016.

D. ACI 302.1R - Guide to Concrete Floor and Slab Construction 2015.

E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).

F. ACI 305R - Guide to Hot Weather Concreting 2010.

G. ACI 306R - Guide to Cold Weather Concreting 2016.

H. ACI 308R - Guide to External Curing of Concrete 2016.

I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary 2014 (Errata 2018).

J. ACI 347R - Guide to Formwork for Concrete 2014, with Errata (2017).

K. ANSI/NFSI B101.1 - Test Method For Measuring Wet SCOF Of Common Hard-Surface Floor Materials 2009.

L. ANSI/NFSI B101.3 - Test Method For Measuring Wet DCOF Of Common Hard-Surface Floor Materials 2012.

M. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished 2018.

N. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.

O. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts 2021a.

P. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2020.

Q. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars 2017.

R. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement 2019, with Editorial Revision (2020).

S. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.

T. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation 2017.

U. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2012.

V. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.

W. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2020.

X. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2020.

Y. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete 2020.

Z. ASTM C150/C150M - Standard Specification for Portland Cement 2020.

AA. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete 2016.

BB. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method 2016.

CC. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete 2019.

DD. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2019.

EE. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing 2017.

FF. ASTM C779/C779M - Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces 2019.

GG. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures 2016.

HH. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete 2013.

II. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2017.

JJ. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures 2020.

KK. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete 2019.

LL. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2012.

MM. ASTM D471 - Standard Test Method for Rubber Property--Effect of Liquids 2016a.

NN. ASTM D523 - Standard Test Method for Specular Gloss 2014 (Reapproved 2018).

OO. ASTM D8139 - Standard Specification for Semi-Rigid, Closed-Cell Polypropylene Foam, Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction 2017.

PP. ASTM D994/D994M - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type) 2011 (Reapproved 2016).

QQ. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2018.

RR. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction 2018.

SS. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting 2015.

TT. ASTM D3963/D3963M - Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars 2015.

UU. ASTM D5767 - Standard Test Method for Instrumental Measurement of Distinctness-of-Image (DOI) Gloss of Coated Surfaces 2018.

VV. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover 2008a, with Editorial Revision (2013).

WW. ASTM E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers 2014.

XX. ASTM E1155M - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers (Metric) 2014.

YY. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs 2018a.

ZZ. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs 2017.

AAA. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection 2020.

BBB. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.

CCC. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength 2018.

DDD. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2021.

EEE. COE CRD-C 48 - Method of Test for Water Permeability of Concrete 1992.

FFF. COE CRD-C 513 - COE Specifications for Rubber Waterstops 1974.

GGG. COE CRD-C 621 - Handbook for Concrete and Cement Standard Specification for Packaged, Dry 1997.

HHH. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements 2015.

III. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements 2016.

JJJ. ICC-ES AC380 - Acceptance Criteria for Termite Physical Barrier Systems 2014, with Editorial Revision (2017).

KKK. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair 2013.

LLL. NSF 61 - Drinking Water System Components - Health Effects 2019.

MMM. NSF 372 - Drinking Water System Components - Lead Content 2016.

1.03 SUBMITTALS

A. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
   1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
   2. Printed application instructions for form release agents.

B. Mix Design: Submit proposed concrete mix design.
   1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
   2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.

C. Shop Drawings:
   1. Show dimensioned locations of anchor bolts for hold-down anchors and columns.
   2. Show reinforcement and all necessary bending diagrams and reinforcing steel list, and construction joint locations.
   3. Provide bar schedules and bending details.

4. Show all formwork for concrete surfaces which are to remain exposed in the finished work.

D. 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 its 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.
   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.

E. Test Reports: Submit report for each test or series of tests specified.

F. Test Reports: Submit termite-resistant sheet manufacturer's summary of independent laboratory and field testing for effectiveness in subterranean termite exclusion.

G. Manufacturer's Installation Instructions: For concrete accessories and form release agents, indicate installation procedures and interface required with adjacent construction.

H. Manufacturer’s Reports:
   1. Provide Manufacturer's performance and testing data for following:
      a. Each admixture used.

I. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

J. 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:
               (1) Date and time of start of pour, Date and time of end of pour, and Date and time of end of finishing procedures.
               (2) Temperature at start of pour, Temperature at end of Pour, and Maximum temperature during performance of finishing procedures.
               (3) Wind speed at start of pour, Wind speed at end of pour, and Maximum wind speed during performance of finishing procedures.
               (4) Humidity at start of pour, Humidity at end of pour, and High and low humidity during performance of finishing procedures.
               (5) Cloud cover at start of pour, Cloud cover at end of pour, and High and low cloud cover during performance of finishing procedures.
               (6) Screeding method and equipment used.
               (7) Saw cut method and equipment used.
         2) Testing and Inspection Reports:

(a) Testing Agency Testing and Inspecting Reports of concrete.

K. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.04 DEFINITIONS

A. 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.

B. 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.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.
   1. Maintain one copy of each document on site.

B. Qualifications: Requirements of Section 01 4000 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.
      b. Certification for National Ready Mixed Concrete Association (NRMCA).
   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.

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 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.

D. Follow recommendations of ACI 305R when concreting during hot weather.

E. Follow recommendations of ACI 306R when concreting during cold weather.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 CONCRETE FORMWORK

A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
   1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.

2. Form Facing for Exposed Finish Concrete: Steel.
3. Earth Cuts: Do not use earth cuts as forms for vertical surfaces. Natural rock formations that maintain a stable vertical edge may be used as side forms.
   a. Vertical earth cuts may be used for footings provided the footing width and length are 6" wider and longer than scheduled.
4. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
5. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.02 CONCRETE ANCHORS

A. General:
   1. Use hot-dipped galvanized or stainless steel with matching nuts and washers in exterior and moist interior applications unless indicated otherwise on Contract Drawings.
      a. 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.
      b. Nut: Conform to requirements of ASTM A563, Grade A, Hex.
      c. Conform to requirements of ASTM F3125/F3125M for chemical, physical and mechanical requirements for quenched and tempered bolts manufactured from steel and alloy steel.
   2. Reinforcing Bars:
      a. Composed of deformed carbon steel meeting requirements of ASTM A615/A615M, Grade 60 (field bent bars may be Grade 40)

2.03 REINFORCEMENT MATERIALS

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.

B. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
   2. Bar Supports:
      a. Concrete masonry units or bricks are not acceptable.
      b. 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 (CSRI, Class 2).
      c. Acceptable Products:
         1) Concrete 'dobies' or blocks wired to reinforcing.
         2) 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.
   3. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

4. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.04 CONCRETE MATERIALS

A. 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.

B. Cement: ASTM C150/C150M, Type V - Normal Portland type.
   1. Acquire cement for entire project from same source.

C. Concrete mix design: Submit mix designs to meet following requirements:
   1. Mix Type A:
      a. Exterior concrete.
      b. 4500 psi (31.03 MPa) minimum at twenty-eight (28) days. (3150 psi minimum at seven (7) days)
      c. Water / Cementitious Material: 0.45 maximum.
   2. 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.

D. Slump:
   1. 4 inch (100 mm) slump maximum before addition of high range water reducer.
   2. 8 inch (200 mm) slump maximum with use of high range water reducer.

E. General:
   1. Submit a letter on quarry's letterhead that certifies all aggregate for concrete complies with the requirements of this section. Material certificates which are submitted shall be signed by both the materials producer and the contractor, certifying that materials comply with or exceed requirements specified herein to the Architect, Civil and Structural Engineering Consultant and the Independent Testing Laboratory for review and approval.
   2. Aggregates for all concrete shall come from a quarry that is DOT approved and meets or exceeds durability Class I aggregate. The quarry shall submit a letter to Engineer that certifies that all aggregate complies with DOT requirements for durability. Aggregate not meeting DOT durability requirements shall not be used.

F. Fine and Coarse Aggregates: ASTM C33/C33M.
   1. Acquire aggregates for entire project from same source.

G. Fly Ash: ASTM C618, Class C or F.
   1. Not to exceed twenty-five (25) percent of weight of cementitious materials.

H. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.05 ADMIXTURES

A. 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.
   1. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Mix design shall show proposed admixtures, amount, usage instructions, and justification for proposed use. Do not use any admixtures without Architect's written approval.
   1. Chemical accelerator or retarder may be used if necessary to meet environmental conditions and construction schedules.

C. Alkali-Silica Reactivity Inhibiting Admixture:
   1. Specially formulated lithium nitrate admixture for prevention of alkali-silica reactivity (ASR) in concrete. Admixture must have test data indicating conformance to ASTM C1293.
   2. Manufacturer: As approved by Architect before use. See Section 01 6000.

D. Viscosity Modifying Admixture (VMA):
   1. Liquid admixture used to optimize viscosity of Self-Consolidating Concrete (SCC). Subject to compliance with requirements, provide following at dosage rates per manufacturer's recommendations.
   2. Manufacturer: As approved by Architect before use. See Section 01 6000.

E. Air Entraining Admixture: ASTM C260/C260M.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

F. High Range Water Reducing Admixture: ASTM C494/C494 Type F.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

G. High Range Water Reducing and Retarding Admixture (Superplasticizer): ASTM C494/C494M Type G.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

H. Water Reducing Admixture: ASTM C494/C494M Type A.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

I. Water Reducing and Accelerating Admixture: ASTM C494/C494 Type E.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

J. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

K. Accelerating Admixture: ASTM C494/C494M Type C.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

L. Retarding Admixture: ASTM C494/C494M Type B.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

M. Shrinkage Reducing Admixture: ASTM C494/C494M Type S.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

N. Non-Chloride, Non-Corrosive Accelerating Admixture: ASTM C494/C494M Type C or E.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

O. Corrosion Inhibiting Admixture: ASTM C494/C494M Type C and ASTM C1582/C1582M.
   1. 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.
   2. Manufacturer: As approved by Architect before use. See Section 01 6000.

P. Waterproofing Admixture:
   1. Admixture formulated to reduce permeability to liquid water, with no adverse effect on concrete properties.
   2. Admixture Composition: Crystalline, functioning by growth of crystals in capillary pores.
   3. Admixture Composition: Hydrophobic polymer waterproofing and corrosion inhibitor, functioning by closing concrete pores and chemical bonding.
   4. Permeability of Cured Concrete: No measurable leakage when tested in accordance with COE CRD-C 48 at 200 psi; provide test reports.
   5. Potable Water Contact Approval: National Science Foundation (NSF) certification for use on structures holding potable water, based on testing in accordance with NSF 61 and NSF 372.
   6. Manufacturer: As approved by Architect before use. See Section 01 6000.

2.06 BONDING AND JOINTING PRODUCTS

A. Bonding Agents:
   1. Manufacturers: As approved by Architect before use. See Section 01 6000.

B. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
   1. Manufacturers: As approved by Architect before use. See Section 01 6000.

C. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
   1. Material: ASTM D1751, cellulose fiber.
   2. Manufacturers: As approved by Architect before use. See Section 01 6000.

D. 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 (12.7 mm) thick.
         3) Resilience:
            (a) When compressed to half of original thickness, recover to minimum of seventy (70) percent of original thickness.
      b. Manufacturers: As approved by Architect before use. See Section 01 6000.

2.07 CURING MATERIALS

A. Membrane Curing:
   1. 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. VOC-compliant compound.
      c. Meet requirements of ASTM C309 and AASHTO M 148, Type 1 or 1-D, Class B.
      d. Maintain ninety-five (95) percent of mix water present in concrete mass after application.
   3. Horizontal and Vertical Cast-In-Place Structural Concrete:
      a. 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.
            (f) Equal as approved by Architect before use. See Section 01 67000

2.08 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Transit Mixers: Comply with ASTM C94/C94M.

C. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section and 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.

3.02 PREPARATION

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

B. Verify that forms are clean and free of rust before applying release agent.

C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

D. 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 insure 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 subgrade materials, shall be 35 deg F (2 deg C) minimum at time of concrete placement.
         3) Thaw sub-grade 6 inches (150 mm) 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 (32 deg C) in hot weather.
         2) Cool aggregate and subgrades by sprinkling.
         3) Avoid cement over 140 deg F (60 deg C).
         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.

E. Surface Preparation:
1. Earthwork Preparation:
a. Aggregate base and subgrade:
1) Prepare aggregate base as specified in Section 312323.
2) Prepare natural soil subgrade as specified in Section 31 2200.
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.

F. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
1. Use latex bonding agent only for non-load-bearing applications.

G. Where new concrete with integral waterproofing is to be bonded to previously placed concrete, prepare surfaces to be treated in accordance with waterproofing manufacturer's instructions. Saturate cold joint surface with clean water, and remove excess water before application of coat of waterproofing admixture slurry. Apply slurry coat uniformly with semi-stiff bristle brush at rate recommended by waterproofing manufacturer.

H. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

I. Removal:
1. Remove water and debris from space to be placed.

3.03 INSTALLATION OF FORMWORK

A. Forms:
1. Assemble forms so forms are sufficiently tight to prevent leakage.
2. Properly brace and tie forms.
3. Provide temporary cleanouts at base of tall forms if used to facilitate cleaning and inspection.
4. Make proper form adjustments before, during, and after concreting.
5. 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.
6. Use metal cold joint forms when unable to place concrete for footings, foundations, and slabs in continuous pours.

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.

3.04 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

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

B. Fabricate and handle epoxy-coated reinforcing in accordance with ASTM D3963/D3963M.

C. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

D. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

E. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

F. Avoid cutting or puncturing vapor retarder during reinforcement placement and concrete operations.

G. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

H. Blowtorch shall not be used to facilitate field cutting or bending or any other reinforcing work.

I. Reinforcement shall not be bent after partially embedded in hardened concrete.

J. 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.

K. Splices:
   1. Per requirements of Structural Drawings.

L. Tolerances:
   1. Provide following minimum concrete cover for reinforcement as per ACI 318 or ACI 318M.

M. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations:
   1. Concrete cast against and permanently exposed to earth:
      a. 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.

3.05 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

C. General:

1. Place as soon after mixing as possible.
2. Deposit as nearly as possible in final position.
3. No concrete shall be deposited in water.
4. Placing of concrete shall be continuous until panel or section is complete.
5. Compact concrete in forms by vibrating and other means where required.
   a. Thoroughly consolidate concrete around reinforcing bars (Consolidation not required in concrete around reinforcing bars with Mix Type G).
   b. Use and type of vibrators shall conform to ACI 309.
6. Form vertical surfaces full depth. Do not allow concrete to flow out from under forms in any degree into landscaped areas.
7. Consolidate concrete thoroughly.
8. Do not embed aluminum in concrete.
9. Do not use contaminated, deteriorated, or re-tempered concrete.
10. Avoid accumulation of hardened concrete.
11. Dusting with cement not permitted.

D. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

E. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

3.06 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, immediately after form removal.

3.07 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
   1. Normal concrete: Not less than seven days.

C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

D. Surfaces Not in Contact with Forms:
   1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by membrane curing, water ponding, water-saturated sand, water-fog spray, or saturated burlap.
   2. Final Curing: Begin after initial curing but before surface is dry.
      a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.
      b. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.08 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

B. 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.

C. Provide free access to concrete operations at project site and cooperate with appointed firm.

D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

E. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

F. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.

G. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

H. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

I. Slab Testing: Cooperate with manufacturer of specified moisture vapor reducing admixture (MVRA) to allow access for sampling and testing concrete for compliance with warranty requirements.

J. Permeability Test: Test concrete with waterproofing admixture according to COE CRD-C 48.

3.09 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
   1. For testing purposes, following concrete strengths are required:
      a. At 7 days: 70 percent minimum of 28 day strengths.
         1) If any concrete compression tests do not meet this requirement, then all concrete poured in the location tested shall be promptly removed and replaced at no additional cost to the owner.
      b. At 28 days: 100 percent minimum of 28 day strengths.
         1) If any concrete compression tests do not meet this requirement, then all concrete poured in the location tested shall be promptly removed and replaced at no additional cost to the owner.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.10 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

B. Protect installed products from damage during construction.

END OF SECTION

SECTION 26 0501

COMMON ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. General electrical system requirements and procedures.
   2. Perform excavating and backfilling work required by work of this Division as described in Contract Documents.
   3. Make electrical connections to equipment provided under other Sections.

B. Products Furnished But Not Installed Under This Section:

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association / American National Standards Institute:
      a. NFPA 70, ‘National Electrical Code (NEC)' (2017 or most recent edition adopted by AHJ).
   2. National Electrical Manufacturing Association Standards (NEMA):
      a. NEMA 250-2018, ‘Enclosure for Electrical Equipment (1000 Volts Maximum)’.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate with Owner for equipment and materials to be removed by Owner.

B. Sequencing:
   1. Include detailed sequence of individual electrical demolition operations on Construction Schedule specified in Section 01 3200.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Provide following information for each item of equipment:
         1) Catalog Sheets.
         2) Assembly details or dimension drawings.
         3) Installation instructions.
         4) Manufacturer's name and catalog number.
         5) Name of local supplier.
      b. Furnish such information for following equipment:
         1) Section 26 3200: 'Turnkey Photovoltaic Collectors’.
      c. Do not purchase equipment before approval of product data.
   2. Shop Drawings:
      a. Submit on following equipment:
         1) Photovoltaic System.
      b. Indicate precise equipment to be used, including all options specified.

B. Informational Submittals:
   1. Test And Evaluation Reports:
      a. Report of site tests, before Substantial Completion.

2. Qualification Statement:
    a. Electrical Subcontractor:
        1) Provide Qualification documentation if requested by Owner.
    b. Installer:
        1) Provide Qualification documentation if requested by Owner.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    a. Operations and Maintenance Data:
        1) Provide operating and maintenance instructions for each item of equipment submitted under Product Data.
    b. Record Documentation:
        1) Manufacturers documentation:
            a) Manufacturer's literature.
            b) Include copy of approved shop drawings.

1.5 QUALITY ASSURANCE

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

B. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
1. Electrical Subcontractor:
    a. Company specializing in performing work of this section.
        1) Minimum five (5) years experience in electrical installations.
        2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
    b. Upon request, submit documentation.
2. Installer:
    a. Licensed for area of Project.
    b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
    c. Upon request, submit documentation.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 INSTALLERS

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

3.2 EXAMINATION

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

B. Evaluation And Assessment:

1. All relocations, reconnections, and removals are not necessarily indicated on Drawings. Include such work without additional cost to Owner.

3.3 PREPARATION

A. Disconnect equipment that is to be removed or relocated. Carefully remove, disassemble, or dismantle as required, and store in approved location on site, existing items to be reused in completed work.

B. Where affected by demolition or new construction, relocate, extend, or repair raceways, conductors, outlets, and apparatus to allow continued use of electrical system. Use methods and materials as specified for new construction.

C. Perform drilling, cutting, block-offs, and demolition work required for removal of necessary portions of electrical system. Do not cut joists, beams, girders, trusses, or columns without prior written permission from Architect.

D. Remove concealed wiring abandoned due to demolition or new construction. Remove circuits, conduits, and conductors that are not to be re-used back to next active fixture, device, or junction box.

E. Patch, repair, and finish surfaces affected by electrical demolition work, unless work is specifically specified to be performed under other Sections of the specifications.

3.4 INSTALLATION

A. General:
   1. Locations of electrical equipment shown on Drawings are approximate only. Field verify actual locations for proper installation.
   2. Coordinate electrical equipment locations and conduit runs with those providing equipment to be served before installation or rough in.
      a. Notify Engineer of conflicts before beginning work.

3.5 FIELD QUALITY CONTROL

A. Field Tests:
   1. Test systems and demonstrate equipment as working and operating properly. Notify Engineer before test. Rectify defects at no additional cost to Owner.

3.6 CLEANING

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

3.7 CLOSEOUT ACTIVITIES

A. Training:
   1. Provide competent instructor for three (3) hours to train Owner’s maintenance personnel in operation and maintenance of electrical equipment and systems. Factory representatives shall assist this instruction as necessary. Schedule instruction period at time of final inspection.

END OF SECTION

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SECTION 26 0519

LINE-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of conductors used on Project except as excluded below.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements'.

1.2 REFERENCES

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

B. Reference Standards:
   1. National Fire Protection Association:
      a. NFPA 70, 'National Electric Code (NEC)' (2017 or most recent edition adopted by AHJ including all applicable amendments and supplements).

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Line Voltage Conductors:
   1. Copper with AWG sizes as shown:
      a. Minimum size shall be No. 12 except where specified otherwise.
      b. Conductor size No. 8 and larger shall be stranded.
   2. Insulation:
      a. Standard Conductor Size No. 10 And Smaller: 600V type THWN or XHHW (75 deg F (24 deg C)).
      b. Standard Conductor Size No. 8 And Larger: 600V Type THW, THWN, or XHHW (75 deg F (24 deg C)).
      c. Higher temperature insulation as required by NFPA 70 or local codes.
   3. Colors:
      a. 120 / 240 V System:
         1) Black: Phase A.
         2) Red: Phase B.
         3) Green: Ground.
         4) White: Neutral.
      b. Conductors size No. 10 and smaller shall be colored full length. Tagging or other methods for coding of conductors size No. 10 and smaller not allowed.
      c. For feeder conductors larger than No. 10 at pull boxes, gutters, and panels, use painted or taped band or color tag color-coded as specified above.

B. Line Voltage Cables:
   1. Metal Clad Cable (MC) may be used as restricted below:
      a. Copper conductors.
      b. Sizes #12 through #8.
      c. Use only in indoor dry locations where:

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

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

PART 3 - EXECUTION

3.1 INSTALLATION

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

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

C. Line Voltage Cables:
1. Route circuits at own discretion, however, circuiting and numbering shall be as shown in Panel Schedules.
2. Support cables using approved straps, hangers, or similar fittings, spaced as required.
3. Where installing in framing, do not bore holes in joists or beams outside center 1/3 of member depth or within 24 inches (600 mm) of bearing points. Do not bore holes in vertical framing members outside center 1/3 of member width. Holes shall be one inch diameter maximum.
4. Conceal cables within ceilings and walls of finished areas. Cables may be exposed in unfinished areas but not run on floors of mechanical equipment spaces or in such a way that they obstruct access to, operation of, or servicing of equipment.
5. Install exposed cables parallel to or at right angles to building structure lines.
6. Keep cables 6 inches (150 mm) minimum from hot water pipes.
7. Prohibited procedures:
   a. Boring holes for installation of cables in vertical truss members.
   b. Notching of structural members for installation of cables.

END OF SECTION

SECTION 26 0526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install grounding for electrical installation as described in Contract Documents except as excluded below.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements'.

1.2 REFERENCES

A. Reference Standards:
   1. Institute of Electrical and. Electronics Engineers (IEEE):
      a. IEEE 837-2014, ‘Standard for Qualifying Permanent Connections Used in Substation Grounding'.
   2. National Fire Protection Association:
      a. NFPA 70, ‘National Electric Code (NEC)’ (2017 or most recent edition adopted by AHJ including all applicable amendments and supplements).
      b. NFPA 780, 'Standard for the Installation of Lightning Protection Systems' (2014 or latest approved edition).
   3. Telecommunications Industry Association:
      a. TIA-942 A, 'Telecommunications Infrastructure Standard for Data Centers' (2014).
   4. Section 27 1116: ‘Communications Cabinets, Racks, Frames, and Enclosures’.
   5. Section 27 1501: 'Communications Horizontal Cabling' for cables for Telephone and Data Systems.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Requirements of Section 27 1501 applies, but is not limited to following:
      a. Cable assemblies shall be UL / CE Listed and CSA Certified. Cables shall be a distinctive green or green/yellow in color, and all jackets shall be UL, VW-1 flame rated.
      b. Grounding shall conform to all required Commercial Building Grounding and Bonding Requirements for Telecommunications, Electrical Codes, and Manufacturer’s grounding requirements.
   2. Systems shall be installed per NFPA 780 and NFPA 70.
   3. All Bonds shall comply with most current version of IEEE 837 Standard.

B. Qualifications: Requirements of Section 01 4301 applies, but is not limited to following:
   1. Installers Qualifications:
      a. Grounding and Bonding:
         1) Licensed electrical contractor shall perform installation and termination of main bonding conductor to building service entrance ground.
         2) Licensed in State that Work is to be performed.

PART 2 - PRODUCTS

2.1 SYSTEM

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

B. Performance:
   1. Design Criteria:
      a. Size materials as shown on Drawings and in accordance with applicable codes.
      b. Bonding System Workmanship:
         1) The ground/earthing system shall be designed for high reliability and shall meet following criteria:
            a) Local electrical codes shall be adhered to.
            b) All grounding/earthing conductors shall be copper.
            c) Regulatory Agency Sustainability Approvals requirements are required.

C. Materials:
   1. Grounding And Bonding Jumper Conductors: Bare copper or with green insulation.
   2. Make grounding conductor connections to ground rods and foundation ground loop using approved bolted clamps listed for such use.
   3. Service Grounding Connections And Cable Splices: Make by exothermic process.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface With Other Work: Coordinate with Section 03 3111 in installing grounding conductor and placing concrete. Do not allow placement of concrete before Architect's inspection of grounding conductor installation.

B. Grounding conductors and bonding jumper conductors shall be continuous from terminal to terminal without splice. Provide grounding for following.
   1. Electrical service, its equipment and enclosures.
   2. Conduits and other conductor enclosures.
   3. Neutral or identified conductor of interior wiring system.
   4. Main panelboard, power and lighting panelboards.

C. Provide grounding bushings on all feeder conduit entrances into panelboards and equipment enclosures.

D. Bond conduit grounding bushings to enclosures with minimum #10 AWG conductor.

E. Connect equipment grounds to building system ground.
   1. Use same size equipment grounding conductors as Phased conductors up through #10 AWG.
   2. Use NEC Table 250-95 for others unless noted otherwise in Drawings.

F. Run separate insulated grounding cable from each equipment cabinet to electrical panel. Do not use intermediate connections or splices. Affix directly to cabinet.

END OF SECTION

SECTION 26 0533

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
1. Quality of material and installation procedures for raceway, boxes, and fittings used on Project but furnished under other Divisions.
2. Furnish and install raceway, conduit, and boxes used on Project not specified to be installed under other Divisions.
3. Furnish and install air-vapor barrier boxes as described in Contract Documents.
4. Furnish and install main electrical service raceway as described in Contract Documents and comply with electrical utility company requirements.
5. Furnish and install main telephone service raceway as described in Contract Documents and comply with telephone company requirements.

B. Related Requirements:
1. Section 26 0501: 'Common Electrical Requirements' for general electrical requirements'.

1.2 REFERENCES

A. Reference Standards:
1. National Fire Protection Association:
a. NFPA 70, 'National Electric Code (NEC)' (2017 or most recent edition adopted by AHJ including all applicable amendments and supplements).

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
1. Manufacturer Contact List:
a. Cooper B-Line, Highland, IL www.b-line.com.
b. Hubbell Incorporated, Milford, CT www.hubbell-wiring.com or Hubbell Canada Inc, Pickering, ON (905) 839-4332.
c. Square D, Palatine, IL www.squared.com.
d. Thomas & Betts, Memphis, TN www.tnb.com or Thomas & Betts Ltd, Iberville, PQ (450) 347-5318.
e. Walker Systems Inc, Williamstown, WV (800) 240-2601 or Walker Systems Inc / Wiremold Canada Inc, Fergus, ON (519) 843-4332.
f. Wiremold Co, West Hartford, CT www.wiremold.com.

B. Materials:
1. Raceway And Conduit:
a. Sizes:
1) 1 inch for exterior use, unless indicated otherwise.
2) 1/2 inch for interior use, unless indicated otherwise.
b. Types: Usage of each type is restricted as specified below by product.
1) Galvanized rigid steel or galvanized intermediate metal conduit (IMC) is allowed for use in all areas. Where in contact with earth or concrete, wrap buried galvanized rigid steel and galvanized IMC conduit and fittings completely with vinyl tape.

2) Galvanized Electrical Metallic Tubing (EMT) and Flexible Steel Conduit:
   a) Allowed for use only in indoor dry locations where it is:
      (1) Not subject to damage.
      (2) Not in contact with earth.
      (3) Not in concrete.
   b) For metal conduit systems, flexible steel conduit is required for final connections to indoor mechanical equipment.
3) Schedule 40 Polyvinyl Chloride (PVC) Conduit:
   a) Allowed for use only underground or below concrete with galvanized rigid steel or IMC elbows and risers.

c. Prohibited Raceway Materials:
   1) Aluminum conduit.
   2) Armored cable type AC (BX) cable.

2. Raceway And Conduit Fittings:
   a. Rigid Steel Conduit And IMC: Threaded and designed for conduit use.
   b. EMT:
      1) Compression type.
      2) Steel set screw housing type.
   c. PVC Conduit:
      1) PVC type. Use PVC adapters at all boxes.
      2) PVC components, (conduit, fittings, cement) shall be from same Manufacturer.
   d. Expansion fittings shall be equal to OZ Type AX sized to raceway and including bonding jumper.
   e. Prohibited Fitting Materials:
      1) Crimp-on, tap-on, indenter type fittings.
      2) Cast set-screw fittings for EMT.
      3) Spray (aerosol) PVC cement.
3. Seal Devices: OZ Type WSK.
4. Outlet Boxes:
   a. Galvanized steel of proper size and shape are acceptable for all systems. Where metal boxes are used, provide following:
      1) Provide metal supports and other accessories for installation of each box.
      2) Equip ceiling and bracket fixture boxes with fixture studs where required.
      3) Equip outlets in plastered, paneled, and furred finishes with plaster rings and extensions to bring box flush with finish surface.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

A. Conduit And Raceway:
   1. Conceal raceways within ceilings, walls, and floors, except at Contractor's option, conduit may be exposed on walls or ceilings of mechanical equipment areas Install exposed raceway runs parallel to or at right angles to building structure lines.
   2. Keep raceway runs 6 inches (150 mm) minimum from hot water pipes.
   3. Make no more than four quarter bends, 360 degrees total, in any conduit run between outlet and outlet, fitting and fitting, or outlet and fitting.
      a. Make bends and offsets so conduit is not injured and internal diameter of conduit is not effectively reduced.
      b. Radius of curve shall be at least minimum indicated by NFPA 70.

4. Cut conduit smooth and square with run and ream to remove rough edges. Cap raceway ends during construction. Clean or replace raceway in which water or foreign matter have accumulated.
5. Bend PVC conduit by hot box bender and, for PVC 2 inches (50 mm) in diameter and larger, expanding plugs. Apply PVC adhesive only by brush.
6. Installation in Concrete:
   a. Install no conduit in concrete unless outside diameter is less than 1/3 of slab, wall, or beam thickness in which it is embedded.
   b. Position conduits in center of concrete below reinforcing steel, and separated by minimum lateral spacing of three diameters.
   c. Elbows embedded in concrete shall be rigid steel or IMC and stubouts from concrete slabs shall extend 3 inches (75 mm) minimum before making connection to EMT.
   d. Separate conduits penetrating structural slabs in buildings by 2 inches (50 mm) minimum.
   e. Install seal device where underground raceways penetrate concrete building wall.
7. Installation In Framing:
   a. Do not bore holes in joists or beams outside center 1/3 of member depth or within 24 inches (600 mm) of bearing points. Do not bore holes in vertical framing members outside center 1/3 of member width.
   b. Holes shall be one inch (25 mm) diameter maximum.
8. Underground Raceway And Conduit:
   a. Bury underground raceway installed outside building 24 inches (600 mm) deep minimum.
   b. Bury underground conduit in planting areas 24 inches (600 mm) deep minimum. It is permissible to install conduit 6 inch (150 mm) below concrete sidewalks, however, conduit must be buried 24 inches (600 mm) deep at point of exit from planting areas.
9. Conduit And Raceway Support:
   a. Securely support raceway with approved straps, clamps, or hangers, spaced as required.
   b. Do not support from mechanical ducts or duct supports without Architect's written approval. Securely mount raceway supports, boxes, and cabinets in an approved manner by:
      1) Expansion shields in concrete or solid masonry.
      2) Toggle bolts on hollow masonry units.
      3) Wood screws on wood.
      4) Metal screws on metal.
10. Prohibited Procedures:
    a. Use of wooden plugs inserted in concrete or masonry units for mounting raceway, supports, boxes, cabinets, or other equipment.
    b. Installation of raceway that has been crushed or deformed.
    c. Use of torches for bending PVC.
    d. Spray applied PVC cement.
    e. Boring holes in truss members.
    f. Notching of structural members.
    g. Supporting raceway from ceiling system support wires.
    h. Nail drive straps or tie wire for supporting raceway.

B. Boxes:
1. Boxes shall be accessible and installed with approved cover.
2. Do not locate device boxes that are on opposite sides of framed walls in the same stud space. In other wall construction, do not install boxes back to back.
3. Locate boxes so pipes, ducts, or other items do not obstruct outlets.
4. Install outlets flush with finished surface and level and plumb.
5. Support switch boxes larger than two-gang with side brackets and steel bar hangers in framed walls.
6. At time of substantial completion, install blank plates on uncovered outlet boxes that are for future use.

END OF SECTION

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SECTION 263200

TURNKEY PHOTOVOLTAIC COLLECTORS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this section.

B. This section is a Division 26 General Provisions section, and is part of each Division 26 sections referring to Turnkey Photovoltaic Collectors (Rooftop).

1.2 DESCRIPTION OF WORK:

A. The following outlines general requirements for Turnkey Photovoltaic Systems:

1. Provide engineered stamped drawings, energy model, shop drawings, and project documentation.
2. Provide a complete fully-operational photovoltaic system consisting of, but not necessarily limited to the following:
    a. Photovoltaic modules.
    b. Combiner boxes, junction boxes, etc.
    c. Power Optimizers.
    d. Inverters.
    e. DC wiring (conduits and conductors) from photovoltaic panels to inverter inputs.
    f. AC wiring (conduits and conductors) from inverter outputs to breakers in distribution panels.
    g. Circuit breakers in AC panelboards as may be required to feed inverter units.
    h. installation, labor, equipment, tools, testing, commissioning, training, etc. for a complete photovoltaic power system.
    i. Commissioning and testing.
3. Specify layout and location of the system at the approved project site to maximize production.
4. Minimize the risk of vandalism, theft and personal injury in the installation and operation of the systems.
5. System layout, spacing, and construction shall comply with all current zoning, building, and fire codes requirements.
6. Other items as may be included in other scope of work documents.

1.3 REFERENCE STANDARDS

A. ASCE 7-10 - Minimum Design Loads for Buildings and Other Structures; 2010.

B. IEC 61215 - Crystalline Silicon Terrestrial Photovoltaic (PV) Modules – Design Qualification and Type Approval; 2005.

C. IEEE 1262-1995 Recommended Practice for Qualifications of Photovoltaic (PV) Modules.

D. IEEE 1547 - Standard for Interconnecting Distributed Resources with Electric Power Systems; 2018.

E. NEC – Article 690 – Solar Photovoltaic (PV) Systems; 2017.

F. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

G. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2008.

H. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. UL 790 - Standard for Standard Test Methods for Fire Tests of Roof Coverings; Current Edition, Including All Revisions.

J. UL 1703 - Flat Plate Photovoltaic Modules and Panels; Current Edition, Including All Revisions.

K. UL 1741 - Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
2. Roof-top Arrays: Coordinate layout of photovoltaic modules and mounting systems with roof and associated equipment.
3. Notify Engineer of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Pre-installation Meeting: Convene one week prior to commencing work of this section; require attendance of all affected installers. Include adequate instruction on the electrical hazards associated with photovoltaic systems and appropriate safety procedures to be followed.

1.5 SUBMITTALS

A. Design Documents: Prepare and submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to plans, electrical diagrams, riser diagrams, mounting details, and description of operation.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product. Include ratings, configurations, standard wiring diagrams, outline and support point dimensions, finishes, weights, service condition requirements, and installed features.

C. Shop Drawings: Include dimensioned plan views and sections indicating locations of system components, required clearances, attachment locations and details, and proposed size, type, and routing of conduits and cables. Include system interconnection schematic diagrams showing all factory and field connections.

D. Design Data:

1. Include structural calculations, certified by structural engineer, for equipment and mounting system.
2. Include electrical calculations, certified by electrical engineer or qualified electrical contractor, for array and associated equipment other than the basis of design products and configuration.

E. Certify that work of this section does not void roof warranty.

F. Installer's Qualifications: Include evidence of compliance with specified requirements.

G. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and operation of product.

H. Field quality control test reports.

1. Include manufacturer's field reports.

I. Operation and Maintenance Data: Include detailed information on system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.

J. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

K. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Photovoltaic Modules: Three (3).

1.6 QUALITY ASSURANCE

A. Comply with NFPA 70.

B. Structural Designer Qualifications: Registered structural engineer licensed in the State of Utah.

C. Electrical Designer Qualifications: Registered electrical engineer licensed in the State of Utah and experienced in the design of photovoltaic systems.

D. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1. Provide 3 references, minimum, with bid.

E. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience with photovoltaic systems of similar size, type, and complexity.

1. Licensed in the State of Utah as a General Electrical Contractor (S200).
2. Licensed in the State of Utah as a Solar Photovoltaic Contractor (S202).
3. Manufacturer's authorized installer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging, keep dry and protect from damage until ready for installation.

1.8 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Photovoltaic Modules: Provide a minimum 25-year manufacturer warranty covering repair

or replacement due to defective materials or workmanship.

C. Photovoltaic Module Mounting System: Provide minimum 10-year manufacturer warranty covering repair or replacement due to defective materials or workmanship.

D. Photovoltaic Inverters and Other Components: Provide a minimum 10-year manufacturer warranty covering repair or replacement due to defective materials or workmanship.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products from one of the following for each component:

B. Photovoltaic Modules:

1. Basis-of-Design Product: ZNSHINESOLAR ZXM7-SH108 Series, 410 watt.

2. Subject to compliance with requirements, other products equivalent to the Basis-of-Design Product may also be provided from one of the following for each component:

a. CanadianSolar.
b. Hanwa Q-CELLS.
c. LG Electronics.

C. Photovoltaic Inverters:

1. Basis-of-Design Product: EG4 Electronics EG4 18kPV Hybrid Inverter.

2. Subject to compliance with all requirements, other products equivalent to the Basis-of-Design Product may also be provided from one of the following for each component:

a. SMA.
b. Yaskawa Solectria Solar

D. Photovoltaic Module Mounting Structures:

1. Basis-of-Design Product: See drawings for requirements.

2. Subject to compliance with all requirements, other products equivalent to the Basis-of-Design Product may also be considered.

E. Photovoltaic Battery:

1. Basis-of-Design Product: EG4 Electronics EG4 wall mount indoor 100Ah Lithium Battery.

2. Subject to compliance with all requirements, other products equivalent to the Basis-of-Design Product may also be considered.

F. Source Limitations: For each type of component, furnish products produced by a single manufacturer and obtained from a single supplier.

2.2 PHOTOVOLTAIC SYSTEM REQUIREMENTS

A. Provide complete photovoltaic system consisting of photovoltaic modules and associated balance of system components necessary for connection to facility electrical system.

B. Capacity:

1. Total Nominal Rated Power Output of Array: Refer to electrical drawings for energy production requirements. Maximum degradation shall be 1% per year.

C. Size:

1. Array: Designed to fit on roof-top of building.
2. Individual Modules: Not less than 410 W

D. Appearance:

1. Arrange array such that modules are aligned with uniform spacing.
2. Final determination of acceptable appearance is by Owner.

E. Provide photovoltaic system and associated components suitable for wind loads, snow loads, seismic loads, and other structural design considerations of the installed location.

1. Comply with ASCE 7-10.

F. Provide photovoltaic system and associated components suitable for continuous operation under the service conditions at the installed location.

G. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or Intertek (ETL) as suitable for the purpose indicated.

H. Unless specifically indicated to be excluded, provide all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system.

I. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

J. Arrange array to provide adequate access to rear of string(s) for maintenance.

K. Arrange array to minimize shading during peak production periods.

L. Roof-Mounted Arrays:

1. Arrange array such that normal roof drainage is not affected.
2. Arrange array to maintain required safety clearances from edge of roof per IBC or OSHA requirements as may be enforced by Authority Having Jurisdiction.
3. Arrange array to maintain access and clearance requirements for other roof-mounted equipment.
4. Arrange array to avoid spanning of expansion joints.

2.4 PHOTOVOLTAIC MODULES

A. General Requirements:

1. Photovoltaic Modules: Factory assembled; consisting of photovoltaic cells, frame, junction box, cables for series connection, and bypass diodes for shade tolerance; rated for 1000 V DC; listed as complying with UL 1703.
2. Crystalline Silicon Photovoltaic Modules: Comply with IEC 61215.
3. Frame: Anodized aluminum.
4. Factory-Installed Junction Box: Weatherproof, with factory-installed terminals and bypass diodes.
5. Factory-Installed Cables: Type USE-2 or listed photovoltaic (PV) wire with polarized locking connectors.
6. Fire Resistance Rating: UL 790, Class equal to or better than required fire rating of roof.
7. Unless otherwise indicated, specified module performance characteristics are rated under Standard Test Conditions (STC).

2.5 PHOTOVOLTAIC INVERTERS

A. General Requirements:

1. Provide inverter(s) as indicated or as required for connection of the photovoltaic array DC system to the AC system indicated.
2. Inverters: Suitable for the requirements of the connected array; output configuration compatible with connected system; listed as complying with UL 1741; furnished with the following features:
   a. Maximum power point tracking (MPPT).
   b. LCD display.
3. Total Harmonic Distortion: Less than five percent.
4. Enclosure Environment Type: NEMA 3R.
5. Shall comply with all NEC rapid-shut down requirements.

2.6 PHOTOVOLTAIC MODULE MOUNTING SYSTEM:

A. General Requirements:

1. Provide complete mounting system compatible with all necessary hardware and accessories.
2. Wind loading: Meets ASCE 7-05 wind loading criteria for 150 mph minimum.
3. Fire Rating: Meets IBC required fire testing levels and have an A Class fire rating.
4. Mechanical Load Testing: Meets IBC snow loading requirements.

2.7 PHOTOVOLTAIC COMBINER BOXES:

A. Photovoltaic Combiner Boxes:

1. Provide combiner box(es) for termination of strings as indicated or as required for the array configuration installed.
2. Combiner Boxes: Rated for 1000 V DC; current ratings suitable for connected strings; equipped with circuit breakers; listed as complying with UL 1741.
3. Number of Input Circuits: As required for termination of strings, with minimum of 20 percent spare capacity for future expansion.
4. Enclosure: NEMA 250, Type 3R.
5. Provide with capability of current monitoring for individual strings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on the Drawings.

B. Verify that ratings and configurations of system components are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive system components.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Use open circuiting, short circuiting, or opaque covering to disable modules, array or portions of array prior to installation and service.

B. Roof-Mounted Arrays: Protect roof and adjacent roof-mounted items from damage. Provide walking mats and rigid insulation, as necessary.

3.3 INSTALLATION

A. Perform work in a neat and workmanlike manner in accordance with NECA 1.

B. Install products in accordance with manufacturer's instructions.

C. All PV arrays shall be oriented facing from southeast to southwest, at tilt angles for maximum solar energy exposure, but not less than 10 degrees to allow for proper draining. Arrays should be located to prevent shading from trees, utility poles, Overhead power lines, fences, or other structure at any time between 9 am and 3 pm solar time, any day of the year.

D. To promote cooling, to maximize air circulation around PV arrays, and to keep the arrays above the snow line, ground-mounted arrays shall be a minimum of 6 inches between any photovoltaic module and the roof, with no obstruction preventing air flow between (beneath) the array and the roof.

E. Inverters shall be mounted on the roof or as otherwise noted on the drawings. Provide C-Channel mounting frames and hardware as may be required for proper support and seismic restraint to meet all applicable structural codes and to meet all electrical code requirements pertaining to grounding of PV systems. Provide a deferred submittal consisting of a stamped drawing from a licensed structural engineer prior to installation.

F. Install weather seal fittings and flanges where PV panel assemblies penetrate exterior elements such as roofs. Seal around openings to make weathertight.

G. Circuiting Requirements:

1. Wiring Methods:
    a. Unless otherwise indicated, use 1000 Volt Type RPVU PV Photovoltaic single-conductor building wire in suitable raceway for wiring between combiner box(es) and point of interconnection. Use IMC as raceway where exposed to moisture and weather.
    b. Secure exposed cables in accordance with NFPA 70. Where possible, conceal behind array.
    c. Install cables in suitable raceway where readily accessible or where required by authority having jurisdiction.
    d. Use suitable twist-on insulated spring connectors, mechanical connectors, or

compression connectors for photovoltaic circuit splices and taps.

2. Photovoltaic DC System Conductor Color Code:
   a. Positive Grounded System:
      1) Positive/Grounded: White.
      2) Negative: Black.
3. Maintain separation of photovoltaic and non-photovoltaic circuits in accordance with NFPA 70.

H. Grounding and Bonding Requirements:

1. Ensure that there is only one AC System bonding connection between grounding system and grounded/neutral conductor, including external connections and connections internal to equipment.

I. Identification Requirements:

1. Use identification nameplate or means of identification acceptable to authority having jurisdiction to identify the presence of multiple power sources and the location of main service disconnecting means and each photovoltaic system disconnecting means. Locate at main service disconnecting means and each photovoltaic system disconnecting means. Verify format and descriptions with authority having jurisdiction.
2. Use identification nameplate to identify each photovoltaic system disconnecting means with text "PHOTOVOLTAIC SYSTEM DC DISCONNECT" or "PHOTOVOLTAIC SYSTEM AC DISCONNECT" as applicable.
3. Use identification nameplate or identification label to identify each photovoltaic system DC disconnecting means with the following information:
   a. Rated maximum power-point current (operating current).
   b. Rated maximum power-point voltage (operating voltage).
   c. Maximum system voltage.
   d. Short-circuit current.
4. Use identification nameplate or identification label to identify the interactive system point of interconnection at the disconnecting means as a power source and with the rated AC output current and the nominal operating AC voltage.
5. Use warning labels, identification nameplates, or identification labels to identify electrical hazards for photovoltaic system disconnecting means. Include the word message "Warning - Electric Shock Hazard; Do not touch terminals; Terminals on both the line and load sides may be energized in the open position" or approved equivalent.
6. Use wire and cable markers to identify photovoltaic system source, output, and inverter circuit conductors at all points of termination, connection, and splices.
7. Use voltage markers, identification labels, stenciled text, or suitable permanent marking approved by authority having jurisdiction to identify exposed raceways, cable trays, pull boxes, junction boxes, and conduit bodies with the text "Photovoltaic Power Source" at maximum intervals of 10 feet (3 m) in accordance with NFPA 70.

3.4 FIELD QUALITY CONTROL

A. See article "SYSTEM STARTUP" below for additional requirements related to testing and inspection.

B. Provide services of a manufacturer's authorized representative to observe installation and assist in inspection and testing. Include manufacturer's detailed testing procedures and field reports with submittals.

C. Inspection and testing to include, at a minimum:

1. Inspect each system component for damage and defects.

2. Verify that equipment enclosures, boxes, and associated connections installed outdoors are weatherproof.
3. Verify proper wiring connections have been made and check for conductor continuity. Verify proper polarity.
4. Verify tightness of mechanical and electrical connections is according to manufacturer's recommended torque settings.
5. Measure and record voltages at the inverter AC and DC inputs.
6. Measure and record AC output power.
7. Perform inverter functional test.

D. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

E. Diagnostic Period: After successful completion of inspections and tests, operate system in normal mode for at least 14 days without any system or equipment malfunctions.

1. Record all system operations and malfunctions.
2. If a malfunction occurs, start diagnostic period over after correction of malfunction.

F. Submit detailed reports indicating inspection and testing results and corrective actions taken.

G. Repair roof or adjacent roof-mounted items damaged as a result of work of this section.

3.5 SYSTEM STARTUP

A. Provide services of a manufacturer's authorized representative to assist in performing system startup. Include manufacturer's detailed startup procedures with submittals.

B. Obtain Owner's approval prior to performing system startup.

C. Grid-Tied Systems: Obtain Utility Company's approval prior to performing system startup.

D. Prepare and start system in accordance with manufacturer's instructions.

3.6 CLEANING

A. Clean modules using only methods recommended by manufacturer to avoid scratches and other damage. Clean exposed surfaces on other components to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.7 CLOSEOUT ACTIVITIES

A. Demonstration: Demonstrate proper operation of system to Owner, and correct deficiencies or adjust as directed.

B. Training: Train Owner's personnel on operation, adjustment, and maintenance of photovoltaic system.

1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
2. Provide minimum of four hours of training.

3.8 PROTECTION

A. Protect installed products from subsequent construction operations.

3.9 MAINTENANCE

A. Conduct site visit at least once every six months to perform inspection, testing, and preventative maintenance. Conduct tests similar to those made during original field quality control testing. Submit report of Owner comparing test results with those of original tests along with evaluations and recommendations.

B. Provide Trouble call-back service upon notification by Owner:

1. Include allowance for call-back service during normal working hours at no cost to Owner.
2. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.

END OF SECTION