PROJECT MANUAL

FOR

NAMPA SAND STORAGE BUILDING

OWNER
State of Idaho
Idaho Transportation Department
3311 State Street
Boise, Idaho 83707

Hutchison-Smith Architects
270 N. 27th Street
Boise, Idaho 83702
(208) 667-9402

DATE: May 25, 2018
SPECIFICATIONS

NEW SAND STORAGE SHED
NAMPA, IDAHO
ITD #18-315

For
Idaho Transportation Department
P.O. Box 7129
Boise, Idaho 83707

DATE: June 2018

ARCHITECT
Hutchison Smith Architects
270 N. 27th, Suite 200
Boise, ID 83702
Contact: Don Hutchison
Tel: (208)338-1212

STRUCTURAL ENGINEER
AHJ Engineers
5418 N. Eagle Road
Boise, Idaho 83713
Contact: Dave Haueland
Tel: (208) 323-0199

ELECTRICAL ENGINEER
Bradley Engineering/Chtd.
645 W. 25th Street
Idaho Falls, ID 83402
Contact: Andrew Yanoshek, P.E.
Tel: (208) 523-2862 Fax: (208)523-2864
SECTION 000103 – PROJECT DIRECTORY

PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Identification of project team members and their contact information.

1.02 OWNER:
   A. State of Idaho – Idaho Transportation Department – District #3
      8150 W. Chinden Blvd.
      Boise, Idaho 83714
      (208) 334-8300

   B. Primary Contact:
      Michael Garz
      (208) 334-8350 – office
      michael.garz@itd.idaho.gov

1.03 Architect:
   Hutchison-Smith Architects
   270 N. 27th Street
   Boise, Idaho 83702

   Primary Contact:
   Scott Fischer
   (208) 667-9402 – office
   (208) 661-7610 – cell
   scottf@architectswest.com

1.04 Construction Manager:
   Petra, Incorporated
   1097 N. Rosario Street
   Suite 200
   Meridian, Idaho 83642

   Primary Contact:
   Roy Jackson
   (208) 323-4500 – office
   rjackson@petrainc.net

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LEGAL NOTICE ADVERTISEMENT FOR BID; The ITD (Idaho Transportation Department) is soliciting sealed proposals for Construction Services for:

**Nampa Sand Storage Shed**

Proposals will be received at the Idaho Transportation Department Headquarters, Business and Support Management Building at 3311 State Street, Boise, Idaho 83707 on Tuesday, June 12th, 2018 at 10:00AM Local Time.

A Pre-Bid Conference will be held at the Site at 10:00 AM on Wednesday June 6th, 2018 to discuss the work, address any concerns and provide opportunity to visually inspect the site and conditions of the work. Attendance is strongly encouraged. Bid Forms for the work are bound with the Project Manual. Michael Garz ITD Operations Manager will be directing the tour with his personnel. Phone contact (208) 334-8350.

Bidders are invited to attend a public bid opening where bids will be read aloud at the Idaho Transportation Department Headquarters, Business and Support Management Building at 3311 State Street, Boise, Idaho 83707, immediately following the closing time for receipt of bids. Owner reserves the right to reject any or all bids, or to waive informalities.

Bids must be accompanied by bid bond issued by an Idaho licensed surety company, or accompanied by a certified or cashier’s check from an Idaho Bank payable to the Owner in an amount not less than 5% of the total bid. This surety shall be forfeited by the Bidder should the Bidder fail to sign the contract or furnish the required 100% Performance and 100% Payment Bonds.


Bidder shall be licensed in the State of Idaho in accordance with Idaho State Public Works license law, Title 54 - Chapter 19 - Idaho Code Amended. Bidder shall comply with all Equal Employment Opportunity provisions required by federal regulations. Bidder shall be in compliance with State of Idaho Title 44 - Chapter 10, Idaho Code Amended as it relates to payment of wages and employment practices.
Instructions to Bidders

for the following PROJECT:
(Name and location or address)
Nampa Sand Storage Building
Idaho Transportation Department
Nampa, Idaho

THE OWNER:
(Name, legal status and address)
State of Idaho Transportation Department
3311 West State Street
Boise, Idaho 83707

THE ARCHITECT:
(Name, legal status and address)
Hutchison-Smith Architects
270 N. 27th Street
Boise, Idaho 83702

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ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An Additions and Deletions Report that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.
ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 The Bidder by making a Bid represents that:

§ 2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder’s personal observations with the requirements of the proposed Contract Documents.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 COPIES

§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

§ 3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.
§ 3.1.3 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

§ 3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

§ 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS
§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.

§ 3.2.3 Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

§ 3.3 SUBSTITUTIONS
§ 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

§ 3.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect’s decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

§ 3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 ADDENDA
§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4  BIDDING PROCEDURES
§ 4.1 PREPARATION OF BIDS
§ 4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.
§ 4.1.2 All blanks on the bid form shall be legibly executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change."

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder’s refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent’s authority to bind the Bidder.

§ 4.2 BID SECURITY

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Section 6.2.

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, unless otherwise provided in the Bidding Documents, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

§ 4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

§ 4.3 SUBMISSION OF BIDS

§ 4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bid and shall be identified with the Project name, the Bidder’s name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 4.4 MODIFICATION OR WITHDRAWAL OF BID

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the
signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5  CONSIDERATION OF BIDS
§ 5.1 OPENING OF BIDS
At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders.

§ 5.2 REJECTION OF BIDS
The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.3 ACCEPTANCE OF BID (AWARD)
§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner’s judgment, is in the Owner’s own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6  POST-BID INFORMATION
§ 6.1 CONTRACTOR’S QUALIFICATION STATEMENT
Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305, Contractor’s Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

§ 6.2 OWNER’S FINANCIAL CAPABILITY
The Owner shall, at the request of the Bidder to whom award of a Contract is under consideration and no later than seven days prior to the expiration of the time for withdrawal of Bids, furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner’s obligations under the Contract. Unless such reasonable evidence is furnished, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 SUBMITTALS
§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:
1. a designation of the Work to be performed with the Bidder’s own forces;
2. names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the Work; and
3. names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder’s option, (1)
withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND
§ 7.1 BOND REQUIREMENTS
§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder’s usual sources.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 If the Owner requires that bonds be secured from other than the Bidder’s usual sources, changes in cost will be adjusted as provided in the Contract Documents.

§ 7.2 TIME OF DELIVERY AND FORM OF BONDS
§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR
Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.
SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

The following supplements modify, change, delete from or add to the Instructions to Bidders, AIA Document A701, 1997 Edition. Where any Article of the Instruction to Bidders is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by the Supplementary Instructions to Bidders, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.

ARTICLE 3 BIDDING DOCUMENTS
Add to or supplement Article 3, with the following:
3.2.1.1 Where Owner can reasonably establish that a bidder has knowledge or and failed to report a material error, inconsistency, or inaccuracy, Owner may find bidder non-responsive or unresponsible.

ARTICLE 4 BIDDING PROCEDURES
Add to or supplement Article 4, with the following:
4.1.1 A photocopy of the form bound in the Project Manual or a modified form included in an addendum is acceptable.
4.1.7 A corporate seal is not required if not required by the state of incorporation.
4.1.8 Bidder shall be a legal resident of the United States of America and shall only employ legal residents.
4.1.8.1 If the Bidder is a corporation, partnership, sole proprietorship or other legal entity, and employs individual persons, by submitting its bid, the Bidder warrants that is does not knowingly hire or engage any illegal aliens or persons not authorized to work in the United States; it takes steps to verify that it does not hire or engage any illegal aliens or persons not authorized to work in the United States; and that any misrepresentation in this regard or any employment of persons not authorized to work in the United States constitutes a material breach and shall be cause for the imposition of monetary penalties and/or termination of any contract resulting from this bid; or
4.1.8.2 If the Bidder is a natural person eighteen (18) years of age or older,
a. by submitting its bid, Bidder warrants that its bid is subject to Idaho Code section 67-7903 and, pursuant thereto, by submitting its bid, Bidder attests, under penalty of perjury, that it is a United State citizen or legal permanent resident or that it is otherwise lawfully present in the United State pursuant to federal law; and
b. prior to being issued a contract, Bidder will be required to submit proof of lawful presence in the United State in accordance with Idaho Code section 67-7903.
4.1.9 Bids submitted must contain all original signatures in ink on all required forms, including the following:
   - Bid Proposal Form
   - Contractor’s Affidavit concerning Alcohol and Drug-Free Workplace
   - Bidders Acknowledgement Statement
   - Bid Bond
4.2.1 Delete the last sentence.
4.2.1.1 To be considered, proposals must be accompanied by an acceptable security in the amount not less than five (5) percent of the total amount of the bid including add alternates. The security may be in the form of a bond or certified or cashier’s check.
4.2.1.2 A successful bidder who fails to sign the contract for the work or furnish the required bonds within 10 days following the receipt of Notice of Intent to Award a Contract, shall forfeit the security. The Owner may then award the contract to the next lowest bidder.
4.2.2 A standard surety bid bond form meeting all the conditions of the AIA Document A310 is acceptable.
4.2.3.1 The specified time for retainage of the bid security is 45 days after the opening of bids, so long as the
bidding has not been notified of the acceptance of the bid.

4.3.1.1 The mailing envelope containing the bid shall be addressed as follows:

Idaho Transportation Department  
P.O. Box 83720  
Boise, Idaho 83720-0072  
Attn: Tony Pirc - Bid Proposal/Nampa Sand Storage Building

4.3.5 Along with his bid the bidder shall submit an affidavit certifying his compliance with Idaho Code, Title 72, Chapter 17, requiring the contractor and his subcontractors at the time of bid to provide a drug-free workplace program and to maintain such program throughout the duration of the contract.

4.3.6 Along with his bid the bidder shall submit an executed copy of the Bidder’s Acknowledgement Statement provided herein.

ARTICLE 5 CONSIDERATION OF BIDS

Add to Article 5, the following:

5.4 PUBLIC WORKS CONTRACTORS LICENSE
5.4.1 This Public Works project is not financed in whole or in part by Federal Aid Funds. Bid Proposals will be accepted from those contractors only (prime contractors, subcontractor, and/or specialty contractors) who, prior to the bid opening, hold current licenses as public works contractors in the State of Idaho.

5.5 EMPLOYMENT PRACTICES
5.5.1 Bids shall be based on the provisions of Section 44-1001 and 44-1002 of the Idaho Code dealing with labor preference.

5.6 NAMING OF SUBCONTRACTORS
5.6.1 Section 67-2310, Idaho Code, requires general (prime) contractors to include in their bid the name of the subcontractors who shall, in the event the contractor secures the contract, subcontract the plumbing, HVAC, and electrical work under the general prime contract. Failure to name subcontractors, as required, shall render any bid submitted by a general (prime) contractor unresponsive and void. Subcontractors named in accordance with the provisions of this section must possess an appropriate license or certificate of competency issued by the State of Idaho covering the contractor work classification in which the subcontractor is named.

The Idaho Transportation Department requires the bidder to complete Bid Proposal Page 2 in its entirety for all categories of work listed. The Idaho Transportation Department also requires that the general (prime) contractor name the entity that will perform the work, including if the entity is a subcontractor, a sub-subcontractor or the general (prime) contractor submitting the bid. Failure to complete Bid Proposal, Page 2 in full shall render a bid unresponsive and void.

With regard to possessing an appropriate license or certificate of competency all subcontractors listed by the general (prime) contractor must have at the time of the bid opening a current license in the appropriate category (class, type and specialty category) as issued by the Public Works Contractors State License Board. In addition, plumbing, HVAC and electrical subcontractors shall have at the time of the bid opening a valid plumbing contractor’s license, HVAC contractor’s license or electrical contractor’s license, respectively, as issued by the Idaho Division of Building Safety.

In determining if the above listed subcontractors are required on the project, the Idaho Transportation Department will refer to the plans and specifications. If doubt exists prior to bid
closing, potential bidders should contact the Idaho Transportation Department and the
architect/engineer who prepare the plans and specifications will be requested to make the
determination. If plumbing, HVAC, boiler, or electrical work in not shown on the plans and
specifications, but is discovered by the bidder subsequent to the date of bid opening, then the bidder
must request clarification form the architect/engineer. Absent such clarification, work will be
considered incidental and naming of the subcontractor will not be required.

5.7 IDAHO DOMICILED CONTRACTORS

5.7.1 Section 67-2348, Idaho Code, requires the Idaho Transportation Department to apply a preference in
determining which contractor submitted the lowest responsible bid. If the contractor who submitted
the lowest dollar bid is domiciled in a state, which has preference law, which penalizes Idaho
domiciled contractors then the Idaho Transportation Department must apply preference. The
preference that will be applied is the preference la of the domiciliary state of the contractor who
submitted the lowest dollar bid.

Generally speaking, a contractor’s domiciliary state is the state in which the contractor’s home office
is located. If federal fund are involved in the project then no preference will be used.

ARTICLE 6; POST BID INFORMATION

Delete paragraph 6.2

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

Modify and add to Article 7, the following:

In subparagraph 7.2.1, in the first sentence, delete “three days following the date of execution of the Contract”; and
substitute “ten days following the receipt of Notice of Intent to Award”.

7.2.2.1 Performance bond and labor and material payment bond are required for this project; each in an
amount of not less than 100% of the contract amount, and issued by a surety company authorized to do business in
Idaho.

END OF SUPPLEMENTARY INSTRUCTIONS TO BIDDERS
IDAHO TRANSPORTATION DEPARTMENT
NAMPA SAND STORAGE BUILDING

BID PROPOSAL FORM

TO: Idaho Transportation Department
P.O. Box 83720
Boise, Idaho 83720
Attn: Tony Pirc – Bid Proposal/Nampa Sand Storage Building

Bidding Contractor:

In compliance with your Invitation for Bid for the construction of (ITD Project No.18315, Nampa Sand Storage Building), having examined the bidding and contract documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of materials and labor, the Bidder hereby proposes to furnish all labor, materials and supplies, and to provide the service and insurance in accordance with the Bidding Requirements and Contract Documents, within the time set forth therein, and at the price(s) stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents.

Bidder hereby agrees to commence work under this contract on a date to be specified in a written "Notice to Proceed" by the Construction Manager and to substantially complete the Work within 120 consecutive calendar days thereafter.

SCOPE OF WORK:

The complete work of furnishing and installing Nampa Sand Storage Building per plans and specifications.

Provide safety barricades/fencing around work area.

GENERAL PROVISIONS:

Bidder shall assign and provide to the site, a designated, full-time, competent supervisor over all of the bidder’s activities; supervisor shall have knowledge of the trade work and be of capacity to make decisions on the behalf of the Bidder.

The successful bidder shall coordinate with the Owner’s staff as the work progresses with respect to any changes in scope of work, material selections, methods, scheduling and quality.

The “Scope of Work” description above is intended to describe the general scope of the work included in this Bid Package. Incidental work related to the general scope outlined above, not specifically described, is deemed to be included. It is the intent the bidder for this work will provide all resources necessary for complete functioning systems and installations.

It is the responsibility of the bidder to review all of the plans and specifications and include all work described in this Bid Package related to this work that is referenced in all bid documents. Bidder should be familiar with the scope of all other bid packages. The Bidder shall ask any questions and bring to the Construction Manager’s attention, any discrepancies in the bid documents prior to submitting this bid proposal.

It is the responsibility of the bidder to clean up and remove refuse related to their work on a daily basis unless specifically noted otherwise or directed otherwise in the field.
OSHA safety regulations will be strictly enforced. All workers on site will adhere to OSHA required PP&E and be easily identifiable with minimum Hi-Vis Class 2 safety vests worn at all times.

Any and all concerns and questions through to bidding phase will be addressed to the Construction Manager. Do not request clarifications from the Architect, Engineer or the Owner. All questions shall be emailed to Roy Jackson at: rjackson@petrainc.net

Bidder warrants that bid has been prepared and that any contract resulting from acceptance of this bid is subject to Subparagraph 4.1.8.1 of the Supplementary Instructions to Bidders.

BASE PROPOSAL:

Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informality in the bidding.

The bidder agrees that this bid shall be good and may not be withdrawn for a period of 45 calendar days after the scheduled closing time for receiving bids.

The bid security attached in the amount of 5% of the bid amount is to become the property of the Owner in the event the contract and bond are not executed within the time set forth, as liquidated damages for the deal and additional expense to the Owner caused thereby.

Upon receipt of written notice of the acceptance of this bid, Bidder will execute the formal contract attached within 10 days and deliver a Surety Bond or Bonds as required by Article 7 of the Instructions to Bidders as modified by the Supplementary Instructions to Bidders.

Pursuant to Section 67-2310, Idaho Code, commonly known as the naming law, the names and addresses of the entities who will perform the plumbing, heating and air conditioning and electrical work, subject to approval of Owner and Architect, if Undersigned is awarded the Contract, are as follows:

Plumbing (PWCLB Category 15400)
(Name) ____________________________________________
(Address) ____________________________________________
Idaho Public Works Contractors License No. __________________________
Idaho Plumbing Contractors License No. __________________________

Heating, Ventilating & Air Conditioning (HVAC) (PWCLB Category 15700)
(Name) ____________________________________________
(Address) ____________________________________________
Idaho Public Works Contractors License No. __________________________
Idaho HVAC Contractors License No. __________________________

Electrical (PWCLB Category 16000)
(Name) ____________________________________________
(Address) ____________________________________________
Idaho Public Works Contractors License No. __________________________
Idaho Electrical Contractors License No. __________________________
ITD District 3 Shop Maintenance Building,
Bid Package # 1 Hazardous Material Abatement & Selective Demolition Page 3 of 3
FAILURE TO NAME A PROPERLY LICENSED CONTRACTOR IN EACH OF THE ABOVE CATEGORIES WILL RENDER THE BID UNRESPONSIVE AND VOID. If a bidder determines plumbing, heating/air conditioning and/or electrical work is not required to be done by a licensed contractor, bidder should complete the line referencing that work with “Not applicable” and provide an explanation.

Should the listing of subcontractors change due to selection of alternates or other similar circumstances, attach explanation.

Respectfully submitted,

Acknowledge Addenda __________________________________________________________

Bidder agrees to perform all of the base proposal work described in the specifications and shown on the plans for the sum of:

Base Bid Amount: ______________________________________________________________

($ _____________________)

The undersigned notifies that he/she is, of this date, duly licensed as an Idaho Public Works Contractor and further that he/she possesses Idaho Public Works Contractor's License No. __________________, and is domiciled in the State of ________________.

Company Name: ________________________________________________________________

Business Address: _______________________________________________________________

By: ____________________________________________ Title: ____________________________

(Authorized Signature)

Dated this _____ day of ________, 2018

Phone: ___________________ email: _______________________ Fax: _____________________

(Seal - if bid is by a corporation)

Have you remembered to initial and include all pages of this Bid Package, to include your bid security (bid bond or a certified or a cashier’s check), Contractor’s Affidavit Concerning Alcohol and Drug-Free Workplace and a signed copy of the Bidder’s Acknowledgment Statement in with your bid? If these are not included, your bid will be considered non-responsive.

END OF BID PROPOSAL
CONTRACTOR’S AFFIDAVIT
CONCERNING ALCOHOL AND DRUG-FREE WORKPLACE

STATE OF _______________________
COUNTY OF _______________________

Pursuant to the Idaho Code, Section 72-1717, I, the undersigned, being duly sworn, depose and certify that ________________________________ is in compliance with the provisions of Idaho Code section 72-1717; that ________________________________ provides a drug-free workplace program that complies with the provisions of Idaho Code, title 72, chapter 17 and will maintain such program throughout the life of a state construction contract and that ________________________________ shall subcontract work only to subcontractors meeting the requirements of Idaho Code, section 72-1717(1)(a).

Name of Contractor

Address

City and State

By: ________________________________
   (Signature)

Subscribed and sworn to before me this ______________________ day of ______________________, ______.

Commission expires:

______________________________

NOTARY PUBLIC, residing at

______________________________

______________________________

FAILURE TO EXECUTE THIS AFFIDAVIT AND SUBMIT IT ALONG WITH YOUR BID SHALL MAKE YOUR BID NON-RESPONSIVE.

CONTRACTOR’S AFFIDAVIT
ON ALCOHOL AND DRUG-FREE WORKPLACE

BOILR-2005 CM revised 02/27/17

CAdfw - 1

(18-305)
(May, 2018)
BIDDER’S ACKNOWLEDGEMENT STATEMENT

NOTE: THE INFORMATION CONTAINED HEREIN IS A SUMMARY OF VITAL CONTRACT PROVISIONS AND DOES NOT CHANGE THE CONTRACT DOCUMENTS THAT WILL GOVERN THIS PROJECT.

Idaho Transportation Department Project No. 18-315

By submitting a bid for this project, the undersigned bidder agrees that, if awarded the contract for construction, Contractor will conform to all conditions and requirements of the contract, including but not limited to:

- Contractor agrees to comply with subparagraph 13.1.3 of the Supplementary Conditions pertaining to Sections 44-1001 and 44-1002, Idaho Code requiring the employment of 95% bona fide Idaho residents and providing for a preference in the employment of bona fide Idaho residents and regarding the employment of persons not authorized to work in the United States.

- Contractor will substantially complete the work within the time stated in the contract documents, or as modified by Change Order.

- If the Contractor fails to substantially complete the Project within the time stated in the contract documents, or as modified by Change Order, the Contractor agrees that the Owner may deduct from the contract amount liquidated damages in the amount per calendar day indicated in the Contract Documents times the number of calendar days until the project is Substantially Complete, as defined in the Contract Documents and as determined by the Architect (or Engineer).

- The Contractor agrees that the amount allowed for overhead and profit on any Change Order is limited to the amounts indicated in paragraph 7.3.10 of the General Conditions of the Contract for Construction, as supplemented, which are stated below.

  1. for total changes of $10,000 or less in direct cost, the amount allowed for overhead, profit, bonds and insurance for the Contractor and all subcontractors of any tier combined shall not exceed twenty percent (20%) of direct costs.

  2. for total changes exceeding $10,000 in direct cost, the amount allowed for overhead, profit, bonds and insurance for the Contractor and all subcontractors of any tier combined shall not exceed fifteen percent (15%) of direct costs.

  3. the Contractor will determine the amount of overhead and profit to be apportioned between the Contractor and its subcontractor of allowable amounts of overhead, profit, bonds and insurance.

- The Contractor agrees that Change Orders are governed by the General Conditions of the Contract for Construction, as supplemented, including but not limited to Section 7.2.3 and Section 7.2.4 of the Supplementary Conditions:
By the execution of a Change Order, the Contractor agrees and acknowledges that he has had sufficient time and opportunity to examine the change in work which is the subject of the Change Order and that he has undertaken all reasonable efforts to discover and disclose any concealed or unknown conditions which may to any extent affect the Contractor’s ability to perform in accordance with the Change Order. Aside from those matters specifically set forth in the Change Order, the Owner shall not be obligated to make any adjustments to either the Contract Sum or Contract Time by reason of any conditions affecting the change in work addressed by the Change Order that could have reasonably been discovered or disclosed by the Contractor’s examination.

Any Change Order fully executed by the Owner, Contractor and Architect (or Engineer), including but not limited to a Change Order arising by reason of the parties’ mutual agreement or by mediation, shall constitute a final and full settlement of all matters relating to or affected by the change in the Work, including but not limited to, all direct and consequential costs associated with such change and any and all adjustments to the Contract Sum and Contract Time. In the event a Change Order increases the Contract Sum, the Contractor shall include the work covered by such Change Order in the Application for Payment as if such work were originally part of the Project and Contract Documents.

**FAILURE TO EXECUTE THIS ACKNOWLEDGEMENT WILL MAKE THE BID NONRESPONSIVE.**

I, ________________, being duly authorized to bind the bidder ________________, does hereby certify that ________________, has fully read and understands this document and that it highlights certain parts of the contract that will be entered between the parties and that will govern this Project.

Signed: ___________________________________
Title: ____________________
Date: ____________

**END OF BIDDER'S ACKNOWLEDGEMENT STATEMENT**
REQUEST FOR TAX RELEASE

Date: _________________

RE: ITD Project Number: 18-315
    Project Name: Nampa Sand Storage Building
    State Agency: Idaho Transportation Department

Contractor Requesting Release – Name: _____________________________________________
Address: _____________________________________________
___________________________________________
Contact Name: ___________________________________
Telephone Number: _____________________________
Federal Employer Identification No.: ________________

Project Information:
Project is Complete: ________________________________
Project is Substantially Complete: _____________________
Project Start Date: __________________________________
Project Complete Date: _______________________________
Final Contract Amount (including change orders): ________________________________

Did any public works or other governmental agency supply materials, which were installed by this contractor or his subcontractors? Yes ______
No ______
If yes, list these materials and their dollar values: ________________________________

CONTRACTOR’S REQUEST FOR TAX RELEASE

CRTR – 1

BOILR-2005 dbb.doc Revised 02/27/17

(18-305) (May, 2018)
To request a Tax Release, please send this form to:

Attn: Contract Desk; Sales Tax Audit; Idaho State Tax Commission; PO Box 36; Boise, ID 83722
PART 1 GENERAL

1.01 CONTRACTOR IS RESPONSIBLE FOR OBTAINING A VALID LICENSE TO USE ALL COPYRIGHTED DOCUMENTS SPECIFIED BUT NOT INCLUDED IN THE PROJECT MANUAL.

1.02 AGREEMENT AND CONDITIONS OF THE CONTRACT

A. See Section 007200 - General Conditions for the General Conditions.
B. See Section 007300 - Supplementary Conditions for the Supplementary Conditions.
C. The Agreement is based on AIA A132/CMa.
D. The General Conditions are based on AIA A232/CMa.

1.03 FORMS

A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in the Contract Documents.

B. Bond Forms:
   1. Bid Bond Form: AIA A310.
   2. Performance and Payment Bond Form: AIA A312.

C. Post-Award Certificates and Other Forms:
      a. Supplemental Attachment: AIA G715
   2. Application for Payment Forms: AIA G732, AIA G736 and AIA G737 (for Construction Manager as Adviser to compile and summarize contractor’s application and certificate for payment).

D. Clarification and Modification Forms:
   2. Change Order Form (for Construction Manager as Adviser): AIA G701CMa.

E. Closeout Forms:

1.04 REFERENCE STANDARDS

A. AIA A132 - Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; 2009.
C. AIA A310 - Bid Bond; 2010.
D. AIA A312 - Performance Bond and Payment Bond; 2010.
J. AIA G736 - Project Application and Project Certificate for Payment, Construction Manager as Adviser Edition; 2009.
K. AIA G737 - Summary of Contractors' Applications for Payment, Construction Manager as Adviser Edition; 2009.
PART 2 PRODUCTS - NOT USED
PART 3 EXECUTION - NOT USED

END OF SECTION 005000
PART 1 GENERAL

1.01 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR
   A. AIA Document A132/CMa, 2009 Edition, Standard Form of Agreement Between Owner and Contractor - Construction Manager-Adviser Edition will be used as the agreement for this project. Copies of AIA Document A132/CMa are available for review at the offices of the Owner, Architect, and Construction Manager. Copies of the document may be purchased from the American Institute of Architects or its local distributors.

1.02 RELATED REQUIREMENTS
   A. Section 007200 - General Conditions.
   B. Section 007300 - Supplementary Conditions.
   C. Section 014216 - Definitions.

1.03 MODIFICATIONS TO THE AGREEMENT FORM
   A. ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
      1. 3.1 The date of commencement will be fixed by issuance of a "Notice of Intent to Award" and a "Notice to Proceed". Delete the last sentence of paragraph 3.1.
      2. 3.2 Liquidated damages will be included as provided in the Supplementary Conditions.
   B. ARTICLE 5 PAYMENTS
      1. In paragraph 5.2, delete "as follows:" and replace with "a day agreed upon by the Owner and Contractor."
      2. Delete paragraph 5.3 and substitute the following:
      3. 5.3 Provided that an application for payment is received by the Construction Manager on the established date, the Owner shall make payment to the Contractor not later than 21 days from receipt by the Owner of the certification by the Construction Manager.
      4. In subparagraphs 5.6.1 and 5.6.2 Retainage will be five percent (5%) for work completed and material suitably stored.
      5. In subparagraph 5.6.1, delete the last sentence. Delete subparagraphs 5.7.1, 5.7.2 and paragraph 5.8.
      6. No reduction in retainage will be allowed prior to final completion without written approval of the Owner. Refer to Supplementary Condition 9.6.1.1.
      7. Add new paragraph 5.9:
      8. 5.9 A condition will be included forbidding more retainage from a subcontractor or supplier than retained from their portion of the work.
   C. ARTICLE 7 MISCELLANEOUS PROVISIONS
      1. 7.2 Will be modified to agree with paragraph 13.6.1 of the Supplementary Conditions.
      2. 7.4.1 Contractor warrants that it does not knowingly hire or engage any illegal aliens or persons not authorized to work in the United States; it takes steps to verify that it does not hire or engage any illegal aliens or persons not authorized to work in the United States; and that any misrepresentation in this regard or any employment of persons not authorized to work in the United States constitutes a material breach and shall be cause for the imposition of monetary penalties not to exceed five percent (5%) of the total Contract Amount per violation and/or termination of this contract.
   D. ARTICLE 8 TERMINATION OR SUSPENSION
      1. Add to both paragraphs 8.1 and 8.2 "as modified by the Supplementary Conditions."

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 005200
STATE OF IDAHO
COUNTY OF ADA

Pursuant to the Idaho Code, Title 63, Chapter 15, I, the undersigned, being duly sworn, depose and certify that all taxes, excises and license fees due to the State or its taxing units, for which I or my property is liable then due or delinquent, has been paid, or arrangements have been made, before entering into a contract for construction of any public works in the State of Idaho.

Name of Contractor

Address

City and State

By: __________________________ (Signature)

Subscribed and sworn to before me this __________________________ day of __________________________.

Commission expires:

NOTARY PUBLIC, residing at

__________________________
General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

for the following PROJECT:
(Name, and location or address)

Nampa Sand Storage Building
Idaho Transportation Department
Nampa, Idaho

THE CONSTRUCTION MANAGER:
(Name, legal status and address)

Petra, Incorporated
1097 N. Rosario Street, Suite 200
Meridian, Idaho 83642

THE OWNER:
(Name, legal status and address)

State of Idaho Transportation Department
3311 West State Street
Boise, Idaho 83707

THE ARCHITECT:
(Name, legal status and address)

Hutchison-Smith Architects
270 N. 27th Street
Boise, Idaho 83702

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An Additions and Deletions Report that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A132™—2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™—2009, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™—2009, Standard Form of Agreement Between Owner and Construction Manager as Adviser.
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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement), and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor’s bid or proposal, or portions of addenda relating to bidding requirements.

§ 1.1.2 The Contract. The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect’s consultants, (2) between the Owner and the Construction Manager or the Construction Manager’s consultants, (3) between the Owner and the Architect or the Architect’s consultants, (4) between the Contractor and the Construction Manager or the Construction Manager’s consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

§ 1.1.3 The Work. The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor’s obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Multiple Prime Contractors and by the Owner’s own forces, including persons or entities under separate contracts not administered by the Construction Manager.

§ 1.1.5 The Drawings. The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 The Specifications. The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service. Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect’s consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker. The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.
§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization
Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation
In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service
§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect, or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 Transmission of Data in Digital Form
If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER
§ 2.1 General
§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner’s approval or authorization. Except as otherwise provided in Article 4, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner’s authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the s.t.e., and the Owner’s interest therein.

§ 2.2 Information and Services Required of the Owner
§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner’s obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the
portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Unless otherwise provided under the Contract Documents, the Owner, through the Construction Manager, shall secure and pay for the building permit.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner’s control and relevant to the Contractor’s performance of the Work with reasonable promptness after receiving the Contractor’s written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.2.6 The Owner shall endeavor to forward all communications to the Contractor through the Construction Manager and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents.

§ 2.3 Owner’s Right to Stop the Work
If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 Owner’s Right to Carry Out the Work
If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner’s expenses and compensation for the Construction Manager’s and Architect’s and their respective consultants’ additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect, after consultation with the Construction Manager. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR
§ 3.1 General
§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term “Contractor” means the Contractor or the Contractor’s authorized representative.

§ 3.1.2 The plural term “Multiple Prime Contractors” refers to persons or entities who perform construction under contracts with the Owner that are administered by the Construction Manager. The term does not include the Owner’s forces, including persons or entities under separate contracts not administered by the Construction Manager.
§ 3.1.3 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.4 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor
§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor’s review is made in the Contractor’s capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor’s notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures
§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor’s best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instruction concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner, the Construction Manager, and the Architect and shall not proceed with that portion of the Work without further written instructions from the Architect, through the Construction Manager. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.
§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform with the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Owner, as legally enacted when bids are received or negotiations concluded, whether or not the fulfills or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices, and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner, through the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of duly authorized public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect and Construction
Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor’s cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor in writing, stating the reasons. If the Owner or Contractor disputes the Architect’s determination or recommendation, either party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances
§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:
  .1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
  .2 Contractor’s costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
  .3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor’s costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent
§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner and Architect through the Construction Manager, the name and qualifications of a proposed superintendent. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager, or the Architect has reasonable objection to the proposed superintendent or (2) that any of them require additional time to review. Failure of the Construction Manager to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner’s consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor’s Construction Schedules
§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner’s and Architect’s information and the Construction Manager’s approval a Contractor’s construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project schedule to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

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The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor’s Work to avoid conflict with, and as to cause no delay in, the work or activities of other Multiple Prime Contractors or the construction or operations of the Owner’s own forces.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter update it as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Construction Manager’s and Architect’s approval. The Architect and Construction Manager’s approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor’s construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall participate with other Contractors, the Construction Manager and Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager and Architect and incorporated into the approved Project schedule.

§ 3.11 Documents and Samples at the Site
The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These documents shall be available to the Architect and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples
§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.9 through 4.2.11. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Construction Manager Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the Project submittal schedule approved by the Construction Manager and Architect, or in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Multiple Prime Contractors or the Owner’s own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor’s Shop Drawings, Product Data, Samples and similar submittals with related documents submitted by other Multiple Prime Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked...
and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been reviewed and approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect’s approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Construction Manager and Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect’s approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such written notice, the Architect’s approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor’s responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional’s written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 The Contractor shall coordinate the Contractor’s operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner’s own forces or of other Multiple Prime Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner’s own forces or by other Multiple Prime Contractors except with written consent of the Construction Manager.
Owner and such other Multiple Prime Contractors; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the other Multiple Prime Contractors or the Owner the Contractor’s consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up
§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove waste materials, rubbish, the Contractor’s tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner’s approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work
The Contractor shall provide the Owner, Construction Manager and Architect access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights
The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner, Construction Manager and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturer is required by the Contract Documents or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner, Architect, or Construction Manager. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect through the Construction Manager.

§ 3.18 Indemnification
§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager’s and Architect’s consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys’ fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers’ compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER
§ 4.1 General
§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 The Owner shall retain a construction manager lawfully licensed to practice construction management or an entity lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.
§ 4.1.3 Duties, responsibilities and limitations of authority of the Construction Manager and Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Construction Manager, Architect and Contractor. Consent shall not be unreasonably withheld.

§ 4.1.4 If the employment of the Construction Manager or Architect is terminated, the Owner shall employ a successor construction manager or architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 4.2 Administration of the Contract
§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner’s representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner and Construction Manager (1) known deviations from the Contract Documents and from the most recent Project schedule prepared by the Construction Manager, and (2) defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide a staffing plan to include one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner reasonably informed of the progress of the Work, and will report to the Owner and Architect (1) known deviations from the Contract Documents and the most recent Project schedule, and (2) defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Multiple Prime Contractors in accordance with the latest approved Project schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, or charge of, construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor’s rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1, and neither will be responsible for the Contractor’s failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of or be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Construction Manager, and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents. Communications by and with the Architect’s consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with other Multiple Prime Contractors shall be through the Construction Manager and shall be contemporaneously provided to the Architect if those communications are about matters arising out of or related to the Contract Documents. Communications by and with the Owner’s own forces shall be through the Owner.

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents and will notify each other about the rejection. The Construction Manager shall determine in general

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whether the Work of the Contractor is being performed in accordance with the requirements of the Contract Documents and notify the Owner, Contractor and Architect of defects and deficiencies in the Work. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require additional inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, upon written authorization of the Owner, whether or not such Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect’s nor the Construction Manager’s authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data and Samples. Where there are Multiple Prime Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from Contractor and other Multiple Prime Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager’s actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.10 The Architect will review and approve or take other appropriate action upon the Contractor’s submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect’s action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect’s professional judgment to permit adequate review. Upon the Architect’s completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.11 Review of the Contractor’s submittals by the Construction Manager and Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect’s review of the Contractor’s submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Construction Manager and Architect’s review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Construction Manager and Architect, of any construction means, methods, techniques, sequences or procedures. The Architect’s approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.12 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.13 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7 and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.14 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.15 The Construction Manager will assist the Architect in conducting inspections to determine the dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related

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documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.16 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.17 The Architect will interpret and decide matters concerning performance under, and requirements of the Contract Documents on written request of the Construction Manager, Owner or Contractor through the Construction Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.18 Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith.

§ 4.2.19 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.20 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing to the Construction Manager to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include other Multiple Prime Contractors or subcontractors of other Multiple Prime Contractors.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Construction Manager for review by the Owner, Construction Manager and Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager or the Architect has reasonable objection to any such proposed person or entity or, (2) that the Construction Manager, Architect or Owner requires additional time for review. Failure of the Construction Manager, Owner, or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract: Time shall be increased or decreased by the difference, if any, occasioned by such change.
and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor’s Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsibly in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations
By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including responsibility for safety of the Subcontractor’s Work, which the Contractor, by these Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts
§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

1. assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

2. assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor’s rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor’s compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor’s obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY OTHER CONTRACTORS
§ 6.1 Owner’s Right to Perform Construction with Own Forces and to Award Other Contracts
§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner’s own forces, which include persons or entities under separate contracts not administered by the Construction Manager, and to award other contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When the Owner performs construction or operations with the Owner’s own forces including persons or entities under separate contracts not administered by the Construction Manager, the Owner shall provide for coordination of such forces with the Work of the Contractor, who shall cooperate with them.
§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner’s own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11 and 12.

§ 6.2 Mutual Responsibility
§ 6.2.1 The Contractor shall afford the Owner’s own forces, Construction Manager and other Multiple Prime Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor’s construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor’s Work depends for proper execution or results upon construction or operations by the Owner’s own forces or other Multiple Prime Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Construction Manager and Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner’s own forces or other Multiple Prime Contractors’ completed or partially completed construction is fit and proper to receive the Contractor’s Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a separate contractor or to other Multiple Prime Contractors because of the Contractor’s delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays, improperly timed activities, damage to the Work or defective construction by the Owner’s own forces or other Multiple Prime Contractors.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner, separate contractors, or other Multiple Prime Contractors as provided in Section 10.2.5

§ 6.2.5 The Owner and other Multiple Prime Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner’s Right to Clean Up
If a dispute arises among the Contractor, other Multiple Prime Contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7  CHANGES IN THE WORK
§ 7.1 General
§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor; a Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 Change Orders
A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect and Contractor, stating their agreement upon all of the following:

1. The change in the Work;
The amount of the adjustment, if any, in the Contract Sum; and

The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

1. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
2. Unit prices stated in the Contract Documents or subsequently agreed upon;
3. Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
4. As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager and Architect of the Contractor’s agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor’s agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

1. Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers compensation insurance;
2. Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
3. Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
4. Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
5. Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When

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both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work
The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order issued through the Construction Manager and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME
§ 8.1 Definitions
§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion
§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time
§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner, Owner's own forces, Construction Manager, Architect, any of the other Multiple Prime Contractors or an employee of any of them, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration, or by other causes that the Architect, based on the recommendation of the Construction Manager, determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.
ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum
The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 Schedule of Values
Where the Contract is based on a Stipulated Sum or Guaranteed Maximum Price, the Contractor shall submit to the Construction Manager, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor’s Applications for Payment. In the event there is one Contractor, the Construction Manager shall forward to the Architect the Contractor’s schedule of values. If there are Multiple Prime Contractors responsible for performing different portions of the Project, the Construction Manager shall forward the Multiple Prime Contractors’ schedules of values only if requested by the Architect.

§ 9.3 Applications for Payment
§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor’s right to payment as the Owner, Construction Manager or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner’s title to such materials and equipment otherwise protect the Owner’s interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor’s knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 Certificates for Payment
§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager’s receipt of the Contractor’s Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor’s Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor’s Application for Payment from the Construction Manager, the Architect will either issue to the Owner a Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect’s reasons for withholding certification in whole or in part as provided.
§ 9.4.2 Where there are Multiple Prime Contractors performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives the Multiple Prime Contractors’ Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Multiple Prime Contractors; (2) prepare a Summary of Contractors’ Applications for Payment by combining information from each Multiple Prime Contractors’ application with information from similar applications for progress payments from other Multiple Prime Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Multiple Prime Contractors; and (5) forward the Summary of Contractors’ Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.3 Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors’ Applications for Payment from the Construction Manager, the Architect will either issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect’s reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect’s notice of withholding certification to the Contractors.

§ 9.4.4 The Construction Manager’s certification of an Application for Payment or, in the case of Multiple Prime Contractors, a Project Application and Certificate for Payment shall be based upon the Construction Manager’s evaluation of the Work and the information provided as part of the Application for Payment. The Construction Manager’s certification will constitute a representation that, to the best of the Construction Manager’s knowledge, information and belief, the Work has progressed to the point indicated and the quality of the Work is in accordance with the Contract Documents. The certification will also constitute a recommendation to the Architect and Owner that the Contractor be paid the amount certified.

§ 9.4.5 The Architect’s issuance of a Certificate for Payment or in the case of Multiple Prime Contractors, Project Application and Certificate for Payment, shall be based upon the Architect’s evaluation of the Work, the recommendation of the Construction Manager, and information provided as part of the Application for Payment or Project Application for Payment. The Architect’s certification will constitute a representation that, to the best of the Architect’s knowledge, information and belief, the Work has progressed to the point indicated, that the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified.

§ 9.4.6 The representations made pursuant to Sections 9.4.4 and 9.4.5 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.7 The issuance of a separate Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed the Contractor’s construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor’s right to payment or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager’s or Architect’s opinion the representations to the Owner required by Section 9.4.4 and 9.4.5 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.3. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of

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subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager’s or Architect’s opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

1. defective Work not remedied;
2. third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
3. failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
4. reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
5. damage to the Owner or a separate contractor;
6. reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
7. repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager and both will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment or Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Construction Manager and Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor’s portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Construction Manager will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner, Construction Manager and Architect on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner, Construction Manager nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary.
liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 Failure of Payment
If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager’s receipt of the Contractor’s Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days’ written notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor’s reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion
§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect’s inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the requirements of the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion.

§ 9.8.4 When the Architect assisted by the Construction Manager, determines that the Work or designated portion thereof is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibility assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use
§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall
be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment
§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a written notice that the Work is ready for final inspection and acceptance and shall also forward to the Construction Manager a final Contractor’s Application for Payment. Upon receipt, the Construction Manager will evaluate the completion of Work of the Contractor and then forward the notice and Application, with the Construction Manager’s recommendations, to the Architect who will promptly make such inspection. When the Architect, finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager’s and Architect’s final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor’s being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner’s property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys’ fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than the retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

1. liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
2. failure of the Work to comply with the requirements of the Contract Documents; or
3. terms of special warranties required by the Contract Documents.
§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY
§ 10.1 Safety Precautions and Programs
The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor’s safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager’s responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 10.2 Safety of Persons and Property
§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to
.1 employees on the Work and other persons who may be affected thereby;
.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor’s Subcontractors or Sub-subcontractors;
.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction; and
.4 construction or operations by the Owner or other Contractors.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4, except damage or loss attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor’s obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor’s organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor’s superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property
If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured,
shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials
§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to, asbestos or polychlorinated biphenyl (PCB) encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner, Construction Manager and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor’s written notice, the Owner shall obtain the services of a licensed laboratory to verify a presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection.

When the material or substance has been rendered harmless, Work in the affected area shall resumed upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor’s reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys’ fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor’s fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner’s fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies
In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor’s discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.
ARTICLE 11 INSURANCE AND BONDS
§ 11.1 Contractor's Liability Insurance
§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:
1. Claims under workers' compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
2. Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
3. Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
4. Claims for damages insured by usual personal injury liability coverage;
5. Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
6. Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and
7. Claims for bodily injury or property damage arising out of completed operations; and
8. Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.13.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be submitted to the Construction Manager for transmittal to the Owner with a copy to the Architect prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Construction Manager, the Construction Manager's consultants, the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 Owner's Liability Insurance
The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 Property Insurance
§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or
entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for the Architect’s, Contractor’s, and Construction Manager’s services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Construction Manager, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 Loss of Use Insurance. The Owner, at the Owner’s option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner’s property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner’s property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, adjoining or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that
the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days’ prior written notice has been given to the Contractor.

§ 11.3.7 Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees each of the other, and (2) the Construction Manager, Architect, Architect’s consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as the Owner and Contractor may have to the proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Construction Manager, Construction Manager’s consultants, Architect, Architect’s consultants, Owner’s separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner’s property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgage clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner’s duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner’s exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or distribution of insurance proceeds in accordance with the direction of the arbitrators.

§ 11.4 Performance Bond and Payment Bond

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager’s or Architect’s request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their observation and be replaced at the Contractor’s expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered which the Construction Manager or Architect has not specifically requested to observe prior to its being covered, the Construction Manager or Architect may request to see such Work.
and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner’s expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor’s expense unless the condition was caused by the Owner or one of the other Contractors in which event the Owner shall be responsible for payment of such costs.

§ 12.2 Correction of Work
§ 12.2.1 Before or After Substantial Completion
The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager’s and Architect’s services and expenses made necessary thereby, shall be at the Contractor’s expense.

§ 12.2.2 After Substantial Completion
§ 12.2.2.1 In addition to the Contractor’s obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition during the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors or other Multiple Prime Contractors caused by the Contractor’s correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor’s liability with respect to the Contractor’s obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work
If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.
ARTICLE 13  MISCELLANEOUS PROVISIONS
§ 13.1 Governing Law
The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns
13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner’s rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 Written Notice
Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity or to an officer of the corporation for which it was intended; or if delivered at or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 Rights and Remedies
§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

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

§ 13.5 Tests and Inspections
§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Construction Manager, Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Construction Manager and Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs except as provided in Section 13.5.3, shall be at the Owner’s expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Construction Manager’s and Architect’s services and expenses shall be at the Contractor’s expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.
§ 13.5.5 If the Constructor Manager or Architect is to observe tests, inspections or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 Interest
Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 Time Limits on Claims
The Owner and the Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and the Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Constructor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;  
.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;  
.3 Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or  
.4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor’s request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Constructor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If any of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days’ written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Constructor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner’s obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days’ written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, after consultation with the Construction Manager, and upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor’s surety, if any, seven days’ written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

1. Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

2. Accept assignment of subcontracts pursuant to Section 5.4; and

3. Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager’s and Architect’s services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

1. that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

2. that an equitable adjustment is made or denied under another provision of this Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner’s convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner’s convenience, the Contractor shall

1. cease operations as directed by the Owner in the notice;

2. take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

3. except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner’s convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.
ARTICLE 15  CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 Notice of Claims. Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Construction Manager and/or Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 Continuing Contract Performance. Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Construction Manager will prepare Change Orders and the Architect will issue a Certificate for Payment or Project Certificate for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.4 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.3.

§ 15.1.5 Claims for Additional Time

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor’s Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 Claims for Consequential Damages. The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes:

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party’s termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5)
advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker’s sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner’s expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect and Construction Manager, if the Architect or Construction Manager is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor’s default, the Owner may, but is not obligated to, notify the surety and request the surety’s assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic’s lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation
§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator’s fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.
§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.
**1.0 INTRODUCTION**

This Foundation Investigation Report is to evaluate the subgrade soil conditions for the erection of a sand shed (Bldg. Y-387) at ITD’s new Nampa Maintenance Yard Facility. The project site location is shown on Figure 1 and is located approximately 1.5 miles north of I-84 in the City of Nampa, Idaho on Ten Lane.
2.0 SITE INVESTIGATION

The proposed site is currently being used for agricultural crop production. The subsurface soils were investigated by excavating eight backhoe test pits to depths ranging from 5.0-11.5 feet. Figure 2 shows the typical subsurface soils at the time of excavation. The location of the backhoe pits and the preliminary site plan is shown in Appendix A.

![Figure 2 - Typical Backhoe Test Pit Soil Profile](image)

The soils on the project site consist of 1.0 to 1.5 feet of sandy silt topsoil (ML) with mostly silty sand (SM) below this topsoil layer. The silty sand (SM) is inter-bedded with lenses of caliche. Groundwater was present in BH-1 at approximately 9.0 feet in depth. This backhoe pit is located at the lowest point on the project site and is not expected to be an issue for the construction of the spreadfootings for the sand shed.

Dynamic Cone Penetrometer (DCP) tests were taken in each of the backhoe pits to estimate the insitu density of the subsurface materials. The soil materials were classified by visual/hand methods for organic content, plasticity, dry strength, and hand screened for fines classification. The soil profiles for these backhoe pits are summarized on Table 1 and the logs are included in Appendix B.

Grab samples were collected from the backhoe pits and evaluated in the D3 laboratory for soil gradation and Atterberg Limits. The result of this laboratory testing is shown in Appendix C and on the logs.
The nearest backhoe pit to the proposed sand shed location is BH-4. The log for this pit indicates that the soils are relatively loose at the surface but are indicated to firm up at the footing depth.

**TABLE 1 – BACKHOE TEST PIT SUMMARY**

<table>
<thead>
<tr>
<th>BH-1</th>
<th>BH-2</th>
<th>BH-3</th>
<th>BH-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>Depth</td>
<td>Soil</td>
<td>Depth</td>
</tr>
<tr>
<td>ML</td>
<td>10.00</td>
<td>ML</td>
<td>1.00</td>
</tr>
<tr>
<td>SW</td>
<td>11.50</td>
<td>SM</td>
<td>6.50</td>
</tr>
</tbody>
</table>

**3.0 ENGINEERING CONSIDERATIONS**

Shallow spread footing foundations are recommended for supporting this structure. D3 Materials recommends that the site be graded to drain away from the shed at a minimum grade of 2% in all directions for a minimum of 50 feet.

Remove the upper 12 inches of topsoil for all areas used for truck traffic. Construct an all-weather surface consisting of 12 inches of Class II Rock Cap per Subsection 703.08.

The recommended frost depth for Nampa, Idaho is 24 inches. The top of the spread footings should be placed below this depth in reference to the finished grade. The footing foundations are recommended be excavated 12” below the base of the footing, compacted, and then backfilled with 12” of compacted ¾” Aggregate for Untreated Base Type A per Subsection 703.04. This footing aggregate base should be extended a minimum of 24” outside the footing base. All compaction shall conform to Class A standards.

Table 2 summarizes the estimated engineering properties to be used for design purposes based on the over excavation of native materials and subsequent backfill using ¾” Aggregate for Untreated Base Type A as the foundation material.

**TABLE 2 – ESTIMATED ENGINEERING PROPERTIES FOR SPREAD FOOTING**

<table>
<thead>
<tr>
<th>ESTIMATED SOIL ENGINEERING PROPERTIES</th>
<th>EQUIVALENT FLUID PRESSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation Type: 3/4” Type B Base</td>
<td>Compaction: Class A</td>
</tr>
<tr>
<td>Dry Unit Weight: 125 pcf</td>
<td>Active Condition EFP: 35 pcf</td>
</tr>
<tr>
<td>Friction Angle: 35°</td>
<td>At-Rest Condition EFP: 55 pcf</td>
</tr>
<tr>
<td>Cohesion: 0 psf</td>
<td>Passive Condition EFP: 445 pcf</td>
</tr>
<tr>
<td>Coefficient of Friction: 0.45</td>
<td></td>
</tr>
<tr>
<td>Allowable Bearing Pressure: 3 ksf</td>
<td></td>
</tr>
</tbody>
</table>
4.0 SEISMIC CONSIDERATIONS
This structure is located in an area with the following seismic acceleration coefficients (7% probability of exceedence in 75 years). These values were obtained from Figures 630.04.01.1 through 630.04.01.3 in the ITD Materials Manual. The Site Class was determined using Table 630.04.01.1 Site Classes for Seismic Design as shown in Table 3. Liquefaction is not a concern for this site.

<table>
<thead>
<tr>
<th>Site Class</th>
<th>Horizontal Peak Ground Acceleration (PGA) Coeff.</th>
<th>Horizontal Response Spectral Acceleration Coeff. at Period of 0.2 sec. (S\textsubscript{s})</th>
<th>Horizontal Response Spectral Acceleration Coeff. at Period of 1 sec. (S\textsubscript{i})</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>0.08</td>
<td>0.18</td>
<td>0.07</td>
</tr>
</tbody>
</table>

5.0 DOCUMENT SEAL
Prepared By: David A. Richards, PE
District 3 Materials
Appendix A

Project Plan
FIGURE 2 – BACKHOE TEST PIT LOCATIONS
Appendix B
Backhoe Pit Logs
## CONDITION SURVEY LOGS

**DATE DRILLED:** 4/12/2017

**COUNTY:** Canyon

**PROJECT NUMBER:**

**PROJECT NAME:** Nampa Sand Shed

**DRILLER/CONTRACTOR:**

**LOGGED BY:** Keith Nottingham

**GEOLOGIST:** Keith Nottingham

**DRILLING METHOD:** Backhoe

**COLLAR ELEV.:** 2460' + -

**ROUTE/SEGMENT/MILEPOST:**

**GPS COORDINATES:** LAT: 43.62159873º / Long: -116.58265436º

**ELEV. (ft)** | **DEPTH (ft)** | **LITHOLOGY** | **MATERIAL DESCRIPTION (Stratification lines represent approximate boundaries between materials.)** | **LAB DATA** | **TESTS**
---|---|---|---|---|---
2460.0 | 11.5 | (ML) Light Brown Sandy Silt with Organic Roots | 28 5 | 17-3DI-0021 1-P 0' - 1.4' (ML) Fines = 59.8% |
2462.5 | 7.5 | (SM) Light Brown Silty Sand with Caliche (Hard/Compact) | 35 4 | 17-3DI-0022 2-P 1.4' - 2' (SM) Fines = 39.3% |
2465.0 | 5.0 | (SM) Light Brown Silty Sand with Caliche (Moist Soft) | 37 4 | 17-3DI-0023 3-P 2' - 7' (SM) Fines = 26.0% |
2467.5 | 2.5 | (ML) Light Brown Sandy Silt with Organic Roots | 28 5 | 17-3DI-0021 1-P 0' - 1.4' (ML) Fines = 59.8% |
2470.0 | 1.0 | (SW-SM) Light Brown Well Graded Sand with Silt (Clean) | 25 NV | 17-3DI-0025 5-P 10' - 11.5' (SW-SM) Fines = 11.9% |

**GROUNDWATER MEASUREMENT(S):** 9.0'

**DISTRICT 3**

**COUNTY KEY NUMBER:**

**PROJECT NUMBER:**

**PROJECT NAME:** Nampa Sand Shed

**GROUNDWATER MEASUREMENT(S):** 9.0'

**GPS COORDINATES:** LAT: 43.62159873º / Long: -116.58265436º

**ELEV. (ft)** | **DEPTH (ft)** | **LITHOLOGY** | **MATERIAL DESCRIPTION (Stratification lines represent approximate boundaries between materials.)** | **LAB DATA** | **TESTS**
---|---|---|---|---|---
2460.0 | 11.5 | (ML) Light Brown Sandy Silt with Organic Roots | 28 5 | 17-3DI-0021 1-P 0' - 1.4' (ML) Fines = 59.8% |
2462.5 | 7.5 | (SM) Light Brown Silty Sand with Caliche (Hard/Compact) | 35 4 | 17-3DI-0022 2-P 1.4' - 2' (SM) Fines = 39.3% |
2465.0 | 5.0 | (SM) Light Brown Silty Sand with Caliche (Moist Soft) | 37 4 | 17-3DI-0023 3-P 2' - 7' (SM) Fines = 26.0% |
2467.5 | 2.5 | (ML) Light Brown Sandy Silt with Organic Roots | 28 5 | 17-3DI-0021 1-P 0' - 1.4' (ML) Fines = 59.8% |
2470.0 | 1.0 | (SW-SM) Light Brown Well Graded Sand with Silt (Clean) | 25 NV | 17-3DI-0025 5-P 10' - 11.5' (SW-SM) Fines = 11.9% |

**COUNTY KEY NUMBER:**

**PROJECT NUMBER:**

**PROJECT NAME:** Nampa Sand Shed

**GROUNDWATER MEASUREMENT(S):** 9.0'

**GPS COORDINATES:** LAT: 43.62159873º / Long: -116.58265436º

**ELEV. (ft)** | **DEPTH (ft)** | **LITHOLOGY** | **MATERIAL DESCRIPTION (Stratification lines represent approximate boundaries between materials.)** | **LAB DATA** | **TESTS**
---|---|---|---|---|---
2460.0 | 11.5 | (ML) Light Brown Sandy Silt with Organic Roots | 28 5 | 17-3DI-0021 1-P 0' - 1.4' (ML) Fines = 59.8% |
2462.5 | 7.5 | (SM) Light Brown Silty Sand with Caliche (Hard/Compact) | 35 4 | 17-3DI-0022 2-P 1.4' - 2' (SM) Fines = 39.3% |
2465.0 | 5.0 | (SM) Light Brown Silty Sand with Caliche (Moist Soft) | 37 4 | 17-3DI-0023 3-P 2' - 7' (SM) Fines = 26.0% |
2467.5 | 2.5 | (ML) Light Brown Sandy Silt with Organic Roots | 28 5 | 17-3DI-0021 1-P 0' - 1.4' (ML) Fines = 59.8% |
2470.0 | 1.0 | (SW-SM) Light Brown Well Graded Sand with Silt (Clean) | 25 NV | 17-3DI-0025 5-P 10' - 11.5' (SW-SM) Fines = 11.9% |

Bottom of hole at 11.5 feet.
## CONDITION SURVEY LOGS

**DATE DRILLED:** 4/12/2017

**SHEET 1 of 1**

<table>
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<th>COLLAR ELEV.</th>
<th>ROUTE/SEGMENT/MILEPOST</th>
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### LAB DATA

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<th>DEPTH (ft)</th>
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<th>MATERIAL DESCRIPTION</th>
<th>LL (%)</th>
<th>PI (%)</th>
<th>MC (%)</th>
<th>DEPTH (ft)</th>
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<tr>
<td>0.90</td>
<td>DCP Blows Per 3&quot;</td>
<td>(ML) Light Brown Sandy Silt with Organic Roots (Loose)</td>
<td>30</td>
<td>4</td>
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<tr>
<td>1.80</td>
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<td>(SM) Light Brown Silty Sand with Caliche Mottled (Hard/Compact)</td>
<td>0.90</td>
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<td></td>
<td>1.80</td>
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<tr>
<td>2.80</td>
<td></td>
<td>(SM) Light Brown Silty Sand with Caliche</td>
<td>1.90</td>
<td></td>
<td></td>
<td>1.90</td>
</tr>
<tr>
<td>6.50</td>
<td></td>
<td>(SM) Light Brown Silty Sand with Caliche (Hard/Compact)</td>
<td>35</td>
<td>NV</td>
<td>3.70</td>
<td>3.70</td>
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**ASTM D6951/D6951M Dynamic Cone Penetrometer 17.6 lb (8kg) Hammer**

Bottom of hole at 6.5 feet.
<table>
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<tr>
<th>ELEV. (ft)</th>
<th>DEPTH (ft)</th>
<th>DCP Blows Per 3&quot;</th>
<th>LITHOLOGY</th>
<th>MATERIAL DESCRIPTION</th>
<th>LAB DATA</th>
<th>TESTS AND REMARKS</th>
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<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
<td>(ML) Light Brown Sandy Silt with Organic Roots</td>
<td></td>
<td>0.90 0.90</td>
<td>DCP 0.0’ - 2.95’ (Initial drop 0.2’)</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
<td>(SM) Light Brown Silty Sand with Caliche (Hard/Compact)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>6</td>
<td>(SM) Light Brown Silty Sand with Caliche Mottled (Hard/Compact)</td>
<td></td>
<td>37 5 0.70</td>
<td>17-3Dl-0026 8-P 2.5’ - 3.5’ (ML) Fines = 56.3%</td>
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<tr>
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<td>42 6 3.50</td>
<td>17-3Dl-0029 9-P 3.5’ - 4.2’ (SM) Fines = 48.1%</td>
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<tr>
<td>2</td>
<td>12</td>
<td>2455.0</td>
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Bottom of hole at 6.5 feet.
### CONDITION SURVEY LOGS

**DATE DRILLED:** 4/12/2017

**DISTRIBUT 3**

**KEY NUMBER**

**PROJECT NUMBER**

**PROJECT NAME** Nampa Sand Shed

**COUNTY** Canyon

**GROUNDWATER MEASUREMENT(S)** No Water Encountered

**DRILLER/CONTRACTOR**

**LOGGED BY** Keith Nottingham

**GEOLOGIST** Keith Nottingham

**DRILLING METHOD** Backhoe

**LOCATION**

**COLLAR ELEV.** 2462' + -

**ROUTE/SEGMENT/MILEPOST**

**GPS COORDINATES** Lat: 43.62197326º / Long: -116.58143529º

**STATION**

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<th>MATERIAL DESCRIPTION</th>
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<th>PI (%)</th>
<th>MC (%)</th>
<th>THICKNESS (ft)</th>
<th>DEPTH (ft)</th>
<th>TESTS AND REMARKS</th>
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<tr>
<td>2460.0</td>
<td>2.5</td>
<td>(ML) Brown Sandy Silt with Organic Roots</td>
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<td>1.00</td>
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<td></td>
<td></td>
<td>1.00</td>
<td>DCP 0.0' - 2.8' (Initial drop 0.3')</td>
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<tr>
<td>2457.5</td>
<td>5.0</td>
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<td>2.50</td>
<td></td>
<td></td>
<td>2.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(SM) Light Brown Silty Sand with some Caliche (Hard/Compact)</td>
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<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td>3.50</td>
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<tr>
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<td>(SM) Light Brown Silty Sand with Caliche</td>
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<td>1.50</td>
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Bottom of hole at 5.0 feet.
## CONDITION SURVEY LOGS

**DATE DRILLED:** 4/12/2017  
**SHEET 1 of 1**

### GENERAL INFORMATION

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<table>
<thead>
<tr>
<th>DRILLER/CONTRACTOR</th>
<th>LOGGED BY</th>
<th>GEOLOGIST</th>
<th>DRILLING METHOD</th>
<th>LOCATION</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Keith Nottingham</td>
<td>Keith Nottingham</td>
<td>Backhoe</td>
<td></td>
</tr>
</tbody>
</table>

### COLLAR ELEVATION

**LAT:** 43.62260501º  
**LONG:** -116.5829769º

### GPS COORDINATES

<table>
<thead>
<tr>
<th>STATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

### COLLAR ELEVATION

1. **2460' +**

### MATERIAL DESCRIPTION

(Stratification lines represent approximate boundaries between materials.)

<table>
<thead>
<tr>
<th>ELEV. (ft)</th>
<th>DEPTH (ft)</th>
<th>LITHOLOGY</th>
<th>MATERIAL DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>(ML)</td>
<td>Brown Sandy Silt with Organic Roots</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>(SM)</td>
<td>Light Brown Silty Sand with Caliche</td>
</tr>
<tr>
<td>2460.0</td>
<td>5.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2457.5</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2455.0</td>
<td>5.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### LAB DATA

<table>
<thead>
<tr>
<th>LL (%)</th>
<th>PI (%)</th>
<th>MC (%)</th>
<th>THICKNESS (ft)</th>
<th>DEPTH (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>3.05</td>
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<tr>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
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<td>4.50</td>
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<tr>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>5.50</td>
</tr>
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</table>

### TESTS AND REMARKS

- **ASTM D6951/D6951M**  
  Dynamic Cone Penetrometer 17.6 lb (8kg) Hammer

- **CONDITION SURVEY LOGS**
  - Bottom of hole at 5.5 feet.
<table>
<thead>
<tr>
<th>ELEV. (ft)</th>
<th>DEPTH (ft)</th>
<th>LITHOLOGY</th>
<th>MATERIAL DESCRIPTION (Stratification lines represent approximate boundaries between materials.)</th>
<th>LL (%)</th>
<th>PI (%)</th>
<th>MC (%)</th>
<th>LAYER THICKNESS (ft)</th>
<th>DEPTH (ft)</th>
<th>TESTS AND REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2460.0</td>
<td>2.5</td>
<td>(ML) Brown Sandy Silt with Organic Roots</td>
<td>1.00</td>
<td></td>
<td></td>
<td>DCP 0.0' - 2.8' (Initial drop 0.3')</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2457.5</td>
<td>5.0</td>
<td>(SM) Light Brown Silty Sand with Caliche</td>
<td>4.80</td>
<td></td>
<td></td>
<td>ASTM D6951/D6951M Dynamic Cone Penetrometer 17.6 lb (8kg) Hammer</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bottom of hole at 5.8 feet.
## Condition Survey Logs

### Project Information
- **District**: District 3
- **Key Number**: Canyon
- **Project Number**: Nampa Sand Shed
- **Project Name**: Nampa Sand Shed
- **Groundwater Measurement(s)**: No Water Encountered
- **Logging by**: Keith Nottingham
- **Geologist**: Keith Nottingham
- **Drilling Method**: Backhoe
- **GPS Coordinates**: Lat: 43.62260453° / Long: -116.58143137°
- **Station**: 2462' + -

### Geological Survey

<table>
<thead>
<tr>
<th>Elev. (ft)</th>
<th>Depth (ft)</th>
<th>DCP Blows Per 3&quot;</th>
<th>Lithology</th>
<th>Material Description</th>
<th>Lab Data</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2460.0</td>
<td>2.5</td>
<td>1</td>
<td>(ML) Brown Sandy Silt with Organic Roots</td>
<td>1.00 DCP 0.0' - 2.8' (Initial drop 0.4')</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2457.5</td>
<td>5.0</td>
<td>2</td>
<td>(SM) Light Brown Silty Sand with Caliche</td>
<td>4.00 ASTM D6951/D6951M Dynamic Cone Penetrometer 17.6 lb (8kg) Hammer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Bottom of hole at 5.0 feet.**
**CONDITION SURVEY LOGS**

**DATE DRILLED:** 4/12/2017

**COUNTY:** Canyon  
**GROUNDWATER MEASUREMENT(S):** No Water Encountered

**DRILLER/CONTRACTOR:****   
**LOGGED BY:** Keith Nottingham  
**GEOLOGIST:** Keith Nottingham

**DRILLING METHOD:** Backhoe  
**LOCATION:**

**COLLAR ELEV.:** 2461.5’ + -  
**ROUTE/SEGMENT/MILEPOST:**

**GPS COORDINATES:**  
LAT: 43.62297256º / Long: -116.58195922º

**DRILLER/CONTRACTOR LOGGED BY GEOLOGIST**

<table>
<thead>
<tr>
<th>ELEV. (ft)</th>
<th>DEPTH (ft)</th>
<th>LITHOLOGY</th>
<th>MATERIAL DESCRIPTION</th>
<th>LAB DATA</th>
<th>TESTS AND REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2460.0</td>
<td></td>
<td>1</td>
<td>(ML) Brown Sandy Silt with Organic Roots</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2457.5</td>
<td></td>
<td>2</td>
<td>(SM) Light Brown Silty Sand with Caliche</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 2455.0     | 2.5        | 2         |                       | 36 7     | DCP 2.8’ - 6.30’ (Initial drop 0.2’)
|            | 4          | 3         | (SM) Light Brown Silty Sand Mottled with Caliche |          | 17-3DI-0031 11-P 7’ - 8’ (SM)
|            | 5          | 4         |                       | 36 NV    | 17-3DI-0032 12-P 8’ - 8.7’ (SM)
|            | 7.5        | 7         | (SM) Light Brown Silty Sand with some Caliche (Hard/Compact) |          |                   |
|            | 13         | 12        | (SM) Light Brown Silty Sand with some Caliche (Hard/Compact)/(Very Weak Rock) |          |                   |

Bottom of hole at 8.7 feet.
Appendix C
Laboratory Results
SOILS TEST REPORT

District Worksheet

KEY NUMBER: JB/A405003
TEST HOLE: BH-1
DEPT: 0.0' - 1.4'
STA: N/A
COUNTY: Canyon

DESCRIPTION OF SOIL: Sandy Silt (ML)

Mechanical Analysis % Pass

<table>
<thead>
<tr>
<th>Mass of Dry Sample</th>
<th>#8</th>
<th>#16</th>
<th>#30</th>
<th>#40</th>
<th>#50</th>
<th>#100</th>
<th>#200</th>
</tr>
</thead>
<tbody>
<tr>
<td>626.5</td>
<td>9.7</td>
<td>24.9</td>
<td>50.0</td>
<td>71.1</td>
<td>100.0</td>
<td>151.6</td>
<td>252.0</td>
</tr>
</tbody>
</table>

Soil Properties

<table>
<thead>
<tr>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
<th>Plastic Index</th>
<th>Specific Gravity (+3/4&quot;)</th>
<th>Specific Gravity (-No. 4)</th>
<th>Sand Equivalent</th>
<th>R - Value</th>
<th>Exp. Pressure, PSI</th>
<th>Unified Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>23</td>
<td>5</td>
<td>98.5</td>
<td>96.0</td>
<td>92.0</td>
<td>88.7</td>
<td>84.0</td>
<td>ML</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

AASHTO Classification: A-4

Soil Properties

<table>
<thead>
<tr>
<th>pH</th>
<th>Resistivity (ohm-cm)</th>
<th>Organic Moisture (%)</th>
<th>Plasticity</th>
<th>Dry Strength</th>
<th>Dilatency</th>
<th>Toughness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low</td>
<td>None</td>
<td>Rapid</td>
<td>Low</td>
</tr>
</tbody>
</table>

Remarks: This report covers only material as represented by sample and does not necessarily cover all soil from this layer or source.
SOILS TEST REPORT

District Worksheet

DISTRICT 3  SAMPLE NUMBER  2  LAB NUMBER  17-3DI-0022

KEY NUMBER  PROJECT NUMBER  PROJECT NAME  Nampa Sand Shed
IDENT. No.  JB/A405003  TEST HOLE  BH-1  DEPTH  1.4' -  2.0'
SUBMITTED BY  Keith Nottingham  FOR  John Arambarri  DATE SAMPLED  4/12/17  DATE RECEIVED  4/13/17
DESCRIPTION OF SOIL  Silty Sand (SM)  SOURCE NUMBER  N/A  COUNTY  Canyon

Remarks: This report covers only material as represented by sample and does not necessarily cover all soil from this layer or source.
### Mechanical Analysis % Pass

<table>
<thead>
<tr>
<th>Mass of Dry Sample</th>
<th>784.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>100.0</td>
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<tr>
<td>3/4&quot;</td>
<td>9.9</td>
</tr>
<tr>
<td></td>
<td>98.7</td>
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<tr>
<td>1/2&quot;</td>
<td>13.2</td>
</tr>
<tr>
<td></td>
<td>98.3</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>16.5</td>
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<tr>
<td></td>
<td>97.9</td>
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<tr>
<td>#4</td>
<td>27.4</td>
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<td></td>
<td>96.5</td>
</tr>
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<td>#8</td>
<td>64.4</td>
</tr>
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<td></td>
<td>91.8</td>
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<tr>
<td>#16</td>
<td>158.7</td>
</tr>
<tr>
<td></td>
<td>79.8</td>
</tr>
<tr>
<td>#30</td>
<td>294.8</td>
</tr>
<tr>
<td></td>
<td>62.4</td>
</tr>
<tr>
<td>#40</td>
<td>350.1</td>
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<td>55.4</td>
</tr>
<tr>
<td>#50</td>
<td>394.4</td>
</tr>
<tr>
<td></td>
<td>49.7</td>
</tr>
<tr>
<td>#100</td>
<td>475.7</td>
</tr>
<tr>
<td></td>
<td>39.3</td>
</tr>
<tr>
<td>#200</td>
<td>580.0</td>
</tr>
<tr>
<td></td>
<td>26.0</td>
</tr>
</tbody>
</table>

### Soil Properties

| Liquid Limit | 37 |
| Plastic Limit | 33 |
| Plastic Index | 4 |
| Specific Gravity (+3/4") | |
| Specific Gravity (-No. 4) | |
| Sand Equivalent | |
| R - Value | |
| Exp. Pressure, PSI | |
| Cc | Cu |
| Unified Classification | SM |
| AASHTO Classification: | A-2-4 |

**Remarks:** This report covers only material as represented by sample and does not necessarily cover all soil from this layer or source.
**SOILS TEST REPORT**

**DISTRIBUTION 3**

**SAMPLE NUMBER 4**

**LAB NUMBER 17-3DI-0024**

**KEY NUMBER**

**PROJECT NUMBER**

**PROJECT NAME** Nampa Sand Shed

**IDENT. No.** JB/A405003

**TEST HOLE** BH-1

**DEPTH** 7.0’ - 9.0’

**STA.**

**GPS** N 43.62159873º / W -116.58265436º

**SUBMITTED BY** Keith Nottingham

**FOR** John Arambarri

**DATE Sampled** 4/12/17

**DATE RECEIVED** 4/13/17

**DESCRIPTION OF SOIL** Silty Sand (SM)

**SOURCE NUMBER** N/A

**COUNTY** Canyon

**COMMENTS**

### Mechanical Analysis % Pass

<table>
<thead>
<tr>
<th>Mass of Dry Sample</th>
<th>U.S. SIEVE NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>516.8</td>
<td>100</td>
</tr>
</tbody>
</table>

| U.S. SIEVE OPENING IN INCHES | 6 | 4 | 3 | 1 1/2 | 1 3/4 | 2 | 2 1/2 | 3 | 4 | 6 | 8 | 10 | 16 | 20 | 30 | 40 | 50 | 60 | 100 | 140 | 200 |
|-----------------------------|---|---|---|-------|-------|---|-------|---|---|---|---|-----|-----|-----|----|----|----|----|----|----|-----|----|-----|
| PERCENT FINER BY WEIGHT     | 100|    |    |       |       | 90 |       |    |    |    |    |      |     |      |    |    |    |    |    |    |    |    |
| GRAIN SIZE IN MILLIMETERS   | 100|    |    |       |       | 90 |       |    |    |    |    |      |     |      |    |    |    |    |    |    |    |    |

### Soil Properties

**Liquid Limit** 32

**Plastic Limit** 27

**Plastic Index** 5

**Specific Gravity (+3/4”)**

| U.S. SIEVE OPENING IN INCHES | 6 | 4 | 3 | 1 1/2 | 1 3/4 | 2 | 2 1/2 | 3 | 4 | 6 | 8 | 10 | 16 | 20 | 30 | 40 | 50 | 60 | 100 | 140 | 200 |
|-------------------------------|---|---|---|-------|-------|---|-------|---|---|---|---|-----|-----|-----|----|----|----|----|----|----|-----|----|-----|
| PERCENT FINER BY WEIGHT       | 100|    |    |       |       | 90 |       |    |    |    |    |      |     |      |    |    |    |    |    |    |    |    |
| GRAIN SIZE IN MILLIMETERS     | 100|    |    |       |       | 90 |       |    |    |    |    |      |     |      |    |    |    |    |    |    |    |    |

**Specific Gravity (-No. 4)**

**Sand Equivalent**

**R - Value**

**Exp. Pressure, PSI**

**Cc**

**Unified Classification** SM

**AASHTO Classification:** A-4

**pH**

**Resistivity (ohm-cm)**

**Sample Moisture (%)**

**Organic** None

**Plasticity** Low

**Dry Strength** None

**Dilatency** Rapid

**Toughness** Low

**Remarks:** This report covers only material as represented by sample and does not necessarily cover all soil from this layer or source.

**U.S. SIEVE OPENING IN INCHES**

| 6 | 4 | 3 | 1 1/2 | 1 3/4 | 2 | 2 1/2 | 3 | 4 | 6 | 8 | 10 | 16 | 20 | 30 | 40 | 50 | 60 | 100 | 140 | 200 |
|---|---|---|-------|-------|---|-------|---|---|---|---|-----|-----|-----|----|----|----|----|----|----|-----|----|-----|
| PERCENT FINER BY WEIGHT       | 100|    |    |       |       | 90 |       |    |    |    |    |      |     |      |    |    |    |    |    |    |    |    |
| GRAIN SIZE IN MILLIMETERS     | 100|    |    |       |       | 90 |       |    |    |    |    |      |     |      |    |    |    |    |    |    |    |    |

**COBBLES**

<table>
<thead>
<tr>
<th>GRAVEL</th>
<th>SAND</th>
<th>SILT OR CLAY</th>
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<tbody>
<tr>
<td>coarse</td>
<td>coarse</td>
<td>coarse</td>
</tr>
<tr>
<td>fine</td>
<td>medium</td>
<td>fine</td>
</tr>
</tbody>
</table>

**Tested By** Jeff Brothers

**Checked By** Zane Smith

**Materials Engineer** John Arambarri

**Published Date**

**SHEET 1 of 1**
### Mechanical Analysis % Pass

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<th>Mass of Dry Sample</th>
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<th>3.4</th>
<th>8</th>
<th>82.6</th>
<th>16</th>
<th>237.4</th>
<th>30</th>
<th>342.6</th>
<th>40</th>
<th>379.0</th>
<th>50</th>
<th>401.6</th>
<th>100</th>
<th>450.4</th>
<th>200</th>
<th>490.3</th>
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</thead>
<tbody>
<tr>
<td>% Pass</td>
<td>100</td>
<td>99.4</td>
<td>85.2</td>
<td>57.3</td>
<td>38.4</td>
<td>31.9</td>
<td>27.8</td>
<td>19.1</td>
<td>11.9</td>
<td></td>
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### Soil Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Liquid Limit</td>
<td>25</td>
</tr>
<tr>
<td>Plastic Limit</td>
<td>NP</td>
</tr>
<tr>
<td>Plastic Index</td>
<td>NV</td>
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<tr>
<td>Specific Gravity  (+3/4&quot;)</td>
<td>20.19</td>
</tr>
<tr>
<td>Specific Gravity  (-No. 4)</td>
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<tr>
<td>Sand Equivalent</td>
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</tr>
<tr>
<td>Exp. Pressure, PSI</td>
<td></td>
</tr>
<tr>
<td>Cc</td>
<td>1.66</td>
</tr>
<tr>
<td>Cu</td>
<td>20.19</td>
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<tr>
<td>AASHTO Classification</td>
<td>A-1-b</td>
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</table>

### Soil Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td></td>
</tr>
<tr>
<td>Resistivity (ohm-cm)</td>
<td></td>
</tr>
<tr>
<td>Sample Moisture (%)</td>
<td>None</td>
</tr>
<tr>
<td>Organic</td>
<td>None</td>
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<tr>
<td>Plasticity</td>
<td>Non Plastic</td>
</tr>
<tr>
<td>Dry Strength</td>
<td>None</td>
</tr>
<tr>
<td>Dilatency</td>
<td>Rapid</td>
</tr>
<tr>
<td>Toughness</td>
<td>Low</td>
</tr>
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</table>

**Remarks:** This report covers only material as represented by sample and does not necessarily cover all soil from this layer or source.

---

### Mechanical Analysis

#### U.S. SIEVE OPENING IN INCHES

<table>
<thead>
<tr>
<th>U.S. SIEVE NUMBERS</th>
<th>HYDROMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 4 3 2 1 1/2 3/4</td>
<td>1 1/2 3/4</td>
</tr>
</tbody>
</table>

#### U.S. SIEVE NUMBERS

<table>
<thead>
<tr>
<th>GRADE SIZE IN MILLIMETERS</th>
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</thead>
<tbody>
<tr>
<td>COBBLES</td>
</tr>
<tr>
<td>coarse</td>
</tr>
</tbody>
</table>

---

**Tested By:** Jeff Brothers  
**Checked By:** Zane Smith  
**Materials Engineer:** John Arambarri  
**Published Date:**

---

**SOILS TEST REPORT**

**DISTRICT 3**

**PROJECT NUMBER**

**PROJECT NAME:** Nampa Sand Shed

**SAMPLE NUMBER**

**LAB NUMBER:** 17-3DI-0025

**IDENT. No.** JB/A405003

**TEST HOLE:** BH-1

**DEPTH:** 10.0' - 11.5'

**STA:**

**SOILS TEST REPORT**

**SHEET 1 of 1**
SOILS TEST REPORT

Sandy Silt (ML)

Mass of Dry Sample: 535.1

Liquid Limit: 30

Mass of Wet Sample: 484.8

Plastic Limit: 26

Plastic Index: 4

Specific Gravity (+3/4”): 2.68

Specific Gravity (-No. 4): 2.70

R - Value: 4

Exp. Pressure, PSI: 10

Cc: Cu

Unified Classification: ML

AASHTO Classification: A-4

Remarks: This report covers only material as represented by sample and does not necessarily cover all soil from this layer or source.
**SOILS TEST REPORT**

**DISTRICT 3**

**SAMPLE NUMBER** 7  **LAB NUMBER** 17-3DI-0027

<table>
<thead>
<tr>
<th>KEY NUMBER</th>
<th>PROJECT NUMBER</th>
<th>PROJECT NAME</th>
<th>DISTRICT 3</th>
<th>SAMPLE NUMBER</th>
<th>LAB NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>JB/A405003</td>
<td>TEST HOLE</td>
<td>BH-2</td>
<td>DEPTH 3.7&quot; - 4.4'</td>
<td>STA.</td>
<td>GPS N 43.62197238º / W -116.5829795º</td>
</tr>
</tbody>
</table>

**DESCRIPTION OF SOIL** Silty Sand (SM)

**SOURCE NUMBER** N/A  **COUNTY** Canyon

**COMMENTS**

### Mechanical Analysis % Pass

<table>
<thead>
<tr>
<th>Mass of Dry Sample</th>
<th>3/4&quot;</th>
<th>1/2&quot;</th>
<th>3/8&quot;</th>
<th>#4</th>
<th>#8</th>
<th>#16</th>
<th>#30</th>
<th>#40</th>
<th>#50</th>
<th>#100</th>
<th>#200</th>
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<tbody>
<tr>
<td></td>
<td>0.0</td>
<td>9.0</td>
<td>14.0</td>
<td>35.0</td>
<td>112.0</td>
<td>219.0</td>
<td>291.1</td>
<td>322.0</td>
<td>352.0</td>
<td>395.5</td>
<td>437.2</td>
</tr>
</tbody>
</table>

### Soil Properties

- **Liquid Limit** 35
- **Plastic Limit** NP
- **Plastic Index** NV
- **Specific Gravity (+3/4")** 98.3
- **Specific Gravity (-No. 4)** 97.4
- **Sand Equivalent** 93.5
- **Sand Equivalent** 93.5
- **R - Value** 79.1
- **Exp. Pressure, PSI** 59.1
- **Cc** 45.6
- **Unified Classification** SM
- **AASHTO Classification:** A-1-b

### Soil Properties

- **pH**
- **Resistivity (ohm-cm)**
- **Sample Moisture (%)**
- **Organic** None
- **Plasticity** Non Plastic
- **Dry Strength** None
- **Dilatency** Rapid
- **Toughness** Low

**Remarks:** This report covers only material as represented by sample and does not necessarily cover all soil from this layer or source.

---

**U.S. SIEVE OPENING IN INCHES**

```
100 | 50 | 40 | 30 | 20 | 14 | 10 | 6 | 3 | 1
---|----|----|----|----|----|----|---|---|---
1/16 | 1/8 | 3/16 | 1/4 | 3/8 | 1/2 | 1 1/16 | 1 1/8 | 1 3/16 | 1 1/4 | 1 3/8 | 1 1/2 | 2
```

**U.S. SIEVE NUMBERS**

```
6 | 4 | 3 | 1 1/2 | 1 1/3 | 3/4 | 1/2 | 1 | 1 1/2 | 1 1/3 | 3/4 | 1/2 | 1 | 1 1/2 | 1 1/3 | 3/4 | 1/2 | 1 |
---|----|----|------|------|-----|-----|---|------|------|----|-----|---|------|------|----|-----|---|
810 | 4 | 16 | 30 | 40 | 50 | 60 | 100 | 140 | 200 |
```

**HYDROMETER**

```
0.1 | 0.01 | 0.001 | 0.01 | 0.1 | 1 | 10 | 60 | 300 | 1000 |
---|------|------|------|------|---|----|---|-----|------|
100 | 90 | 80 | 70 | 60 | 50 | 40 | 30 | 20 | 10 |
```

**GRAIN SIZE IN MILLIMETERS**

<table>
<thead>
<tr>
<th>COBBLES</th>
<th>GRAVEL</th>
<th>SAND</th>
<th>SILT OR CLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>coarse</td>
<td>fine</td>
<td>coarse</td>
<td>medium</td>
</tr>
</tbody>
</table>

**Tested By** Jeff Brothers  **Checked By** Zane Smith  **Materials Engineer** John Arambarri

**Published Date**

**Sheet 1 of 1**
SOILS TEST REPORT

District Worksheet

KEY NUMBER
DEPARTMENT
PROJECT NUMBER
PROJECT NAME
Nampa Sand Shed

IDENT. No. JB/A405003
TEST HOLE BH-3
DEPTH 2.8'-3.5'
STA. N/A

SUBMITTED BY Keith Nottingham
FOR John Arambarri
DATE SAMPLED 4/12/17
DATE RECEIVED 4/13/17

DESCRIPTION OF SOIL Sandy Silt (ML)
SOURCE NUMBER N/A
COUNTY Canyon

COMMENTS

Mechanical Analysis % Pass

<table>
<thead>
<tr>
<th>Mass of Dry Sample</th>
<th>#4</th>
<th>#8</th>
<th>#16</th>
<th>#30</th>
<th>#40</th>
<th>#50</th>
<th>#100</th>
<th>#200</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.0</td>
<td>7.0</td>
<td>23.0</td>
<td>40.6</td>
<td>51.5</td>
<td>62.0</td>
<td>86.8</td>
<td>131.0</td>
</tr>
</tbody>
</table>

Soil Properties

<table>
<thead>
<tr>
<th>Sample Moisture (%)</th>
<th>Specific Gravity (+3/4&quot;)</th>
<th>Specific Gravity (-No. 4)</th>
<th>Sand Equivalent</th>
<th>R - Value</th>
<th>Exp. Pressure, PSI</th>
<th>Unified Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Soil Properties

<table>
<thead>
<tr>
<th>Organic</th>
<th>Plasticity</th>
<th>Dry Strength</th>
<th>Dilatency</th>
<th>Toughness</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Low</td>
<td>None</td>
<td>Rapid</td>
<td>Low</td>
</tr>
</tbody>
</table>

AASHTO Classification: A-4

Remarks: This report covers only material as represented by sample and does not necessarily cover all soil from this layer or source.
### Mechanical Analysis % Pass

<table>
<thead>
<tr>
<th>Mass of Dry Sample</th>
<th>#4</th>
<th>#8</th>
<th>#16</th>
<th>#30</th>
<th>#40</th>
<th>#50</th>
<th>#100</th>
<th>#200</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.0</td>
<td>15</td>
<td>37.7</td>
<td>58</td>
<td>68.4</td>
<td>79</td>
<td>102.0</td>
<td>141.9</td>
</tr>
</tbody>
</table>

- **Liquid Limit**: 42
- **Plastic Limit**: 36
- **Specific Gravity (+3/4")**: 94.5
- **Specific Gravity (-No. 4)**: 86.2
- **Sand Equivalent**: 78.8
- **R - Value**: 75.0
- **Exp. Pressure, PSI**: 71.1
- **Copper Screen**: 62.7
- **Unified Classification**: SM
- **AASHTO Classification**: A-5

### Soil Properties

- **pH**: 
- **Resistivity (ohm-cm)**: 
- **Sample Moisture (%)**: 
- **Organic**: None
- **Plasticity**: Low
- **Dry Strength**: None
- **Dilatency**: Rapid
- **Toughness**: Low

Remarks: This report covers only material as represented by sample and does not necessarily cover all soil from this layer or source.

### U.S. Sieve Numbers

<table>
<thead>
<tr>
<th>U.S. SIEVE OPENING IN INCHES</th>
<th>U.S. SIEVE NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3/4</td>
</tr>
<tr>
<td>2</td>
<td>3/8</td>
</tr>
<tr>
<td>1.5</td>
<td>1/8</td>
</tr>
<tr>
<td>1</td>
<td>3/16</td>
</tr>
<tr>
<td>1/2</td>
<td>1/32</td>
</tr>
<tr>
<td>1/4</td>
<td>1/64</td>
</tr>
<tr>
<td>1/8</td>
<td>1/128</td>
</tr>
<tr>
<td>1/16</td>
<td>1/256</td>
</tr>
<tr>
<td>1/32</td>
<td>1/512</td>
</tr>
<tr>
<td>1/64</td>
<td>1/1024</td>
</tr>
<tr>
<td>1/128</td>
<td>1/2048</td>
</tr>
<tr>
<td>1/256</td>
<td>1/4096</td>
</tr>
<tr>
<td>1/512</td>
<td>1/8192</td>
</tr>
<tr>
<td>1/1024</td>
<td>1/16384</td>
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<tr>
<td>1/2048</td>
<td>1/32768</td>
</tr>
<tr>
<td>1/4096</td>
<td>1/65536</td>
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<tr>
<td>1/8192</td>
<td>1/131072</td>
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<tr>
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<td>1/262144</td>
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<tr>
<td>1/524288</td>
<td>1/524288</td>
</tr>
<tr>
<td>1/1048576</td>
<td>1/1048576</td>
</tr>
</tbody>
</table>

### District Worksheet

- **District**: 3
- **Sample Number**: 9
- **LAB NUMBER**: 17-3DI-0029
- **Sampled By**: Keith Nottingham
- **FOR**: John Arambarri
- **Date Sampled**: 4/12/17
- **Received By**: Zane Smith
- **Date Received**: 4/13/17
- **Description of Soil**: Silty Sand (SM)
- **County**: Canyon
- **Project Name**: Nampa Sand Shed
- **Sampled By**: Jeff Brothers
- **Checked By**: Zane Smith
- **Materials Engineer**: John Arambarri

**Remarks**: This report covers only material as represented by sample and does not necessarily cover all soil from this layer or source.

---

**SOILS TEST REPORT**

**KEY NUMBER**  **PROJECT NUMBER**  **PROJECT NAME**

**IDENT. No.**: JB/A405003  **TEST HOLE**: BH-3  **DEPTH**: 3.5’ - 4.2’  **STA.**:  **GPS**: N 43.62198661º / W -116.58218383º

**SUBMITTED BY**: Keith Nottingham  **FOR**: John Arambarri  **DATE SAMPALED**: 4/12/17  **DATE RECEIVED**: 4/13/17

**DESCRIPTION OF SOIL**: Silty Sand (SM)

**SOFER NUMBER**: N/A  **COUNTY**: Canyon

**COMMENTS**

---

**U.S. Sieve Opening in Inches**

<table>
<thead>
<tr>
<th>U.S. SIEVE OPENING IN INCHES</th>
<th>U.S. SIEVE NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3/4</td>
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<tr>
<td>2</td>
<td>3/8</td>
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<td>1.5</td>
<td>1/8</td>
</tr>
<tr>
<td>1</td>
<td>3/16</td>
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<td>1/2</td>
<td>1/32</td>
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<tr>
<td>1/4</td>
<td>1/64</td>
</tr>
<tr>
<td>1/8</td>
<td>1/128</td>
</tr>
<tr>
<td>1/16</td>
<td>1/256</td>
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</tr>
<tr>
<td>1/64</td>
<td>1/1024</td>
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<td>1/2048</td>
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<tr>
<td>1/256</td>
<td>1/4096</td>
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<tr>
<td>1/512</td>
<td>1/8192</td>
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<td>1/2048</td>
<td>1/32768</td>
</tr>
<tr>
<td>1/4096</td>
<td>1/65536</td>
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<tr>
<td>1/8192</td>
<td>1/131072</td>
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<td>1/16384</td>
<td>1/262144</td>
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<td>1/524288</td>
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<tr>
<td>1/1048576</td>
<td>1/1048576</td>
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</table>

**Tested By**: Jeff Brothers  **Checked By**: Zane Smith  **Materials Engineer**: John Arambarri

**Published Date**
**SOILS TEST REPORT**

**District Worksheet**

<table>
<thead>
<tr>
<th>KEY NUMBER</th>
<th>PROJECT NUMBER</th>
<th>PROJECT NAME</th>
<th>DISTRICT 3</th>
<th>SAMPLE NUMBER</th>
<th>LAB NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>JB/A405003</td>
<td>TEST HOLE BH-8</td>
<td>DEPTH 3.0'-4.5' STA.</td>
<td>Nampa Sand Shed</td>
<td>10</td>
<td>17-3DI-0030</td>
</tr>
</tbody>
</table>

**SUBMITTED BY** Keith Nottingham **FOR** John Arambarri **DATE SAMPLED** 4/12/17 **DATE RECEIVED** 4/13/17

**DESCRIPTION OF SOIL** Silty Sand (SM) **SOURCE NUMBER** N/A **COUNTY** Canyon

### Mechanical Analysis % Pass

<table>
<thead>
<tr>
<th>Mass of Dry Sample</th>
<th>U.S. SIEVE OPENING IN INCHES</th>
<th>U.S. SIEVE NUMBERS</th>
<th>HYDROMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>100.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>10.0</td>
<td>98.1</td>
<td>-</td>
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<tr>
<td>#4</td>
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<tr>
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<td>-</td>
</tr>
<tr>
<td>#200</td>
<td>268.8</td>
<td>49.3</td>
<td>-</td>
</tr>
</tbody>
</table>

### Soil Properties

<table>
<thead>
<tr>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
<th>Plastic Index</th>
<th>pH</th>
<th>Resistivity (ohm-cm)</th>
<th>Sample Moisture (%)</th>
<th>Organic</th>
<th>Plasticity</th>
<th>Dry Strength</th>
<th>Dilatency</th>
<th>Toughness</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>31</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td>None</td>
<td>Low</td>
<td>None</td>
<td>Rapid</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Remarks:** This report covers only material as represented by sample and does not necessarily cover all soil from this layer or source.

**U.S. SIEVE NUMBERS**

<table>
<thead>
<tr>
<th>U.S. SIEVE NUMBERS</th>
<th>GRAVEL</th>
<th>SAND</th>
<th>SILT OR CLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>coarse</td>
<td>fine</td>
<td>coarse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>fine</td>
</tr>
</tbody>
</table>

**Tested By** Jeff Brothers **Checked By** Zane Smith **Materials Engineer** John Arambarri

**Published Date**

**PROJECT NUMBER**

**PROJECT NAME**

**SOURCE NUMBER**

**COUNTY**

**DEPTH**

**STA.**

**GPS** N 43.62297256º / W -116.58195922º

**COMMENTS**
SOILS TEST REPORT

District Worksheet

SHEET 1 of 1

Tested By: Jeff Brothers
Checked By: Zane Smith
Materials Engineer: John Arambarri

Sample Number: 11
Lab Number: 17-3DI-0031

District: 3
Project Number: Nampa Sand Shed

Ident. No.: JB/A405003
Test Hole: BH-8
Depth: 7.0’ - 8.0’
STA.: N/A
GPS: N 43.62297256º / W -116.58195922º

SUBMITTED BY: Keith Nottingham
FOR: John Arambarri
DATE SAMPLED: 4/12/17
DATE RECEIVED: 4/13/17

DESCRIPTION OF SOIL: Silty Sand (SM)

Source Number: N/A
County: Canyon

Comments:

Material as represented by sample and does not necessarily cover all soil from this layer or source.

### Mechanical Analysis % Pass

<table>
<thead>
<tr>
<th>Mass of Dry Sample</th>
<th>327.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sieve #4</td>
<td>0.0</td>
</tr>
<tr>
<td>Sieve #8</td>
<td>3.4</td>
</tr>
<tr>
<td>Sieve #16</td>
<td>66.2</td>
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<td>159.1</td>
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<tr>
<td>Sieve #40</td>
<td>190.1</td>
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<td>214.0</td>
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<td>247.8</td>
</tr>
<tr>
<td>Sieve #200</td>
<td>275.0</td>
</tr>
</tbody>
</table>

### Soil Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid Limit</td>
<td>36</td>
</tr>
<tr>
<td>Plastic Limit</td>
<td>NP</td>
</tr>
<tr>
<td>Plastic Index</td>
<td>NV</td>
</tr>
<tr>
<td>Specific Gravity (+3/4”)</td>
<td>99.0</td>
</tr>
<tr>
<td>Specific Gravity (-No. 4)</td>
<td>79.8</td>
</tr>
<tr>
<td>Sand Equivalent</td>
<td>51.4</td>
</tr>
<tr>
<td>R - Value</td>
<td>42.0</td>
</tr>
<tr>
<td>Exp. Pressure, PSI</td>
<td>34.7</td>
</tr>
<tr>
<td>Cc</td>
<td>24.4</td>
</tr>
<tr>
<td>Unified Classification</td>
<td>SM</td>
</tr>
<tr>
<td>AASHTO Classification</td>
<td>A-1-b</td>
</tr>
</tbody>
</table>

### Soil Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td></td>
</tr>
<tr>
<td>Resistivity (ohm-cm)</td>
<td></td>
</tr>
<tr>
<td>Sample Moisture (%)</td>
<td></td>
</tr>
<tr>
<td>Organic</td>
<td>None</td>
</tr>
<tr>
<td>Plasticity</td>
<td>Non Plastic</td>
</tr>
<tr>
<td>Dry Strength</td>
<td>None</td>
</tr>
<tr>
<td>Dilatency</td>
<td>Rapid</td>
</tr>
<tr>
<td>Toughness</td>
<td>Low</td>
</tr>
</tbody>
</table>

### Remarks:
This report covers only material as represented by sample and does not necessarily cover all soil from this layer or source.
STRUCTURAL CALCULATIONS
FOR
ITD DISTRICT 3 SAND SHED FOUNDATION
NAMPA, IDAHO

For
Hutchison Smith Architects
Boise, Idaho

AHJ ENGINEERS, PC
STRUCTURAL CONSULTANTS
5418 N. Eagle Rd. #140
Boise, Idaho 83713
208.323.0199

Project#18055
ITD DISTRICT 4- NAMPA SAND SHED FOUNDATION

PROJECT DESCRIPTION
The “ITD District #3- Sand Shed Foundation Design” project is a pre-engineered metal structure designed by others. The scope of this project includes foundation design for intermediate and end frames for gravity, uplift, thrust, and lateral loading plus containment walls.

DESCRIPTION OF STRUCTURAL ELEMENTS
Roof Framing:
The roof framing is of steel.

Columns:
The columns are of steel.

Foundation:
The foundation is of concrete.

Lateral Load Resisting System:
The lateral load resisting system is by others.
# Engineering Information Sheet

**Code:**
2015 International Building Code

**Risk Category (Table 1604.5):**
I

## Materials

### Soils

<table>
<thead>
<tr>
<th>Design Bearing Pressure:</th>
<th>3000 psf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source:</td>
<td>Foundation investigation</td>
</tr>
<tr>
<td>Geotechnical Report by:</td>
<td>ITD</td>
</tr>
<tr>
<td>Report no.</td>
<td>Y-387</td>
</tr>
</tbody>
</table>

### Concrete f'c:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Footings:</td>
<td>2500 psi</td>
</tr>
<tr>
<td>Beams and columns:</td>
<td>4000 psi</td>
</tr>
<tr>
<td>Reinforcing:</td>
<td>60000 psi</td>
</tr>
</tbody>
</table>

### Structural Steel fy:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolts (ASTM):</td>
<td>A325</td>
</tr>
</tbody>
</table>
ASCE Seismic Base Shear

Shows seismic does not govern

Risk Category

Risk Category of Building or Other Structure: "I": Buildings and other structures that represent a low hazard to human life in the event of failure.

Seismic Importance Factor = 1

Calculated per ASCE 7-10

Gridded Ss & S1 values ASCE-7-10 Standard

Max. Ground Motions, 5% Damping:

\[
\begin{align*}
S_s &= 0.2780 \text{ g}, \text{ 0.2 sec response} \\
S_1 &= 0.09950 \text{ g}, \text{ 1.0 sec response}
\end{align*}
\]

Latitudes = 43.622 deg North

Longitudes = 116.582 deg West

Site Class, Site Coeff. and Design Category

Site Classification: "D": Shear Wave Velocity 600 to 1,200 ft/sec

Site Coefficients Fa & Fv

(using straight-line interpolation from table values)

\[
\begin{align*}
F_a &= 1.58 \\
F_v &= 2.40
\end{align*}
\]

Maximum Considered Earthquake Acceleration

\[
\begin{align*}
S_{MS} &= F_a \cdot S_s \\
S_{M1} &= F_v \cdot S_1
\end{align*}
\]

\[
\begin{align*}
S_{MS} &= 0.439 \\
S_{M1} &= 0.239
\end{align*}
\]

Design Spectral Acceleration

\[
\begin{align*}
S_{DE} &= S_{MS} \times 2^{1/3} \\
S_{DI} &= S_{M1} \times 2^{1/3}
\end{align*}
\]

\[
\begin{align*}
S_{DE} &= 0.292 \\
S_{DI} &= 0.159
\end{align*}
\]

Seismic Design Category = C

Resisting System

Basic Seismic Force Resisting System . . .

Ordinary steel moment frames

Response Modification Coefficient * R * = 3.50

System Overstrength Factor * Wo * = 3.00

Deflection Amplification Factor * Cd * = 3.00

Building height Limits:

Category "A & B" Limit: Height from base to highest level = 25.0 ft

Category "C" Limit: No Limit

Category "D" Limit: Not permitted

Category "E" Limit: Not permitted

Category "F" Limit: Not permitted

NOTE! See ASCE 7-10 for all applicable footnotes.

Lateral Force Procedure

Equivalent Lateral Force Procedure

The "Equivalent Lateral Force Procedure" is being used according to the provisions of ASCE 7-10 12.6

Determine Building Period

Use ASCE 12.6-7

Structure Type for Building Period Calculation:

* Ct * value = 0.020

* h = Height from base to highest level = 25.0 ft

* x value = 0.75

* Ta * Approximate fundamental period using Eq. 12.8-7:

\[
T_a = \frac{C_t \cdot (h)^{1/3}}{6.00} = 0.224 \text{ sec}
\]

Building Period * Ta * Calculated from Approximate Method selected = 0.224 sec

* Cs * Response Coefficient

\[
S_{DS} = \text{Short Period Design Spectral Response} = 0.292 \text{ From Eq. 12.8-2, Preliminary Cs } = 0.084
\]

* R *: Response Modification Factor = 3.50

* I *: Seismic Importance Factor = 1

From Eq. 12.8-3 & 12.8-4, Cs need not exceed = 0.203

Cs : Seismic Response Coefficient = 0.0835

Seismic Base Shear

Cs = 0.0835 from 12.8.1.1

W (see Sum W below) = 0.00 k

Seismic Base Shear V = Cs * W = 0.00 k
### Analytical Values

**User verified these IBC 2015 All-Heights Wind Method Limitations:**

1. **1609.6.1 (1):** Total Height <= 75 ft with (Height / Least Width) <= 4 or Fundamental frequency >= 1 hertz
2. **1609.6.1 (2):** Not sensitive to dynamic effects
3. **1609.6.1 (3):** Site not affected by channeling/buffeting from upwind items
4. **1609.6.1 (4):** Simple diaphragm building per ASCE 7-10 Sec 26.2
5. **1609.6.1 (5):** Aware of ASCE 7 provisions for open buildings, multispans gable roofs, stepped roofs, sawtooth roofs, domed roofs, roofs with slopes > 45 deg, solid free standing walls & signs.
6. **1609.6.4.1:** Aware of need to check torsion per ASCE 7, Fig. 27.4-8

### Calculations per IBC 2015 1609.6

**Exposure Category, ASCE 7-10 Sect 26.7.3**

<table>
<thead>
<tr>
<th>Mean Roof Height</th>
<th>Exposure C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20.0 ft</td>
</tr>
</tbody>
</table>

**Topographic Factor per ASCE 7-10 Sect 26.8.2**

- $K_1 = 0.250$
- $K_2 = 1.0$
- $K_3 = 1.0$

**Force Kz to 1.0 per ASCE 7-10 26.8.2**

- No

**Topographic Factor: $K_z = (1+K_1*K_2*K_3)/2$**

- 1.563

**V : Basic Wind Speed per ASCE 7-10 26.5.1**

- 105.0 mph

### MWFRS Table per IBC 2015 1609.6.2, Section 1

#### WINDWARD WALLS & PARAPETS

<table>
<thead>
<tr>
<th>Height</th>
<th>$K_z$ based on IBC 2015 1609.6.4.2 Item 1</th>
<th>$K_z$</th>
<th>Enclosed</th>
<th>Partially Enclosed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>+Internal</td>
<td>-Internal</td>
</tr>
<tr>
<td>0 - 15'</td>
<td>0.850</td>
<td></td>
<td>16.10</td>
<td>27.34</td>
</tr>
<tr>
<td>20'</td>
<td>0.900</td>
<td></td>
<td>17.05</td>
<td>28.95</td>
</tr>
<tr>
<td>25'</td>
<td>0.940</td>
<td></td>
<td>17.81</td>
<td>30.24</td>
</tr>
<tr>
<td>30'</td>
<td>0.980</td>
<td></td>
<td>18.57</td>
<td>31.52</td>
</tr>
<tr>
<td>40'</td>
<td>1.040</td>
<td></td>
<td>19.70</td>
<td>33.45</td>
</tr>
<tr>
<td>50'</td>
<td>1.090</td>
<td></td>
<td>20.65</td>
<td>35.06</td>
</tr>
<tr>
<td>60'</td>
<td>1.130</td>
<td></td>
<td>21.41</td>
<td>36.35</td>
</tr>
<tr>
<td>70'</td>
<td>1.170</td>
<td></td>
<td>22.17</td>
<td>37.63</td>
</tr>
<tr>
<td>80'</td>
<td>1.210</td>
<td></td>
<td>22.93</td>
<td>38.92</td>
</tr>
<tr>
<td>90'</td>
<td>1.240</td>
<td></td>
<td>23.49</td>
<td>39.89</td>
</tr>
<tr>
<td>100'</td>
<td>1.260</td>
<td></td>
<td>23.87</td>
<td>40.53</td>
</tr>
</tbody>
</table>

#### LEEWARD & SIDEWALLS

<table>
<thead>
<tr>
<th>Height</th>
<th>$K_z$ based on IBC 2015 1609.6.4.2 Item 2</th>
<th>$K_z$</th>
<th>Enclosed</th>
<th>Partially Enclosed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>+Internal</td>
<td>-Internal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Leeward Wall: -20.22 -3.33 -32.91 4.36
- Side Wall: -26.17 -13.88 -38.47 1.59
- Parapet Wall: Both Directions -33.71 Both Directions -33.71
### IBC 2015 1609.6 Alternate All-Heights Wind

**Lic. #: KW-06001594**  
**Description:** Wind at retaining walls

**MWFRS per IBC 2015 Table 1609.6.2 Section 1**

\[
P = 0.00256 \times V^2 \times K_c \times K_{zt} \text{ psf}
\]

Kz per IBC 2015 1609.6.4.2 Item 2 = 0.900

#### WIND PERPENDICULAR TO RIDGE

<table>
<thead>
<tr>
<th>Slope &lt; 2:12 (10 deg)</th>
<th>Condition 1</th>
<th>Leeward Roof or Flat Roof</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-43.23</td>
<td>+Internal -26.17</td>
</tr>
<tr>
<td></td>
<td>-31.33</td>
<td>-Internal -13.88</td>
</tr>
<tr>
<td></td>
<td>-55.92</td>
<td>+Internal -38.47</td>
</tr>
<tr>
<td></td>
<td>18.64</td>
<td>-Internal -1.59</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Slope &lt; 4:12 (18 deg)</th>
<th>Condition 1</th>
<th>Leeward Roof or Flat Roof</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-28.95</td>
<td>+Internal -26.17</td>
</tr>
<tr>
<td></td>
<td>-16.66</td>
<td>-Internal -13.88</td>
</tr>
<tr>
<td></td>
<td>-41.24</td>
<td>+Internal -38.47</td>
</tr>
<tr>
<td></td>
<td>4.36</td>
<td>-Internal -1.59</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Slope &lt; 5:12 (23 deg)</th>
<th>Condition 1</th>
<th>Leeward Roof or Flat Roof</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-23.00</td>
<td>+Internal -26.17</td>
</tr>
<tr>
<td></td>
<td>-11.10</td>
<td>-Internal -13.88</td>
</tr>
<tr>
<td></td>
<td>-35.69</td>
<td>+Internal -38.47</td>
</tr>
<tr>
<td></td>
<td>1.59</td>
<td>-Internal -1.59</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Slope &lt; 6:12 (27 deg)</th>
<th>Condition 1</th>
<th>Leeward Roof or Flat Roof</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-18.64</td>
<td>+Internal -26.17</td>
</tr>
<tr>
<td></td>
<td>-6.35</td>
<td>-Internal -13.88</td>
</tr>
<tr>
<td></td>
<td>-30.93</td>
<td>+Internal -38.47</td>
</tr>
<tr>
<td></td>
<td>5.95</td>
<td>-Internal -1.59</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Slope &lt; 7:12 (30 deg)</th>
<th>Condition 1</th>
<th>Leeward Roof or Flat Roof</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-14.67</td>
<td>+Internal -26.17</td>
</tr>
<tr>
<td></td>
<td>-2.38</td>
<td>-Internal -13.88</td>
</tr>
<tr>
<td></td>
<td>-26.97</td>
<td>+Internal -38.47</td>
</tr>
<tr>
<td></td>
<td>-10.31</td>
<td>-Internal -1.59</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Slope &lt; 9:12 (37 deg)</th>
<th>Condition 1</th>
<th>Leeward Roof or Flat Roof</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-10.71</td>
<td>+Internal -26.17</td>
</tr>
<tr>
<td></td>
<td>1.59</td>
<td>-Internal -13.88</td>
</tr>
<tr>
<td></td>
<td>-23.00</td>
<td>+Internal -38.47</td>
</tr>
<tr>
<td></td>
<td>13.88</td>
<td>-Internal -1.59</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Slope &lt; 12:12 (45 deg)</th>
<th>Condition 1</th>
<th>Leeward Roof or Flat Roof</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5.55</td>
<td>+Internal -26.17</td>
</tr>
<tr>
<td></td>
<td>17.45</td>
<td>-Internal -13.88</td>
</tr>
<tr>
<td></td>
<td>30.14</td>
<td>+Internal -38.47</td>
</tr>
<tr>
<td></td>
<td>30.14</td>
<td>-Internal -1.59</td>
</tr>
</tbody>
</table>

#### WIND PARALLEL TO RIDGE

**All slopes including Flat Roofs**

-43.23 -31.33 -55.92 -18.64

### Roof & Overhang Components & Cladding per IBC 2015 Table 1609.6.2, Section 2 & 3

**Design Pressure**

\[
P = 0.00256 \times V^2 \times K_c \times K_{zt}
\]

**Description**

<table>
<thead>
<tr>
<th>Description</th>
<th>Continuity</th>
<th>Item Type</th>
<th>Ef. Area ft²</th>
<th>Kz</th>
<th>Enclosed</th>
<th>Partially Enclosed</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Discontinuity</td>
<td>Gable, Slope &lt; 6:12</td>
<td>10.00</td>
<td>0.900</td>
<td>+ : 0.00</td>
<td>0.00</td>
<td></td>
</tr>
</tbody>
</table>

### Wall & Parapet Components & Cladding per IBC 2015 Table 1609.6.2, Section 4 & 5

**Design Pressure**

\[
P = 0.00256 \times V^2 \times K_c \times K_{zt}
\]

**Description**

<table>
<thead>
<tr>
<th>Description</th>
<th>Continuity</th>
<th>Item Type</th>
<th>Z, Ht. Above Ground Level, ft</th>
<th>Ef. Area ft²</th>
<th>Kz</th>
<th>Enclosed</th>
<th>Partially Enclosed</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Discontinuity</td>
<td>Wall Elements, h&lt;=60 ft</td>
<td>25</td>
<td>10.00</td>
<td>0.94</td>
<td>+ : 41.42</td>
<td>54.67</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- : -45.15</td>
<td>-57.99</td>
<td></td>
</tr>
</tbody>
</table>
DATE: May 8, 2017

TO: Michael Garz
D3 Maintenance Engineer

FROM: Dave Richards
District 3 Staff Engineer (Materials)

RE: Abbreviated Phase IV Foundation Investigation Report

1.0 INTRODUCTION
This Foundation Investigation Report is to evaluate the subgrade soil conditions for the erection of a sand shed (Bldg. Y-387) at ITD’s new Nampa Maintenance Yard Facility. The project site location is shown on Figure 1 and is located approximately 1.5 miles north of I-84 in the City of Nampa, Idaho on Ten Lane.

FIGURE 1 - VICINITY MAP
The nearest backhoe pit to the proposed sand shed location is BH-4. The log for this pit indicates that the soils are relatively loose at the surface but are indicated to firm up at the footing depth.

<table>
<thead>
<tr>
<th>TABLE 1 – BACKHOE TEST PIT SUMMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BH-1</strong></td>
</tr>
<tr>
<td>Soil</td>
</tr>
<tr>
<td>ML</td>
</tr>
<tr>
<td>SW</td>
</tr>
<tr>
<td><strong>BH-5</strong></td>
</tr>
<tr>
<td>Soil</td>
</tr>
<tr>
<td>ML</td>
</tr>
<tr>
<td>SM</td>
</tr>
</tbody>
</table>

3.0 ENGINEERING CONSIDERATIONS
Shallow spread footing foundations are recommended for supporting this structure. D3 Materials recommends that the site be graded to drain away from the shed at a minimum grade of 2% in all directions for a minimum of 50 feet.

Remove the upper 12 inches of topsoil for all areas used for truck traffic. Construct an all-weather surface consisting of 12 inches of Class II Rock Cap per Subsection 703.08.

The recommended frost depth for Nampa, Idaho is 24 inches. The top of the spread footings should be placed below this depth in reference to the finished grade. The footing foundations are recommended be excavated 12” below the base of the footing, compacted, and then backfilled with 12” of compacted ¾” Aggregate for Untreated Base Type A per Subsection 703.04. This footing aggregate base should be extended a minimum of 24” outside the footing base. All compaction shall conform to Class A standards.

Table 2 summarizes the estimated engineering properties to be used for design purposes based on the over excavation of native materials and subsequent backfill using ¾” Aggregate for Untreated Base Type A as the foundation material.

<table>
<thead>
<tr>
<th>TABLE 2 – ESTIMATED ENGINEERING PROPERTIES FOR SPREAD FOOTING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ESTIMATED SOIL ENGINEERING PROPERTIES</strong></td>
</tr>
<tr>
<td>Foundation Type: 3/4&quot; Type B Base</td>
</tr>
<tr>
<td>Dry Unit Weight: 125 pcf</td>
</tr>
<tr>
<td>Friction Angle: 35°</td>
</tr>
<tr>
<td>Cohesion: 0 psf</td>
</tr>
<tr>
<td>Coefficient of Friction: 0.45</td>
</tr>
<tr>
<td>Allowable Bearing Pressure: 3 ksf</td>
</tr>
</tbody>
</table>
## Loads and Criteria

### Risk Category II

<table>
<thead>
<tr>
<th>Building Code</th>
<th>2015 IBC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Risk Category</td>
<td>Agricultural (Category I)</td>
</tr>
<tr>
<td>Roof Dead Load</td>
<td></td>
</tr>
<tr>
<td>Superimposed</td>
<td>2.48 psf</td>
</tr>
<tr>
<td>Collateral</td>
<td>0.50 psf</td>
</tr>
<tr>
<td>(0.00 psf Ceiling 0.50 psf Other)</td>
<td></td>
</tr>
<tr>
<td>Roof Live Load</td>
<td>20.00 psf no reduction</td>
</tr>
</tbody>
</table>

### Snow

| Ground Snow Load (Pg)       | 20.00 psf |
| Snow Load Importance Factor (J) | 0.80     |
| Flat Roof Snow Load (PF)    | 12.10 psf (per code) |
| Minimum Roof Snow Load (PF) | 35.00 psf (used in design) |
| Snow Exposure Factor (Ce)   | 0.90 |
| Thermal Factor (Ct)         | 1.20     |

### Wind

| Ultimate Wind Speed (Vult)  | 105.00 mph |
| Nominal Wind Speed (Vnom)   | 81 mph (IBC section 1609.3.1) |
| Wind Exposure Category      | C         |
| Internal Pressure Coef (CCP) | 0.18-0.19 |
| Loads for components not provided by building manufacturer |
| Corner Areas (within 6.00' of corner) | 26.17 psf pressure -35.04 psf suction |
| Other Areas                 | 26.17 psf pressure -28.39 psf suction |

These values are the maximum values required based on a 10 sq ft area. Components with larger areas may have lower wind loads.

### Seismic

| Seismic Importance Factor (Ie) | 1.00 |
| Seismic Design Category        | C    |
| Soil Site Class                | D: Dense Soil & Soft Rock |
| Analysis Procedure             | Equivalent Lateral Force |
| Column Line                    | All  |
| Basic Force Resisting System   | H    |
| Response Modification Coefficient (R) | 3.00   |
| Seismic Response Coefficient (Cs) | 0.0855 |
| Design Base Shear in Kips (V)  | 0.0835W |
| Basic Structural System (from ASCE 7-10 Table 12.2-1) | H - Steel System not Specifically Detailed for Seismic Resistance |

Note: Calculations are based on a copied design & it's RXN's since building hmr has not designed the block. Yet this building is assumed to be an exact copy & loads on new block = copied block with the exception of seismic loads. Since wind governs this is not expected to impact the final design.

It's will be re-evaluated once actual RXN's are received & design is subject to change.
REACTION NOTATIONS

LOAD COMBINATION MAXIMUM REACTION TABLE

<table>
<thead>
<tr>
<th>COLUMN LOAD COMB</th>
<th>1-D</th>
<th>1-A</th>
<th>1-C</th>
<th>1-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-D</td>
<td>0.1</td>
<td>2.6</td>
<td>0</td>
<td>-0.1</td>
</tr>
<tr>
<td>1-A</td>
<td>0.1</td>
<td>-0.4</td>
<td>-0.1</td>
<td>-0.3</td>
</tr>
<tr>
<td>1-C</td>
<td>2</td>
<td>-5.5</td>
<td>0</td>
<td>-4.4</td>
</tr>
<tr>
<td>1-B</td>
<td>6.7</td>
<td>-0.0</td>
<td>6.7</td>
<td>-0.0</td>
</tr>
</tbody>
</table>

WIND LOAD COMBINATION

<table>
<thead>
<tr>
<th>LOAD COMBINATION</th>
<th>1-D</th>
<th>1-A</th>
<th>1-C</th>
<th>1-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>-0.7</td>
<td>0</td>
<td>0.4</td>
<td>-1.8</td>
</tr>
<tr>
<td>2.6</td>
<td>0</td>
<td>0.4</td>
<td>-1.8</td>
<td>0.4</td>
</tr>
<tr>
<td>0.2</td>
<td>-0.7</td>
<td>0</td>
<td>0.4</td>
<td>-1.8</td>
</tr>
<tr>
<td>2.6</td>
<td>0</td>
<td>0.4</td>
<td>-1.8</td>
<td>0.4</td>
</tr>
<tr>
<td>2.1</td>
<td>-5.5</td>
<td>0</td>
<td>-4.4</td>
<td>0.5</td>
</tr>
<tr>
<td>0.6</td>
<td>6.7</td>
<td>-0.0</td>
<td>6.7</td>
<td>-0.0</td>
</tr>
</tbody>
</table>

TRANSVERSE EARTHQUAKE LOAD COMBINATION

<table>
<thead>
<tr>
<th>LOAD COMBINATION</th>
<th>1-D</th>
<th>1-A</th>
<th>1-C</th>
<th>1-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0</td>
<td>-0.0</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>0.5</td>
<td>0</td>
<td>-0.0</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>0.5</td>
<td>0</td>
<td>-0.0</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>0.5</td>
<td>0</td>
<td>-0.0</td>
<td>0.5</td>
<td>0.1</td>
</tr>
</tbody>
</table>

LOAD COMBINATION DESCRIPTION

2 : D + C + S
6 : 0.60D + C + 0.60W+ 
7 : 0.60D + 0.60W+ 
8 : 0.60D + C + 0.60W- 
10 : 0.60D + C + 0.60HR 
11 : 0.60D + 0.60WR 
12 : 0.60D + C + 0.60ML 
13 : 0.60D + 0.60ML 
22 : D + C + 3/4S + 0.45W+ 
26 : D + C + 3/4S + 0.45WR 
28 : D + C + 3/4S + 0.45ML 
30 : 1.03D + 1.03C + 0.70ER 
31 : 1.03D + 1.03C + 0.70EL
REACTION NOTATIONS

LOAD GROUP REACTION TABLE

<table>
<thead>
<tr>
<th>LOAD GROUP</th>
<th>COLUMN</th>
<th>1-D</th>
<th>1-A</th>
<th>1-C</th>
<th>1-B</th>
</tr>
</thead>
<tbody>
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</table>

LOAD GROUP DESCRIPTION

D : DEAD LOAD
C : COLLATERAL LOAD
L : LIVE LOAD
S : DESIGN SNOW LOAD
SBAL : BALANCED ROOF SNOW
W+ : WIND LOAD AS AN INWARD ACTING PRESSURE
W- : WIND LOAD AS AN OUTWARD ACTING SUCTION
WR : WIND FORCE FROM THE RIGHT
WL : WIND FORCE FROM THE LEFT
SUR : UNBALANCED SNOW - WIND FROM RIGHT TO LEFT
SUL : UNBALANCED SNOW - WIND FROM LEFT TO RIGHT
BR : EARTHQUAKE FORCE FROM RIGHT
EL : EARTHQUAKE FORCE FROM LEFT
**MAX. SUPPORT REACTIONS FOR LOAD COMBINATIONS**

*LOCATION: Gridlines: 2 3 4 5 6*

**NOTES:**
1. All reactions are in kips and kip-ft.
2. These reactions are from loads determined from the applicable code for ASD design. Seismic loads are limited to the state of magnification factors when so required by the seismic provisions of the applicable code for ASD design. It is the responsibility of the foundation designer to apply the load factors and load combinations appropriate for the concrete foundation design.
3. The seismic overstrength factor (Omega) is not included in the "RDBRQ" and "RDBPQ" load group reactions. The "USER-ONLY" combination reactions include an overstrength factor of 2.500.

**REACTION NOTATION**

**LOAD COMBINATION MAXIMUM REACTION TABLE**

<table>
<thead>
<tr>
<th>COLUMN</th>
<th>V</th>
<th>LNL</th>
<th>LNR</th>
<th>V</th>
<th>LNL</th>
<th>LNR</th>
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<td>LOAD COMB</td>
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<td>VL</td>
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<td>HR</td>
<td>VR</td>
<td>LNR</td>
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<td>GRAVITY LOAD COMBINATION</td>
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</table>

**LOAD COMBINATION DESCRIPTION**

1. DL +COLL +SNOW
2. DL +COLL +SNOW
10. 1.0347DL +1.0347COLL +0.7EQ
11. 1.0347DL +1.0347COLL -0.7EQ
13. 0.5633DL +0.7RBUPEQ
27. 0.6DL +0.6WL1
31. 0.6DL +0.6WL1 +0.5RBUPLW
32. 0.6DL +0.6WL1 +0.5RBUPLW
33. 0.6DL +0.6WL2 +0.5RBUPLW
39. 0.6DL +0.6WL3
53. DL +COLL +0.75SNOW +0.45WL2
54. DL +COLL +0.75SNOW +0.45WL2
57. DL +COLL +0.75SNOW +0.45WL4
58. DL +COLL +0.75SNOW +0.45WL4
### REACTION NOTATIONS

```
HL  LNL  LNR  %HR
VL  VR  *A  *D
```

### LOAD GROUP REACTION TABLE

<table>
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<tr>
<th>LOAD GROUP</th>
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<th>*D</th>
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</table>

### LOAD GROUP DESCRIPTION

- **DL**: Roof Dead Load
- **COLL**: Roof Collateral Load
- **SNOW**: Roof Snow Load
- **LL**: Roof Live Load
- **EQ**: Lateral Seismic Load (parallel to plane of frame)
- **RBUPSEQ**: Upward Acting Rod Brace Load from Longit. Seismic
- **WL1**: Lateral Primary Wind Load
- **WL2**: Lateral Primary Wind Load
- **WL3**: Lateral Primary Wind Load
- **WL4**: Lateral Primary Wind Load
- **LML1**: Longitudinal Primary Wind Load
- **RBUPLWL**: Upward Acting Rod Brace Load from Longitud. Wind
- **LML2**: Longitudinal Primary Wind Load
- **LML3**: Longitudinal Primary Wind Load
- **LML4**: Longitudinal Primary Wind Load
- **RS**: Unbalanced Right Roof Snow Load
- **LS**: Unbalanced Left Roof Snow Load
- **RBDLWL**: Downward Acting Rod Brace Load from Longit. Wind
- **RBDLWEQ**: Downward Acting Rod Brace Load from Long. Seismic
## Reaction Notations

- **VL**: Vertical Load
- **V1**: Vertical Load
- **V2**: Vertical Load
- **VR**: Vertical Load
- **7-A**: Beam Label
- **7-B**: Beam Label
- **7-C**: Beam Label
- **7-D**: Beam Label

### Load Combination Maximum Reaction Table

<table>
<thead>
<tr>
<th>LOAD COMB</th>
<th>COLUMI</th>
<th>7-A</th>
<th>7-D</th>
<th>7-B</th>
<th>7-C</th>
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<td>LL</td>
<td>HR</td>
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<td>-0.0</td>
<td>0.5</td>
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### Load Combination Description

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<th>DESCRIPTION</th>
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<td>2</td>
<td>D + C + S</td>
</tr>
<tr>
<td>6</td>
<td>0.60D + C + 0.60W+</td>
</tr>
<tr>
<td>7</td>
<td>0.60D + 0.60W+</td>
</tr>
<tr>
<td>8</td>
<td>0.60D + C + 0.60W-</td>
</tr>
<tr>
<td>10</td>
<td>0.60D + C + 0.60Wk</td>
</tr>
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<td>0.60D + 0.60Wk</td>
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<td>12</td>
<td>0.60D + C + 0.60WL</td>
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<tr>
<td>13</td>
<td>0.60D + 0.60WL</td>
</tr>
<tr>
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<td>D + C + 3/48 + 0.45W+</td>
</tr>
<tr>
<td>26</td>
<td>D + C + 3/48 + 0.45Wk</td>
</tr>
<tr>
<td>28</td>
<td>D + C + 3/48 + 0.45WL</td>
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<tr>
<td>30</td>
<td>1.03D + 1.03C + 0.70ER</td>
</tr>
<tr>
<td>31</td>
<td>1.03D + 1.03C + 0.70ER</td>
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</tbody>
</table>
REACTIOn NOTATIONS

LOAD GROUP REACTION TABLE

| LOAD GROUP | COLUMN | 7-A | | 7-B | | 7-C | | 7-D |
|------------|--------|-----|-----|-----|-----|-----|-----|
|            | HL     | VL  | LL  | HR  | VR  | LR  | H1  | V1  | L1  | H2  | V2  | L2  |
| D          | 0.0    | 0.4 | 0.0 | 0.0 | 0.4 | 0.0 | 0.1 | 1.1 | 0.0 | 0.1 | 1.1 | 0.0 |
| C          | 0.0    | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 |
| L          | 0.1    | 1.7 | 0.0 | -0.1| 1.7 | 0.0 | 4.4 | 0.0 | 4.4 | 0.0 | 4.4 | 0.0 |
| S          | 0.1    | 2.1 | 0.0 | -0.1| 2.1 | 0.0 | 5.5 | 0.0 | 5.5 | 0.0 | 5.5 | 0.0 |
| SBAL       | 0.0    | 1.0 | 0.0 | 0.0 | 1.0 | 0.0 | 2.7 | 0.0 | 2.7 | 0.0 | 2.7 | 0.0 |
| W+         | -0.1   | -3.6| 0.5 | 0.1 | -3.6| 0.5 | -8.6| 3.9 | 0.0 | 8.6 | 3.9 | 0.0 |
| W-         | -0.1   | -3.6| -0.6| 0.1 | -3.6| -0.6| -8.6| 4.4 | 0.0 | 8.6 | 4.4 | 0.0 |
| WR-        | 0.5    | -3.6| 0.0 | 4.2 | -7.1| 0.0 | -8.6| 0.0 | 5.0 | 0.0 | -5.0| 0.0 |
| ML         | -0.6   | -3.6| 0.0 | -0.4| -1.7| 0.0 | -8.6| 0.0 | -5.4| 0.0 | -10.4| 0.0 |
| SUR        | 0.0    | 0.9 | 0.0 | 0.0 | 0.2 | 0.0 | 3.5 | 0.0 | 1.3 | 0.0 | 1.3 | 0.0 |
| SUIL       | 0.0    | 0.2 | 0.0 | 0.0 | 0.2 | 0.0 | 1.3 | 0.0 | 3.5 | 0.0 | 3.5 | 0.0 |
| ER         | 0.0    | 0.0 | 0.0 | 0.2 | -0.2| 0.0 | 0.0 | 0.0 | 6.0 | 0.0 | 0.2 | 0.0 |
| EL         | 0.0    | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2| 0.0 | -0.1| 0.0 |

LOAD GROUP DESCRIPTION

- D: DEAD LOAD
- C: COLLATERAL LOAD
- L: LIVE LOAD
- S: DESIGN SNOW LOAD
- SBAL: BALANCED ROOF SNOW
- W+: WIND LOAD AS AN INWARD ACTING PRESSURE
- W-: WIND LOAD AS AN OUTWARD ACTING SUCTION
- WR: WIND FORCE FROM THE RIGHT
- ML: WIND FORCE FROM THE LEFT
- SUR: UNBALANCED SNOW - WIND FROM RIGHT TO LEFT
- SUIL: UNBALANCED SNOW - WIND FROM LEFT TO RIGHT
- ER: EARTHQUAKE FORCE FROM RIGHT
- EL: EARTHQUAKE FORCE FROM LEFT
WORST CASE +1

LL #1: \[ V = 17.64k \left( 0.4L + 0.5L \right) = 2.610k + 150 \left( 0.4L + 0.5L \right) \]
\[ A = 10.8 \left( 0.4L + 0.5L - 18\right) = 15 + 9.1 \left( 0.4L + 0.5L \right) \]

LL #27: \[ V = 2.8k \left( 0.4L + 0.6L \right) = 2.8 - 6.6 \left( 0.4L + 0.6L \right) \]
\[ A = 2.0 \left( 0.4L + 0.6L \right) = 1.3 - 6.2 \left( 0.4L + 0.6L \right) \]

LCA 33: \[ V = 4.7 \left( 0.6L + 0.6L \right) = 9.5 - 10.5 \left( 0.6L + 0.6L \right) \]
\[ A = 1.5 \left( 0.6L + 0.6L \right) = 1.3 - 1.5 \left( 0.6L + 0.6L \right) \]

Earth Load on Wall/ft
\[ H = 7.34k/ft \]
Say 6' footing width
To simulate w/ pier forces
\[ M_{H} = 7.8k \times 6' = 47.03k-f \]

Equivalent Pier wt (SWIVAK) \[ p(2/3) = \sqrt[3]{46.24} = 16.61 \text{ lb square foot} \]

Use 9" x 6" x 1.2" thick footing but make continuous with wall footing, centered on piers.

Use 9" x 6" x 1.2" thick footing but make continuous with wall footing, centered on piers.
F2

LL #2 : \[ \text{L} = 6.7 = \text{DL} + \text{LL} + \text{SL} = 7.2 + 5.5 (\text{DL + LL}) \]

\[ \gamma = 0 \]

LL #7/8 : \[ \text{L} = -4.5 = 0.60 \times 10.6 \text{wL} \rightarrow 1.9 - 0.9 \text{wL} \]

\[ \gamma = -2.9 \quad \text{wL} \rightarrow 3.9 \text{wL} \]

\[ M_{LL} = \text{sand pressure} = \]

\[ \text{USE } 7^\prime \times 10^\prime \times 6^\prime \text{ w/ min (6) #5's EA. WA} \]

F3

LL #13 : \[ \text{L} = -3.6 = 0.60 \times 10.6 \text{wL} \rightarrow 0.5 - 5.5 \text{ wL} \]

\[ \gamma = -2.4 \quad 0.60 + 10.6 \text{wL} = -4.1 \text{ wL} \]

\[ \text{USE } 6^\prime \times 8^\prime \times 12^\prime \text{ PR w/ min (6) #5's EA. WA} \]

PECIAL DESIGN

\[ \phi_1 = 1.5 \times 3.5 \quad \text{MAX F1} = 2.615 \]

\[ \phi_2 = 1.5 \times 3.5 \quad \text{MIN F1} = 1.519 \]

\[ \text{USE AT LEAST 21" ROUND CON. W/ MIN (#2 #5 Video) #8 HEAVY} \]

\[ \#8 HEAVY AT 18" O.C. W/ (#3 IN TOPS) \]

CONTRACTOR MAY CHOOSE TO USE 22% OR 24" Ø PEDESTAL 21" USED FOR CALL SINE MIN (RECOMMENDED) (SEE SEPARATE CALL)

AHJ ENGINEERS, PC
STRUCTURAL CONSULTANTS

AHJ NO.
PROJECT 1/0 SAND SIEVE

DATE: __________________________

BY: _______________

SHEET NO. __________________________
General Footing

Lic. #: KW-08001594
Description: F1 LC 27

Code References
Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used: ASCE 7-10

General Information

Material Properties
- f′c : Concrete 28 day strength = 2.50 ksi
- f′y : Rebar Yield = 60.0 ksi
- Ec : Concrete Elastic Modulus = 3,122.0 ksi
- Concrete Density = 150.0pcf
- ϕ : Values Flexure = 0.80
- Shear = 0.750

Analysis Settings
- Min Steel % Bending Reinf. =
- Min Allow % Temp Reinf. = 0.00180
- Min. Overturning Safety Factor = 1.0 : 1
- Min. Sliding Safety Factor = 1.0 : 1
- Add Flg Wt for Soil Pressure = Yes
- Use flg wt for stability, moments & shears = Yes
- Add Pedestal Wt for Soil Pressure = Yes
- Use Pedestal wt for stability, mom & shear = Yes

Dimensions
- Width parallel to X-X Axis = 9.0 ft
- Length parallel to Z-Z Axis = 6.0 ft
- Footing Thickness = 14.0 in
- Load location offset from footing center...
  - ex : Prl to X-X Axis = -9 in
  - in

Pedestal dimensions...
- px : parallel to X-X Axis = 30.0 in
- pz : parallel to Z-Z Axis = 30.0 in
- Height = 132.0 in
- Rebar Centerline to Edge of Concrete...
  - at Bottom of footing = 3.0 in

Reinforcing
- Bars parallel to X-X Axis
  - Number of Bars = 6.0
  - Reinforcing Bar Size = # 5
- Bars parallel to Z-Z Axis
  - Number of Bars = 9.0
  - Reinforcing Bar Size = # 5

Bandwidth Distribution Check (ACI 15.4.4.2)
- Direction Requiring Closer Separation = 1g Z-Z Axis
- # Bars required within zone = 80.0 %
- # Bars required on each side of zone = 20.0 %

Applied Loads

<table>
<thead>
<tr>
<th></th>
<th>D</th>
<th>Lr</th>
<th>L</th>
<th>S</th>
<th>W</th>
<th>E</th>
<th>H</th>
</tr>
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<tbody>
<tr>
<td>P : Column Load</td>
<td>=</td>
<td>2.30</td>
<td></td>
<td></td>
<td>-6.60</td>
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<td>k</td>
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<tr>
<td>OB : Overburden</td>
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<td>0.220</td>
<td></td>
<td></td>
<td></td>
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<td>ksf</td>
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<tr>
<td>M : xx</td>
<td>=</td>
<td></td>
<td></td>
<td></td>
<td>k-ft</td>
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<td></td>
</tr>
<tr>
<td>M : zz</td>
<td>=</td>
<td></td>
<td></td>
<td></td>
<td>-47.034 k-ft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V : x</td>
<td>=</td>
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<td></td>
<td>-6.20</td>
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<tr>
<td>V : z</td>
<td>=</td>
<td></td>
<td></td>
<td></td>
<td>k</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Soil Design Values
- Allowable Soil Bearing = 3.0 ksf
- Increase Bearing By Footing Weight = No
- Soil Passive Resistance (for Sliding) = 445.0 pcf
- Soil/Concrete Friction Coeff. = 0.450

Increases based on footing Depth
- Footing base depth below soil surface = 3.0 ft
- Allow press. increase per foot of depth when footing base is below = ksf

Increases based on footing plan dimension
- Allowable pressure increase per foot of depth when max. length or width is greater than = ksf
### General Footing

#### Design Summary

<table>
<thead>
<tr>
<th>Item</th>
<th>Min. Ratio</th>
<th>Applied Capacity</th>
<th>Governing Load Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Bearing</td>
<td>0.5930</td>
<td>1.779 ksf</td>
<td>+0.600 ksf about Z-Z axis</td>
</tr>
<tr>
<td>Overturning - X-X</td>
<td>n/a</td>
<td>0.0 k-ft</td>
<td>No Overturning</td>
</tr>
<tr>
<td>Overturning - Z-Z</td>
<td>1.426</td>
<td>88.330 k-ft</td>
<td>+0.600+0.400+W+1.600H</td>
</tr>
<tr>
<td>Sliding - X-X</td>
<td>5.960</td>
<td>2.940 k</td>
<td>+0.600+0.400+W+0.60H</td>
</tr>
<tr>
<td>Sliding - Z-Z</td>
<td>n/a</td>
<td>0.0 k</td>
<td>No Sliding</td>
</tr>
<tr>
<td>Uplift</td>
<td>6.592</td>
<td>-3.960 k</td>
<td>+0.600+0.600+W+0.60H</td>
</tr>
<tr>
<td>Z Flexure (+X)</td>
<td>0.4038</td>
<td>5.991 k-ft</td>
<td>+1.20D+0.50Lr+0.50Lx+1.60H</td>
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<tr>
<td>Z Flexure (-X)</td>
<td>0.4042</td>
<td>5.997 k-ft</td>
<td>+1.20D+0.50Lr+0.50Lx+1.60H</td>
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<tr>
<td>X Flexure (+Z)</td>
<td>0.03510</td>
<td>0.5208 k-ft</td>
<td>+1.20D+0.50Lr+0.50Lx+1.60H</td>
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<tr>
<td>X Flexure (-Z)</td>
<td>0.03510</td>
<td>0.5208 k-ft</td>
<td>+1.20D+0.50Lr+0.50Lx+1.60H</td>
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<tr>
<td>1-way Shear (+X)</td>
<td>0.3167</td>
<td>23.754 psi</td>
<td>+1.20D+0.50Lr+0.50Lx+1.60H</td>
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<tr>
<td>1-way Shear (-X)</td>
<td>0.3286</td>
<td>2.164 psi</td>
<td>+1.20D+0.50Lr+0.50Lx+1.60H</td>
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<tr>
<td>1-way Shear (+Z)</td>
<td>0.02886</td>
<td>2.164 psi</td>
<td>+1.20D+0.50Lr+0.50Lx+1.60H</td>
</tr>
<tr>
<td>1-way Shear (-Z)</td>
<td>0.05334</td>
<td>8.014 psi</td>
<td>+1.20D+0.50Lr+0.50Lx+1.60H</td>
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</tbody>
</table>

#### Detailed Results

##### Soil Bearing

<table>
<thead>
<tr>
<th>Rotation Axis &amp; Load Combination</th>
<th>Gross Allowable</th>
<th>X(_{acc}) (in)</th>
<th>Z(_{acc}) (in)</th>
<th>Actual Soil Bearing Stress @ Location</th>
<th>Actual / Allow Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-X. +D+H</td>
<td>3.0</td>
<td>n/a</td>
<td>0.0</td>
<td>0.8057</td>
<td>0.8057</td>
</tr>
<tr>
<td>X-X. +D+L+H</td>
<td>3.0</td>
<td>n/a</td>
<td>0.0</td>
<td>0.8057</td>
<td>0.8057</td>
</tr>
<tr>
<td>X-X. +D+L+H</td>
<td>3.0</td>
<td>n/a</td>
<td>0.0</td>
<td>0.8057</td>
<td>0.8057</td>
</tr>
<tr>
<td>X-X. +D+S+H</td>
<td>3.0</td>
<td>n/a</td>
<td>0.0</td>
<td>0.8057</td>
<td>0.8057</td>
</tr>
<tr>
<td>X-X. +D+0.750Lr+0.750L+H</td>
<td>3.0</td>
<td>n/a</td>
<td>0.0</td>
<td>0.8057</td>
<td>0.8057</td>
</tr>
<tr>
<td>X-X. +D+0.750Lr+0.750S+H</td>
<td>3.0</td>
<td>n/a</td>
<td>0.0</td>
<td>0.8057</td>
<td>0.8057</td>
</tr>
<tr>
<td>X-X. +D+0.600W+H</td>
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<td>n/a</td>
<td>0.0</td>
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<td>X-X. +D+0.70E+H</td>
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<td>n/a</td>
<td>0.0</td>
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<td>0.8057</td>
</tr>
<tr>
<td>X-X. +D+0.750Lr+0.450W+H</td>
<td>3.0</td>
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<td>0.7507</td>
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<td>X-X. +D+0.750Lr+0.750S+0.450W+H</td>
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<td>0.4834</td>
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<tr>
<td>Z-Z. +D+H</td>
<td>3.0</td>
<td>-10.638</td>
<td>n/a</td>
<td>1.277</td>
<td>0.3343</td>
</tr>
<tr>
<td>Z-Z. +D+L+H</td>
<td>3.0</td>
<td>-10.638</td>
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<td>1.277</td>
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<td>n/a</td>
<td>1.277</td>
<td>0.3343</td>
</tr>
<tr>
<td>Z-Z. +D+0.600W+H</td>
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<td>-24.534</td>
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<td>1.779</td>
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<tr>
<td>Z-Z. +D+0.70E+H</td>
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<td>-10.638</td>
<td>n/a</td>
<td>1.277</td>
<td>0.3343</td>
</tr>
<tr>
<td>Z-Z. +D+0.750Lr+0.450W+H</td>
<td>3.0</td>
<td>-20.806</td>
<td>n/a</td>
<td>1.620</td>
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<td>Z-Z. +D+0.750Lr+0.750S+0.450W+H</td>
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<td>-20.806</td>
<td>n/a</td>
<td>1.620</td>
<td>0.0</td>
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<tr>
<td>Z-Z. +D+0.750Lr+0.750S+0.5250E+H</td>
<td>3.0</td>
<td>-10.638</td>
<td>n/a</td>
<td>1.277</td>
<td>0.3343</td>
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<tr>
<td>Z-Z. +D+0.600W+0.60H</td>
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<td>1.732</td>
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<td>Z-Z. +D+0.70E+0.60H</td>
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<td>-12.060</td>
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<td>0.8041</td>
<td>0.1628</td>
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</table>

##### Overturning Stability

<table>
<thead>
<tr>
<th>Rotation Axis &amp; Load Combination</th>
<th>Overturning Moment</th>
<th>Resisting Moment</th>
<th>Stability Ratio</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-X. +D+H</td>
<td>None</td>
<td>0.0 k-ft</td>
<td>Infinity</td>
<td>OK</td>
</tr>
<tr>
<td>X-X. +D+L+H</td>
<td>None</td>
<td>0.0 k-ft</td>
<td>Infinity</td>
<td>OK</td>
</tr>
<tr>
<td>X-X. +D+L+H</td>
<td>None</td>
<td>0.0 k-ft</td>
<td>Infinity</td>
<td>OK</td>
</tr>
<tr>
<td>X-X. +D+S+H</td>
<td>None</td>
<td>0.0 k-ft</td>
<td>Infinity</td>
<td>OK</td>
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<tr>
<td>X-X. +D+0.750Lr+0.750L+H</td>
<td>None</td>
<td>0.0 k-ft</td>
<td>Infinity</td>
<td>OK</td>
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<tr>
<td>X-X. +D+0.750Lr+0.750S+H</td>
<td>None</td>
<td>0.0 k-ft</td>
<td>Infinity</td>
<td>OK</td>
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<tr>
<td>X-X. +D+0.600W+H</td>
<td>None</td>
<td>0.0 k-ft</td>
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<td>X-X. +D+0.70E+H</td>
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<td>0.0 k-ft</td>
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<tr>
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<td>0.0 k-ft</td>
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<td>OK</td>
</tr>
<tr>
<td>X-X. +D+0.750Lr+0.750S+0.450W+H</td>
<td>None</td>
<td>0.0 k-ft</td>
<td>Infinity</td>
<td>OK</td>
</tr>
<tr>
<td>X-X. +D+0.750Lr+0.750S+0.5250E+H</td>
<td>None</td>
<td>0.0 k-ft</td>
<td>Infinity</td>
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<tr>
<td>X-X. +D+0.600W+0.60H</td>
<td>None</td>
<td>0.0 k-ft</td>
<td>Infinity</td>
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<tr>
<td>X-X. +D+0.70E+0.60H</td>
<td>None</td>
<td>0.0 k-ft</td>
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### Overturning Stability

<table>
<thead>
<tr>
<th>Rotation Axis &amp; Load Combination...</th>
<th>Overturning Moment</th>
<th>Resisting Moment</th>
<th>Stability Ratio</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>X-X, +D+0.750L+0.750S+0.5250E+H</td>
<td>None</td>
<td>0.0 k-ft</td>
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<tr>
<td>X-X, +D+0.60D+0.60W+0.60H</td>
<td>None</td>
<td>0.0 k-ft</td>
<td>Infinity</td>
<td>OK</td>
</tr>
<tr>
<td>X-X, +D+0.60D+0.70E+0.60H</td>
<td>None</td>
<td>0.0 k-ft</td>
<td>Infinity</td>
<td>OK</td>
</tr>
<tr>
<td>Z-Z, +D+H</td>
<td>47.034 k-ft</td>
<td>209.888 k-ft</td>
<td>4.462</td>
<td>OK</td>
</tr>
<tr>
<td>Z-Z, +D+L+H</td>
<td>47.034 k-ft</td>
<td>209.888 k-ft</td>
<td>4.462</td>
<td>OK</td>
</tr>
<tr>
<td>Z-Z, +D+L+H</td>
<td>47.034 k-ft</td>
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<td>209.888 k-ft</td>
<td>4.462</td>
<td>OK</td>
</tr>
<tr>
<td>Z-Z, +D+0.70L+0.750L+H</td>
<td>47.034 k-ft</td>
<td>209.888 k-ft</td>
<td>4.462</td>
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<td>107.144 k-ft</td>
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<td>1.969</td>
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<tr>
<td>Z-Z, +D+0.70L+0.750L+0.450W+H</td>
<td>92.117 k-ft</td>
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<td>Z-Z, +D+0.70L+0.750L+0.450W+H</td>
<td>92.117 k-ft</td>
<td>209.888 k-ft</td>
<td>2.279</td>
<td>OK</td>
</tr>
<tr>
<td>Z-Z, +D+0.70L+0.750L+0.5250E+H</td>
<td>47.034 k-ft</td>
<td>209.888 k-ft</td>
<td>4.462</td>
<td>OK</td>
</tr>
<tr>
<td>Z-Z, +D+0.60D+0.60W+0.60H</td>
<td>88.330 k-ft</td>
<td>125.933 k-ft</td>
<td>1.426</td>
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<td>Z-Z, +D+0.60D+0.70E+0.60H</td>
<td>22.820 k-ft</td>
<td>125.933 k-ft</td>
<td>4.462</td>
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</tr>
</tbody>
</table>

All units k

### Sliding Stability

<table>
<thead>
<tr>
<th>Load Combination...</th>
<th>Sliding Force</th>
<th>Resisting Force</th>
<th>Stability Ratio</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-X, +D+H</td>
<td>1.30 k</td>
<td>27.106 k</td>
<td>20.852</td>
<td>OK</td>
</tr>
<tr>
<td>X-X, +D+L+H</td>
<td>1.30 k</td>
<td>27.106 k</td>
<td>20.852</td>
<td>OK</td>
</tr>
<tr>
<td>X-X, +D+L+H</td>
<td>1.30 k</td>
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<td>1.30 k</td>
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</tr>
<tr>
<td>X-X, +D+0.70L+0.750L+H</td>
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</tr>
<tr>
<td>X-X, +D+0.70L+0.750L+H</td>
<td>1.30 k</td>
<td>27.106 k</td>
<td>20.852</td>
<td>OK</td>
</tr>
<tr>
<td>X-X, +D+0.60W+H</td>
<td>-2.420 k</td>
<td>25.326 k</td>
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<td>X-X, +D+0.70E+H</td>
<td>1.30 k</td>
<td>27.106 k</td>
<td>20.852</td>
<td>OK</td>
</tr>
<tr>
<td>X-X, +D+0.70L+0.750L+0.450W+H</td>
<td>-1.490 k</td>
<td>25.771 k</td>
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<tr>
<td>X-X, +D+0.70L+0.750L+0.450W+H</td>
<td>-1.490 k</td>
<td>25.771 k</td>
<td>17.296</td>
<td>OK</td>
</tr>
<tr>
<td>X-X, +D+0.70L+0.750S+0.5250E+H</td>
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<td>27.106 k</td>
<td>20.852</td>
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<tr>
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<td>30.871 k</td>
<td>No Sldinq</td>
<td>OK</td>
</tr>
<tr>
<td>Z-Z, +D+L+H</td>
<td>0.0 k</td>
<td>30.871 k</td>
<td>No Sldinq</td>
<td>OK</td>
</tr>
<tr>
<td>Z-Z, +D+L+H</td>
<td>0.0 k</td>
<td>30.871 k</td>
<td>No Sldinq</td>
<td>OK</td>
</tr>
<tr>
<td>Z-Z, +D+S+H</td>
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<td>No Sldinq</td>
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<tr>
<td>Z-Z, +D+S+H</td>
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<td>30.871 k</td>
<td>No Sldinq</td>
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<tr>
<td>Z-Z, +D+0.70L+0.750L+H</td>
<td>0.0 k</td>
<td>30.871 k</td>
<td>No Sldinq</td>
<td>OK</td>
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<tr>
<td>Z-Z, +D+0.70L+0.750L+0.450W+H</td>
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<td>30.871 k</td>
<td>No Sldinq</td>
<td>OK</td>
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<tr>
<td>Z-Z, +D+0.70L+0.750S+0.5250E+H</td>
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<td>30.871 k</td>
<td>No Sldinq</td>
<td>OK</td>
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<td>Z-Z, +D+0.60D+0.60W+0.60H</td>
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<td>29.535 k</td>
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<td>Z-Z, +D+0.70L+0.750L+0.450W+H</td>
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<td>29.535 k</td>
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<tr>
<td>Z-Z, +D+0.70L+0.750L+0.450W+H</td>
<td>0.0 k</td>
<td>29.535 k</td>
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### Footing Flexure

<table>
<thead>
<tr>
<th>Mu k-ft</th>
<th>Side</th>
<th>Tension Surface</th>
<th>As Req'd</th>
<th>Gvrn. As</th>
<th>Actual As</th>
<th>Phi'Mn k-ft</th>
<th>Status</th>
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<tbody>
<tr>
<td>0.3892</td>
<td>+Z</td>
<td>Bottom</td>
<td>0.3024</td>
<td>Min Temp</td>
<td>0.310</td>
<td>14.836</td>
<td>OK</td>
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<tr>
<td>0.3892</td>
<td>-Z</td>
<td>Bottom</td>
<td>0.3024</td>
<td>Min Temp</td>
<td>0.310</td>
<td>14.836</td>
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<tr>
<td>0.3336</td>
<td>+Z</td>
<td>Bottom</td>
<td>0.3024</td>
<td>Min Temp</td>
<td>0.310</td>
<td>14.836</td>
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<tr>
<td>0.3336</td>
<td>-Z</td>
<td>Bottom</td>
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<td>Min Temp</td>
<td>0.310</td>
<td>14.836</td>
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<tr>
<td>0.3336</td>
<td>+Z</td>
<td>Bottom</td>
<td>0.3024</td>
<td>Min Temp</td>
<td>0.310</td>
<td>14.836</td>
<td>OK</td>
</tr>
<tr>
<td>0.3336</td>
<td>-Z</td>
<td>Bottom</td>
<td>0.3024</td>
<td>Min Temp</td>
<td>0.310</td>
<td>14.836</td>
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</tr>
<tr>
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<td>+Z</td>
<td>Bottom</td>
<td>0.3024</td>
<td>Min Temp</td>
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<tr>
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<td>-Z</td>
<td>Bottom</td>
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<td>0.310</td>
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<td>Bottom</td>
<td>0.3024</td>
<td>Min Temp</td>
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</tr>
<tr>
<td>0.2401</td>
<td>+Z</td>
<td>Bottom</td>
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<td>Min Temp</td>
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<tr>
<td>0.2401</td>
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<td>Bottom</td>
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<td>Min Temp</td>
<td>0.310</td>
<td>14.836</td>
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### General Footing

**Lic. #: KW-06001594**  
**Description:** F1 LC 27

#### Footing Flexure

<table>
<thead>
<tr>
<th>Flexure Axis &amp; Load Combination</th>
<th>Mu k-ft</th>
<th>Side</th>
<th>Tension Surface</th>
<th>As Req'd in^2</th>
<th>Gvrn. As in^2</th>
<th>Actual As in^2</th>
<th>Phi*Mn k-ft</th>
<th>Status</th>
</tr>
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<tbody>
<tr>
<td>+1.40D+1.60H</td>
<td>1.159</td>
<td>+X</td>
<td>Top</td>
<td>0.3024</td>
<td>Min Temp %</td>
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<td>14.836</td>
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#### One Way Shear

<table>
<thead>
<tr>
<th>Load Combination...</th>
<th>Vu @ -X</th>
<th>Vu @ +X</th>
<th>Vu @ -Z</th>
<th>Vu @ +Z</th>
<th>Vu:Max</th>
<th>Phi Vn</th>
<th>Vu / Phi*Vn</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1.40D+0.50L+1.60L+1.60H</td>
<td>10.61 psi</td>
<td>5.50 psi</td>
<td>1.62 psi</td>
<td>1.62 psi</td>
<td>10.61 psi</td>
<td>75.00 psi</td>
<td>0.14</td>
<td>0.00</td>
</tr>
<tr>
<td>+1.40D+0.50L+0.50L+1.60H</td>
<td>10.57 psi</td>
<td>6.95 psi</td>
<td>1.39 psi</td>
<td>1.39 psi</td>
<td>10.57 psi</td>
<td>75.00 psi</td>
<td>0.14</td>
<td>0.00</td>
</tr>
<tr>
<td>+1.40D+1.60L+0.50L+1.60H</td>
<td>10.57 psi</td>
<td>6.95 psi</td>
<td>1.39 psi</td>
<td>1.39 psi</td>
<td>10.57 psi</td>
<td>75.00 psi</td>
<td>0.14</td>
<td>0.00</td>
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<tr>
<td>+1.40D+1.60L+0.50W+1.60H</td>
<td>14.77 psi</td>
<td>14.65 psi</td>
<td>1.00 psi</td>
<td>1.00 psi</td>
<td>14.65 psi</td>
<td>75.00 psi</td>
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<tr>
<td>+1.40D+1.60W-0.50W+1.60H</td>
<td>6.94 psi</td>
<td>1.12 psi</td>
<td>1.78 psi</td>
<td>1.78 psi</td>
<td>6.94 psi</td>
<td>75.00 psi</td>
<td>0.09</td>
<td>0.00</td>
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<tr>
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<td>10.57 psi</td>
<td>6.95 psi</td>
<td>1.39 psi</td>
<td>1.39 psi</td>
<td>10.57 psi</td>
<td>75.00 psi</td>
<td>0.14</td>
<td>0.00</td>
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<td>75.00 psi</td>
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<td>+1.40D+1.60S+0.50W+1.60H</td>
<td>6.94 psi</td>
<td>1.12 psi</td>
<td>1.78 psi</td>
<td>1.78 psi</td>
<td>6.94 psi</td>
<td>75.00 psi</td>
<td>0.09</td>
<td>0.00</td>
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<tr>
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<td>17.36 psi</td>
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<td>9.19 psi</td>
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<td>2.16 psi</td>
<td>9.19 psi</td>
<td>75.00 psi</td>
<td>0.12</td>
<td>0.00</td>
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<tr>
<td>+1.40D+1.40L+0.50L+1.60H</td>
<td>3.31 psi</td>
<td>9.19 psi</td>
<td>2.16 psi</td>
<td>2.16 psi</td>
<td>9.19 psi</td>
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#### Two-Way *Punching* Shear

<table>
<thead>
<tr>
<th>Load Combination...</th>
<th>Vu</th>
<th>Phi*Vn</th>
<th>Vu / Phi*Vn</th>
<th>Status</th>
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<tbody>
<tr>
<td>+1.40D+1.60H</td>
<td>5.99 psi</td>
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<tr>
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<td>0.03423</td>
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</tr>
<tr>
<td>+1.40D+1.60L+0.50L</td>
<td>5.13 psi</td>
<td>150.00 psi</td>
<td>0.03423</td>
<td>OK</td>
</tr>
<tr>
<td>+1.40D+1.60L+0.50L</td>
<td>5.13 psi</td>
<td>150.00 psi</td>
<td>0.03423</td>
<td>OK</td>
</tr>
<tr>
<td>+1.40D+1.60L+0.50W</td>
<td>6.57 psi</td>
<td>150.00 psi</td>
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<td>+1.40D+1.60S+0.50W</td>
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<td>150.00 psi</td>
<td>0.04383</td>
<td>OK</td>
</tr>
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<td>5.13 psi</td>
<td>150.00 psi</td>
<td>0.03423</td>
<td>OK</td>
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<tr>
<td>+1.40D+0.50S+0.50S</td>
<td>5.13 psi</td>
<td>150.00 psi</td>
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<td>+0.90E+E+0.90H</td>
<td>3.85 psi</td>
<td>150.00 psi</td>
<td>0.02567</td>
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</tr>
</tbody>
</table>
General Footing

Code References
Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used: ASCE 7-10

General Information

Material Properties
- fy: Concrete 28 day strength = 2.50 ksi
- fy': Rebar Yield = 60.0 ksi
- Ec: Concrete Elastic Modulus = 3,122.0 ksi
- Concrete Density = 150.0pcf
- e' Values: Flexure = 0.90
- Shear = 0.750

Analysis Settings
- Min Steel % Bending Reinf. = 0.00180
- Min Allow % Temp Reinf. = 1.0 : 1
- Min. Overturming Safety Factor = 1.0 : 1
- Min. Sliding Safety Factor = Yes
- Add Flg Wt for Soil Pressure = Yes
- Use flg wt for stability, moments & shears = Yes
- Add Pedestal Wt for Soil Pressure = Yes
- Use Pedestal wt for stability, mom & shear = Yes

Dimensions
- Width parallel to X-X Axis = 8.50 ft
- Length parallel to Z-Z Axis = 5.0 ft
- Footing Thickness = 12.0 in
- Load location offset from footing center...
- ex: Pill to X-X Axis = -36 in

Pedestal dimensions...
- px: parallel to X-X Axis = 18.610 in
- pz: parallel to Z-Z Axis = 18.610 in
- Height = 108.0 in
- Rebar Centreline to Edge of Concrete...
- at Bottom of footing = 3.0 in

Reinforcing
- Bars parallel to X-X Axis
  - Number of Bars = 8.0
  - Reinforcing Bar Size = 

- Bars parallel to Z-Z Axis
  - Number of Bars = 11.0
  - Reinforcing Bar Size = 

Bandwidth Distribution Check (ACI 15.4.4.2)
- Direction Requiring Closest Separation
  - # Bars required within zone = 74.1 %
  - # Bars required on each side of zone = 25.9 %

Applied Loads

<table>
<thead>
<tr>
<th></th>
<th>D</th>
<th>Lr</th>
<th>L</th>
<th>S</th>
<th>W</th>
<th>E</th>
<th>H</th>
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<tbody>
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<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
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<tr>
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<td>k-ft</td>
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<td>M-zz</td>
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<td></td>
<td>k-ft</td>
<td></td>
<td>k-ft</td>
</tr>
<tr>
<td>V-x</td>
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<td>V-z</td>
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<td></td>
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<tr>
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<td>Capacity</td>
<td>Governing Load Combination</td>
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<tr>
<td>Overturning - Z-Z</td>
<td>30.675 k-ft</td>
<td>56.554 k-ft</td>
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<tr>
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<td>3.786 k</td>
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<tr>
<td>Sliding - Z-Z</td>
<td>0.0 k</td>
<td>0.0 k</td>
<td>No Sliding</td>
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<td>Uplift</td>
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<td>Z Flexure (+X)</td>
<td>9.173 k-ft</td>
<td>18.786 k-ft</td>
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<td>Z Flexure (-X)</td>
<td>0.03281 k-ft</td>
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<td>X Flexure (+Z)</td>
<td>0.5780 k-ft</td>
<td>15.396 k-ft</td>
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<tr>
<td>X Flexure (-Z)</td>
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<td>1-way Shear (+X)</td>
<td>22.135 psi</td>
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</tr>
<tr>
<td>1-way Shear (-X)</td>
<td>0.0 psi</td>
<td>0.0 psi</td>
<td>n/a</td>
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<td>1-way Shear (+Z)</td>
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<tr>
<td>1-way Shear (-Z)</td>
<td>3.599 psi</td>
<td>75.0 psi</td>
<td>+1.20D+0.50L+0.50L-W+1.60H</td>
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<tr>
<td>2-way Punching</td>
<td>14.553 psi</td>
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<td>+1.20D+0.50L+0.50L-W+1.60H</td>
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</table>

**Detailed Results**

**Soil Bearing**

<table>
<thead>
<tr>
<th>Rotation Axis &amp; Load Combination...</th>
<th>Gross Allowable</th>
<th>X Ecc</th>
<th>Z Ecc</th>
<th>Actual Soil Bearing Stress Location</th>
<th>Actual / Allow Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Allowable</td>
<td></td>
<td></td>
<td></td>
<td>Bottom, -Z</td>
<td></td>
</tr>
<tr>
<td>Top, +Z</td>
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<td></td>
<td></td>
<td>Left, -X</td>
<td></td>
</tr>
<tr>
<td>Right, +X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
General Footing

Load Combinations Used: ACI 7-10

Material Properties
- Concrete 28 day strength: 2.50 ksi
- Rebar Yield: 60.0 ksi
- Concrete Elastic Modulus: 3,122.0 ksi
- Concrete Density: 150.0pcf
- Flexure Shear: 0.90
- Shear: 0.750

Analysis Settings
- Steel % Bending Reinforcement: 0.00180
- Allow % Temp Reinforcement
- Overturning Safety Factor: 1.0
- Sliding Safety Factor: 1.0
- Use Fig Wt for Soil Pressure: Yes
- Add Pedestal Wt for Soil Pressure: Yes
- Use Pedestal Wt for stability, moments & shears: Yes

Soil Design Values
- Allowable Soil Bearing: 1,550 ksf
- Increase Bearing By Footing Weight
- Soil Passive Resistance for Sliding: 100.0 ksf
- Soil/Concrete Friction Coeff.: 0.250

Increases based on footing Depth
- Footing base depth below soil surface: -3.0 ft
- Allow pressure increase per foot of depth when footing base below
- Increase based on footing plan dimension
- Allowable pressure increase per foot of depth

Dimensions
- Width parallel to X-X Axis: 8.50 ft
- Length parallel to Z-Z Axis: 5.0 ft
- Footing Thickness: 12.0 in
- Load location offset from footing center...
  - Ex: Pll to X-X Axis: -36 in

Pedestal dimensions...
- px: parallel to X-X Axis: 18.610 in
- pz: parallel to Z-Z Axis: 18.610 in
- Height: 108.0 in
- Rebar Centerline to Edge of Concrete...
  - at Bottom of footing: 3.0 in

Reinforcing
- Bars parallel to X-X Axis
  - Number of Bars: 13.0
  - Reinforcing Bar Size: # 5
- Bars parallel to Z-Z Axis
  - Number of Bars: 11.0
  - Reinforcing Bar Size: # 5

Bandwidth Distribution Check (ACI 15.4.4.2)
- Direction requiring closer separation: 1g Z-Z Axis
- # bars required within zone: 74.1 %
- # bars required on each side of zone: 25.9 %

Applied Loads

<table>
<thead>
<tr>
<th>P: Column Load</th>
<th>OB: Overburden</th>
<th>M-xx</th>
<th>M-zz</th>
<th>V-x</th>
<th>V-z</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.60</td>
<td>0.220</td>
<td></td>
<td></td>
<td>1.50</td>
<td>9.10</td>
</tr>
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</table>
# DESIGN SUMMARY

<table>
<thead>
<tr>
<th>Item</th>
<th>Min. Ratio</th>
<th>Applied</th>
<th>Capacity</th>
<th>Governing Load Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Bearing</td>
<td>0.9318</td>
<td>1.584 ksf</td>
<td>1.70 ksf</td>
<td>+D+S+H about Z-Z axis</td>
</tr>
<tr>
<td>Overturing - X-X</td>
<td>n/a</td>
<td>0.0 k-ft</td>
<td>0.0 k-ft</td>
<td>No Overturing</td>
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<tr>
<td>Overturing - Z-Z</td>
<td>1.943</td>
<td>106.0 k-ft</td>
<td>206.982 k-ft</td>
<td>+D+S+H</td>
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<tr>
<td>Sliding - X-X</td>
<td>1.062</td>
<td>10.60 k</td>
<td>11.281 k</td>
<td>+D+S+H</td>
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<tr>
<td>Sliding - Z-Z</td>
<td>n/a</td>
<td>0.0 k</td>
<td>0.0 k</td>
<td>No Sliding</td>
</tr>
<tr>
<td>Uplift</td>
<td>n/a</td>
<td>0.0 k</td>
<td>0.0 k</td>
<td>No Uplift</td>
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<tr>
<td>Z Flexure (+X)</td>
<td>0.9499</td>
<td>27.742 k-ft</td>
<td>28.294 k-ft</td>
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<td>Z Flexure (+X)</td>
<td>0.001881</td>
<td>0.04910 k-ft</td>
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<td>X Flexure (+Z)</td>
<td>0.06903</td>
<td>1.063 k-ft</td>
<td>15.398 k-ft</td>
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<tr>
<td>X Flexure (-Z)</td>
<td>0.06903</td>
<td>1.063 k-ft</td>
<td>15.398 k-ft</td>
<td>+1.20D+0.50L+1.60S+1.60H</td>
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<tr>
<td>1-way Shear (+X)</td>
<td>0.7883</td>
<td>59.120 psi</td>
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<td>1-way Shear (-X)</td>
<td>0.0</td>
<td>0.0 psi</td>
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<tr>
<td>1-way Shear (+Z)</td>
<td>0.08625</td>
<td>6.619 psi</td>
<td>75.0 psi</td>
<td>+1.20D+0.50L+1.60S+1.60H</td>
</tr>
<tr>
<td>1-way Shear (-Z)</td>
<td>0.08625</td>
<td>6.619 psi</td>
<td>75.0 psi</td>
<td>+1.20D+0.50L+1.60S+1.60H</td>
</tr>
<tr>
<td>2-way Punching</td>
<td>0.0</td>
<td>28.769 psi</td>
<td>75.0 psi</td>
<td>+1.20D+0.50L+1.60S+1.60H</td>
</tr>
</tbody>
</table>

## Detailed Results

### Soil Bearing

<table>
<thead>
<tr>
<th>Rotation Axis &amp; Load Combination...</th>
<th>Gross Allowable</th>
<th>Xecc (in)</th>
<th>Zecc (in)</th>
<th>Actual Soil Bearing Stress Location</th>
<th>Actual / Allow Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Allowable</td>
<td></td>
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<td></td>
<td>Location</td>
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<td>Bottom, -Z</td>
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<td>Top, +Z</td>
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<tr>
<td>Left, -X</td>
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<td>Right, +X</td>
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</tr>
<tr>
<td>Actual / Allow Ratio</td>
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</tbody>
</table>
**General Footing**

**Lic. #:** KWW-06001594  
**Description:** P2 LC7/8

**Code References**
Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10  
Load Combinations Used: ASCE 7-10

### General Information

**Material Properties**  
- $f'_c$: Concrete 28 day strength = 2.50 ksi  
- $f_y$: Rebar Yield = 60.0 ksi  
- $E_c$: Concrete Elastic Modulus = 3,122.0 ksi  
- Concrete Density = 150.0 pcf  
- $e'$ Values  
  - Flexure = 0.90  
  - Shear = 0.750

**Analysis Settings**  
- Min. Steel % Bending Reinf. = 0.0180  
- Min. Overturning Safety Factor = 1.0 : 1  
- Min. Sliding Safety Factor = 1.0 : 1  
- Add Rtg Wt for Soil Pressure = Yes  
- Use Rtg w for stability, moments & shears = Yes  
- Add Pedestal Wt for Soil Pressure = Yes  
- Use Pedestal w for stability, mom & shear = Yes

**Soil Design Values**  
- Allowable Soil Bearing = 1.50 ksf  
- Increase Bearing By Footing Weight = Yes  
- Soil Passive Resistance (for Sliding) = 100.0 pcf  
- Soil/CrCone Friction Coef. = 0.250

**Increases based on footing Depth**  
- Footing base depth below soil surface = -3.0 ft  
- Allow press. increase per foot of depth = ksf  
- when footing base is below = ft

**Increases based on footing plan dimension**  
- Allowable pressure increase per foot of depth = ksf  
- when max. length or width is greater than = ft

### Dimensions

- Width parallel to X-X Axis = 7.0 ft  
- Length parallel to Z-Z Axis = 7.0 ft  
- Footing Thickness = 12.0 in

**Pedestal dimensions...**  
- px: parallel to X-X Axis = 18,610 in  
- pz: parallel to Z-Z Axis = 18,610 in  
- Height = 108.0 in  
- Reber Centerline to Edge of Concrete...  
  - at Bottom of footing = 3.0 in

**Reinforcing**

- Bars parallel to X-X Axis  
  - Number of Bars = 8.0  
  - Reinforcing Bar Size = # 5

- Bars parallel to Z-Z Axis  
  - Number of Bars = 11.0  
  - Reinforcing Bar Size = # 5

**Bandwidth Distribution Check (ACI 15.4.4.2)**  
- Direction Requiring Closer Separation = n/a  
- # Bars required within zone = n/a  
- # Bars required on each side of zone = n/a

### Applied Loads

<table>
<thead>
<tr>
<th>P: Column Load</th>
<th>OB: Overturden</th>
<th>M-xx</th>
<th>M-zz</th>
<th>V-x</th>
<th>V-z</th>
<th>D</th>
<th>Lr</th>
<th>L</th>
<th>S</th>
<th>W</th>
<th>E</th>
<th>H</th>
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<td>1.20</td>
<td>0.2280</td>
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<td>k</td>
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</tbody>
</table>

Note: 
- D: Applied Load
- Lr: Applied Load
- L: Applied Load
- S: Applied Load
- W: Applied Load
- E: Applied Load
- H: Applied Load
## DESIGN SUMMARY

<table>
<thead>
<tr>
<th>Item</th>
<th>Applied</th>
<th>Capacity</th>
<th>Governing Load Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Bearing</td>
<td>1.131 ksf</td>
<td>1.650 ksf</td>
<td>+0.8D+0.8W+0.60H about Z-Z axis</td>
</tr>
<tr>
<td>Overturning - X-X</td>
<td>0.0 k-ft</td>
<td>0.0 k-ft</td>
<td>No Overturning</td>
</tr>
<tr>
<td>Overturning - Z-Z</td>
<td>41.460 k-ft</td>
<td>47.053 k-ft</td>
<td>+0.8D+0.8W+0.60H</td>
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<tr>
<td>Sliding - X-X</td>
<td>2.340 k</td>
<td>5.223 k</td>
<td>+0.6D+0.60W+0.60H</td>
</tr>
<tr>
<td>Sliding - Z-Z</td>
<td>0.0 k</td>
<td>0.0 k</td>
<td>No Sliding</td>
</tr>
<tr>
<td>Uplift</td>
<td>-5.169 k</td>
<td>13.452 k</td>
<td>+0.6D+0.60W+0.60H</td>
</tr>
<tr>
<td>Z Flexure (+X)</td>
<td>2.967 k-ft</td>
<td>13.684 k-ft</td>
<td>+0.9D+0.9W+0.9H</td>
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<tr>
<td>Z Flexure (-X)</td>
<td>2.880 k-ft</td>
<td>13.684 k-ft</td>
<td>+1.2D+0.5L+0.5L-W+1.60H</td>
</tr>
<tr>
<td>X Flexure (+Z)</td>
<td>1.006 k-ft</td>
<td>18.473 k-ft</td>
<td>+1.2D+0.5L+0.5L-W+1.60H</td>
</tr>
<tr>
<td>X Flexure (-Z)</td>
<td>1.006 k-ft</td>
<td>18.473 k-ft</td>
<td>+1.2D+0.5L+0.5L-W+1.60H</td>
</tr>
<tr>
<td>1-way Shear (+X)</td>
<td>9.405 psi</td>
<td>75.0 psi</td>
<td>+1.2D+0.5L+0.5L-W+1.60H</td>
</tr>
<tr>
<td>1-way Shear (-X)</td>
<td>13.955 psi</td>
<td>75.0 psi</td>
<td>+1.2D+0.5L+0.5L-W+1.60H</td>
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<td>1-way Shear (+Z)</td>
<td>4.976 psi</td>
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<td>+1.2D+0.5L+0.5L-W+1.60H</td>
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<tr>
<td>1-way Shear (-Z)</td>
<td>4.976 psi</td>
<td>75.0 psi</td>
<td>+1.2D+0.5L+0.5L-W+1.60H</td>
</tr>
<tr>
<td>2-way Punching</td>
<td>11.876 psi</td>
<td>150.0 psi</td>
<td>+1.2D+0.5L+0.5L-W+1.60H</td>
</tr>
</tbody>
</table>

## Detailed Results

### Soil Bearing

<table>
<thead>
<tr>
<th>Rotation Axis &amp; Load Combination</th>
<th>Gross Allowable</th>
<th>Xecc (in)</th>
<th>Zecc (in)</th>
<th>Actual Soil Bearing Stress @ Location</th>
<th>Actual / Allow Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Bottom, -Z</td>
<td>Top, +Z</td>
<td>Left, X</td>
<td>Right, +X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

...
General Footing

Code References
Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used: ASCE 7-10

General Information

Material Properties
- f′c : Concrete 28 day strength = 2.50 ksi
- fyy : Rebar Yield = 60.0 ksi
- Ec : Concrete Elastic Modulus = 3,122.0 ksi
- Concrete Density = 150.0pcf
- ε′f Values
  - Flexure = 0.90
  - Shear = 0.750

Analysis Settings
- Min Steel % Bending Reinf. = 0.00180
- Min Allow % Temp Reinf. = 1.0 : 1
- Min. Overturning Safety Factor = 1.0 : 1
- Min. Sliding Safety Factor = 1.0 : 1
- Add Adj Wt for Soil Pressure = Yes
- Use Adj Wt for stability, moments & shears = Yes
- Add Pedestal Wt for Soil Pressure = Yes
- Use Pedestal w/ for stability, mom & shear = Yes

Soil Design Values
- Allowable Soil Bearing = 1.50 ksf
- Increase Bearing By Footing Weight = Yes
- Soil Passive Resistance (for Sliding) = 100.0 pcf
- Soil/Concrete Friction Coeff. = 0.250

Increases based on footing Depth
- Footing base depth below soil surface = -3.0 ft
- Allow press. increase per foot of depth when footing base is below = ksf
- Increases based on footing plan dimension
- Allowable pressure increase per foot of depth when max. length or width is greater than = ft

Dimensions
- Width parallel to X-X Axis = 7.0 ft
- Length parallel to Z-Z Axis = 7.0 ft
- Footing Thikness = 12.0 in

Pedestal dimensions...
- px : parallel to X-X Axis = 18.610 in
- pz : parallel to Z-Z Axis = 18.610 in
- Height = 106.0 in
- Rebar Centerline to Edge of Concrete...
  - at Bottom of footing = 3.0 in

Reinforcing
- Bars parallel to X-X Axis
  - Number of Bars = 7.0
  - Reinforcing Bar Size = # 5
- Bars parallel to Z-Z Axis
  - Number of Bars = 7.0
  - Reinforcing Bar Size = # 5

Bandwidth Distribution Check (ACI 15.4.4.2)
- Direction Requiring Closer Separation = n/a
- # Bars required within zone = n/a
- # Bars required on each side of zone = n/a

Applied Loads

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<tr>
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<th>D</th>
<th>Lr</th>
<th>L</th>
<th>S</th>
<th>W</th>
<th>E</th>
<th>H</th>
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<td></td>
<td></td>
<td></td>
<td>k</td>
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Project Name: 15D DISTRICT SAND SHO
Engineer: E.BEGANOVIC
Project Descr: PEMB FDN
Project ID:

File: C:\Users\sal\Desktop\SANDSH-1.E06
ERIECALC, INC. 1985-2016, Build 6.16.8.31, Ver 6.16.8.31
Licensee: AHJ Engineers, P.C.
**General Footing**

### Code References
Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10

### General Information

<table>
<thead>
<tr>
<th>Material Properties</th>
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<tbody>
<tr>
<td>f'c : Concrete 28 day strength</td>
<td>2.50 ksi</td>
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<td>f_y : Rebar Yield</td>
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<td>E_o : Concrete Elastic Modulus</td>
<td>3,122.0 ksi</td>
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<td>Concrete Density</td>
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<td>ε' Values</td>
<td>Flexure = 0.90, Shear = 0.750</td>
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<table>
<thead>
<tr>
<th>Soil Design Values</th>
<th>Value</th>
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<tr>
<td>Allowable Soil Bearing</td>
<td>1.550 ksf</td>
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<tr>
<td>Increase Bearing By Footing Weight</td>
<td>Yes</td>
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<tr>
<td>Soil Passive Resistance (for Sliding)</td>
<td>100.0 pcf</td>
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<td>Soil/Concrete Friction Coeff.</td>
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<td>Allow press. increase per foot of depth when footing base is below</td>
<td>ft</td>
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<tr>
<td>Increases based on footing plan dimension</td>
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</tr>
<tr>
<td>Allowable pressure increase per foot of depth when max. length or width is greater than</td>
<td>ft</td>
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### Analysis Settings

- Min. Steel % Bending Reinf. = 0.00180
- Min. Allow % Temp Reinf. =
- Min. Overturning Safety Factor = 1.0:1
- Min. Sliding Safety Factor = 1.0:1
- Add Flg Wt for Soil Pressure = Yes
- Use flg wt for stability, moments & shears = Yes
- Add Pedestal Wt for Soil Pressure = Yes
- Use Pedestal wt for stability, mom & shear = Yes

### Dimensions

- Width parallel to X-X Axis = 6.0 ft
- Length parallel to Z-Z Axis = 6.0 ft
- Footing Thickness = 12.0 in
- Load location offset from footing center...
  - H : Prt to X-X Axis = -18 in
  - Z

- Pedestal dimensions...
  - px : parallel to X-X Axis = 18.610 in
  - pz : parallel to Z-Z Axis = 18.610 in
  - Height = 108.0 in
- Rebar Conteline to Edge of Concrete...
  - at Bottom of footing = 3.0 in

### Reinforcing

- Bars parallel to X-X Axis
  - Number of Bars = 6.0
  - Reinforcing Bar Size = # 5
- Bars parallel to Z-Z Axis
  - Number of Bars = 6.0
  - Reinforcing Bar Size = # 5

### Bandwith Distribution Check (ACI 15.4.4.2)

- Direction Requiring Closer Separation = n/a
- # Bars required within zone = n/a
- # Bars required on each side of zone = n/a

### Applied Loads

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<thead>
<tr>
<th>P : Column Load</th>
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<th>E</th>
<th>H</th>
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<td>M_xx</td>
<td></td>
<td></td>
<td>k-ft</td>
</tr>
<tr>
<td>M_zz</td>
<td></td>
<td></td>
<td>k-ft</td>
</tr>
<tr>
<td>V_x</td>
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<td>4.10</td>
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<td>V_z</td>
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<td></td>
<td>k</td>
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### DESIGN SUMMARY

<table>
<thead>
<tr>
<th>Item</th>
<th>Applied</th>
<th>Capacity</th>
<th>Governing Load Combination</th>
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</thead>
<tbody>
<tr>
<td>Soil Bearing</td>
<td>1.166 ksf</td>
<td>1.70 ksf</td>
<td>+D+0.750L+0.750S+0.450W+H about Z-Z</td>
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<tr>
<td>Overturning - X-X</td>
<td>0.0 k-ft</td>
<td>0.0 k-ft</td>
<td>No Overturing</td>
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<tr>
<td>Overturning - Z-Z</td>
<td>42.413 k-ft</td>
<td>49.913 k-ft</td>
<td>+D+0.750L+0.750S+0.450W+H</td>
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<tr>
<td>Sliding - X-X</td>
<td>2.460 k</td>
<td>5.166 k</td>
<td>+0.60D+0.60W+0.60H</td>
</tr>
<tr>
<td>Sliding - Z-Z</td>
<td>0.0 k</td>
<td>0.0 k</td>
<td>No Sliding</td>
</tr>
<tr>
<td>Uplift</td>
<td>-7.10 k</td>
<td>16.438 k</td>
<td>+D+S+H</td>
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<tr>
<td>Z Flexure (+X)</td>
<td>5.814 k-ft</td>
<td>12.046 k-ft</td>
<td>+1.2D+0.50L+0.50S+W+1.60H</td>
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<tr>
<td>Z Flexure (-X)</td>
<td>0.6635 k-ft</td>
<td>12.046 k-ft</td>
<td>+1.2D+0.50L+0.50S=W+1.60H</td>
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<tr>
<td>X Flexure (+Z)</td>
<td>0.5228 k-ft</td>
<td>12.046 k-ft</td>
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</tr>
<tr>
<td>X Flexure (-Z)</td>
<td>0.5228 k-ft</td>
<td>12.046 k-ft</td>
<td>+1.2D+0.50L+1.60S+1.60H</td>
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<tr>
<td>1-way Shear (+X)</td>
<td>17.549 psi</td>
<td>75.0 psi</td>
<td>+1.2D+0.80L+0.80S+W+1.60H</td>
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<tr>
<td>1-way Shear (-X)</td>
<td>0.0 psi</td>
<td>n/a</td>
<td>n/a</td>
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<td>1-way Shear (+Z)</td>
<td>2.939 psi</td>
<td>75.0 psi</td>
<td>+1.2D+0.50L+1.60S+1.60H</td>
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<td>1-way Shear (-Z)</td>
<td>2.939 psi</td>
<td>75.0 psi</td>
<td>+1.2D+0.50L+1.60S+1.60H</td>
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<td>2-way Punching</td>
<td>13.508 psi</td>
<td>75.0 psi</td>
<td>+1.2D+0.80S+0.50W+1.60H</td>
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</table>

### Detailed Results

#### Soil Bearing

- **Rotation Axis & Load Combination:**
  - Gross Allowable
  - Xecc = Zecc
  - Actual Soil Bearing Stress @ Location:
    - Bottom, -Z: 75.0 psi
    - Top, +Z: 75.0 psi
    - Left, -X: 75.0 psi
    - Right, +X: 75.0 psi

- **Actual / Allow Ratio:**
  - 1.00
Concrete Column
Lic. #: KW-06001594
Description: SAND SHED PEDESTAL LC#1

Code References
Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used: ASCE 7-10

General Information
\[ f_c': \text{Concrete 28 day strength} = 2.5 \text{ ksi} \]
\[ E = 3,122.0 \text{ ksi} \]
Density = 145.0pcf
\[ \beta = 0.850 \]
fy - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits ASTM A615 Bars Used
Min. Rein. = 1.0%
Max. Rein. = 8.0%

Overall Column Height = 10 ft
End Fixity: Top Free, Bottom Fixed
Brace condition for deflection (buckling) along columns:
X-X (width) axis:
Unbraced Length for X-X axis buckling = 10 ft, K = 2.10
Y-Y (depth) axis:
Unbraced Length for X-X axis buckling = 2 ft, K = 1.0

Column Cross Section
Column Dimensions: 24.0 in Square Column, Column Edge to Rebar Edge Cover = 2.0 in

Column Reinforcing:
4 - #6 bars @ corners, 2.0 - #6 bars top & bottom between corner bars, 2.0 - #6 bars left & right between corner bars

Applied Loads
Column self weight included: 5,800.0 lbs * Dead Load Factor
AXIAL LOADS...
Axial Load at 10.0 ft above base, D = 2.60, S = 15.0 k
BENDING LOADS...
Lat. Point Load at 10.0 ft creating My-y, D = 1.50, S = 9.10 k

DESIGN SUMMARY
Load Combination +1.20D+0.50L+1.60S+1.60H Location of max. above base 9,933 ft
Maximum Stress Ratio 0.581:1
\[ \text{Ratio} = \frac{(Pu+2\text{Mu}^2)^{0.5}}{(\Phi \text{Pn}+2\Phi\text{Mn}^2)^{0.5}} \]
\[ Pu = 34.080 \text{ k} \]
\[ \Phi \] * \[ Pn = 58.638 \text{ k} \]
\[ Mu = 0.0 \text{ k-ft} \]
\[ \Phi \] * \[ Mn = 0.0 \text{ k-ft} \]
\[ Mu = -163.60 \text{ k-ft} \]
\[ \Phi \] * \[ Mn = -283.995 \text{ k-ft} \]
\[ Mu = 270.0 \text{ deg} \]
\[ Mu = 163.60 \text{ k-ft} \]
\[ \Phi \text{Mn at Angle} = 281.622 \text{ k-ft} \]

Moment & Mu values located at Pu-Mu vector intersection with capacity curve

Column Capacities...
\[ Pnmax: \text{Nominal Max. Compressive Axial Capacity} = 1,529.58 \text{ k} \]
\[ Pnmin: \text{Nominal Min. Tension Axial Capacity} = k \]
\[ \Phi \text{Pn, max: Usable Compressive Axial Capacity} = 795.38 \text{ k} \]

Governing Load Combination Results

<table>
<thead>
<tr>
<th>Moment</th>
<th>Axial Load</th>
<th>Bending Analysis</th>
<th>Utilization</th>
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<tbody>
<tr>
<td>X-X</td>
<td>Y-Y</td>
<td>Pu</td>
<td>Sx</td>
</tr>
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<td>+1.40D+1.60H</td>
<td>Actual</td>
<td>9.93</td>
<td>11.76</td>
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### Governing Load Combination Results

<table>
<thead>
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<th>Governing Factored Load Combination</th>
<th>Moment X-X</th>
<th>Dist. from base ft</th>
<th>Axial Load Pu * Pn</th>
<th>φ * Mu</th>
<th>Bending Analysis k-ft</th>
<th>Utilization φ Mn Ratio</th>
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<tbody>
<tr>
<td>+1.20D+0.50L+1.60L+1.60H</td>
<td>Actual</td>
<td>9.93</td>
<td>10.08</td>
<td>205.41</td>
<td>1.000</td>
<td>-18.00</td>
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<td>10.08</td>
<td>205.41</td>
<td>1.000</td>
<td>-18.00</td>
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<tr>
<td>+1.20D+1.60L+0.50S+1.60H</td>
<td>Actual</td>
<td>9.93</td>
<td>10.08</td>
<td>205.41</td>
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#### Maximum Reactions

<table>
<thead>
<tr>
<th>Load Combination</th>
<th>X-X Axis Reaction @ Base</th>
<th>X-Y Axis Reaction @ Top</th>
<th>Axial Reaction @ Base</th>
<th>My - End Moments @ Top k-ft</th>
<th>Mx - End Moments @ Top</th>
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<tbody>
<tr>
<td>+D+H</td>
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<td>15.000</td>
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<tr>
<td>+D+L+H</td>
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<td>8.400</td>
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<tr>
<td>+D+S+H</td>
<td>1.50</td>
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<td>8.400</td>
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#### Maximum Moment Reactions

<table>
<thead>
<tr>
<th>Load Combination</th>
<th>Moment About X-X Axis @ Base</th>
<th>Moment About X-X Axis @ Top</th>
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</thead>
<tbody>
<tr>
<td>+D+H</td>
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<td>k-ft</td>
</tr>
<tr>
<td>+D+H+L</td>
<td>k-ft</td>
<td>k-ft</td>
</tr>
<tr>
<td>+D+L+H</td>
<td>k-ft</td>
<td>k-ft</td>
</tr>
<tr>
<td>+D+S+H</td>
<td>k-ft</td>
<td>k-ft</td>
</tr>
<tr>
<td>+D+0.750L+0.750L+H</td>
<td>k-ft</td>
<td>k-ft</td>
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<td>+D+0.750L+0.750S+H</td>
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<td>k-ft</td>
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<tr>
<td>+D+0.600W+H</td>
<td>k-ft</td>
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<tr>
<td>+D+0.700E+H</td>
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<tr>
<td>+D+0.750L+0.750L+0.450W+H</td>
<td>k-ft</td>
<td>k-ft</td>
</tr>
<tr>
<td>+D+0.750L+0.750S+0.450W+H</td>
<td>k-ft</td>
<td>k-ft</td>
</tr>
<tr>
<td>+D+0.750L+0.750S+0.5250E+H</td>
<td>k-ft</td>
<td>k-ft</td>
</tr>
<tr>
<td>+D+0.600W+0.600W+H</td>
<td>k-ft</td>
<td>k-ft</td>
</tr>
<tr>
<td>+D+0.700E+0.700E+H</td>
<td>k-ft</td>
<td>k-ft</td>
</tr>
<tr>
<td>D Only</td>
<td>k-ft</td>
<td>k-ft</td>
</tr>
<tr>
<td>L Only</td>
<td>k-ft</td>
<td>k-ft</td>
</tr>
<tr>
<td>S Only</td>
<td>k-ft</td>
<td>k-ft</td>
</tr>
<tr>
<td>W Only</td>
<td>k-ft</td>
<td>k-ft</td>
</tr>
<tr>
<td>E Only</td>
<td>k-ft</td>
<td>k-ft</td>
</tr>
<tr>
<td>H Only</td>
<td>k-ft</td>
<td>k-ft</td>
</tr>
</tbody>
</table>
### Maximum Deflections for Load Combinations

<table>
<thead>
<tr>
<th>Load Combination</th>
<th>Max. X-X Deflection</th>
<th>Distance</th>
<th>Max. Y-Y Deflection</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>+D+H</td>
<td>0.0100 in</td>
<td>10,000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>+D+L+H</td>
<td>0.0100 in</td>
<td>10,000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>+D+Lr+H</td>
<td>0.0100 in</td>
<td>10,000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>+D+S+H</td>
<td>0.0704 in</td>
<td>10,000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>+D+0.750L+0.750L+H</td>
<td>0.0100 in</td>
<td>10,000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>+D+0.750L+0.750S+H</td>
<td>0.0653 in</td>
<td>10,000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>+D+0.80W+H</td>
<td>0.0100 in</td>
<td>10,000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>+D+0.70E+H</td>
<td>0.0100 in</td>
<td>10,000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>+D+0.750L+0.750L+0.450W+H</td>
<td>0.0100 in</td>
<td>10,000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>+D+0.750L+0.750S+0.450W+H</td>
<td>0.0653 in</td>
<td>10,000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>+D+0.750L+0.750S+0.5250E+H</td>
<td>0.0653 in</td>
<td>10,000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>+0.60D+0.60W+0.60H</td>
<td>0.0060 in</td>
<td>10,000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>+0.60D+0.70E+0.60H</td>
<td>0.0060 in</td>
<td>10,000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>D Only</td>
<td>0.0100 in</td>
<td>10,000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>Lr Only</td>
<td>0.0000 in</td>
<td>0.000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>L Only</td>
<td>0.0000 in</td>
<td>0.000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>S Only</td>
<td>0.0604 in</td>
<td>10,000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>W Only</td>
<td>0.0000 in</td>
<td>0.000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>E Only</td>
<td>0.0000 in</td>
<td>0.000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
<tr>
<td>H Only</td>
<td>0.0000 in</td>
<td>0.000 ft</td>
<td>0.000 in</td>
<td>0.000 ft</td>
</tr>
</tbody>
</table>

### Sketches

![Concrete Column Sketches](image)

### Interaction Diagrams

![Interaction Diagrams](image)
Concrete Column

Lic. #: KW-06001594
Description: SAND SHED PEDESTAL LC#1

Concrete Column P-M Interaction Diagram

Concrete Column P-M Interaction Diagram

Concrete Column P-M Interaction Diagram

Concrete Column P-M Interaction Diagram
**BOLT DESIGN**

Max. Shear = \( F_t \times \frac{L}{2} \times \left[ 12 / (L + 12) \right] = 12 \times 9.1 = 108.4 \text{ kN} \) (LRF-P 1.2D + 1.5L)

\( F_t = 108.4 \times \frac{12}{22} \times \frac{8}{9} \times \frac{0.9}{1.2} = 7.52 \text{ kN} \) (LRF-P 0.8 + 0.7E)

\( A = 0.4 \text{ in}^2 \rightarrow A_{LC} = \pi r^2 = 3.145 \times 4^2 = 50.26 \text{ in}^2 \) - CONCRETE = BREACHING (CONC - T/C CONVISION)

**STEEL**

Check: \( \frac{\phi N_{se} = 0.15 \times 12}{4 \times 1.5 \times (0.6 \times 5)} \times 28.52 = 28.52 \times 7.52 \text{ kN} \)

STEEL OK

**BREAKOUT**

\[ \frac{N_b}{A_{lc}} = \frac{N_b}{\pi r^2} = \frac{12}{3.145 \times 4^2} = \frac{12}{50.26} = 0.24 \]

\[ A_{nc} = 25 \text{ in}^2 \]

\[ A_{nc} = \frac{9 \times 8}{2} = 36 \text{ in}^2 \]

\[ N_b = 6 \text{ kN} \phi \]

\[ \psi_{cr, N = 1.0} = 0.77 \times 0.2 \times 9.125 \times \frac{1}{5} = 0.87 \]

\[ \psi_{in, N = 1.25} \]

\[ N_{in} = 1.25 \times N_{cr} = 2.4\times (1.0) \times \frac{1200}{1.5} \times \frac{1}{5} = 63.65 \]

\[ N_{bc} = 63.65 \times \left( \frac{24}{125} \right) = 18.17 \times 1.25 \times 7.52 = 145.7 \text{ kN} \]

Pull-out OK

---

**AHJ NO.**

PROJECT: I1V SANK SHEL

DATE:

BY: G. BORISOV

SHEET NO.

---

AHJ ENGINEERS, PC

STRUCTURAL CONSULTANTS
ANCHOR BOLD DESIGN CONT. FL1F3

CHECK SIDE TAIL HOLLOW - 0.1

\[ \begin{align*}
N_{sb} &= \left(1 + \frac{56}{24} \right) N_{sb} \\
N_{sb} &= \frac{1}{100} \left( 0.866 \left( 1.25 \frac{3}{4} \right) \right) \times 0.7 \approx 57.68K \\
\phi &= 0.7 \\
N_{sb} &= \frac{57.68}{0.7} \approx 82.40K
\end{align*} \]

\[ \begin{align*}
N_{sb} &= 57.68 \times 0.955 = 55.19K \\
N_{sb} &= 30.9K \\
\text{CONCRETE} \\
\text{OHM} &= 55.19K \\
\text{ACM} &= 55.19K
\end{align*} \]

STEEL:
\[ V_{sa} = 0.6 A_{se} \cdot \sqrt{f_u} = (0.6 \times 4.14 \text{ in}^2 \cdot 36000 \text{ psi})^{0.75} = 7.128 \text{ ft-lb} \geq 2.9 \text{ ft-lb} \]

STEEL OK

CHECK BASE -

\[ \begin{align*}
V_{lb} &= 0.97 \cdot V_{lc} \\
V_{lc} &= \frac{1}{100} \left( \frac{4}{5} \right) \left( 1 - \frac{1}{2} \right) \cdot \frac{1}{10} \cdot \frac{1}{15} \cdot \frac{1}{10} \cdot \frac{1}{15} \cdot \frac{1}{10} \cdot \frac{1}{15} \\
V_{lb} &= 0.97 \times 7.128 = 6.95K \left( \frac{69.3 \text{ in}}{12 \text{ in}} \right) = 15.69K \geq 15 \text{ kips}
\end{align*} \]

\[ \begin{align*}
\phi V_{lb} &= \frac{69.3}{12} \times (0.972)(1.2)(1.08)(0.85) = 15.69K \times 0.79 \geq 12.0K \\
\text{OK}
\end{align*} \]

AT FL1F3 USE BASE PT PER AISC F 9, 3/4" X 12" EMB. THEN ADD RED ANCHORS W/ HEAVY-NEXT NUT.

---

AHJ NO. PROJECT DATE: SHEET NO.

AHJ ENGINEERS, PC
STRUCTURAL CONSULTANTS

BY: L. BUCKANNAN

111 SAND BAY

ANCHOR BOLT DESIGN (CONTINUED)

F. ANCHOR BOLT DESIGN

TENSION:

\[ V_{\text{design}} = 115.44 \text{ kips} \]

\[ V_{\text{actual}} = 94.58 \text{ kips} \]

\[ V_{\text{allowable}} = 155.2 \text{ kips} \]

\[ V_{\text{method}} = 96.5 \text{ kips} \]

\[ V_{\text{method}} = 96.5 \times 0.673 = 155.2 \text{ kips} \]

\[ F_{\text{method}} = 155.2 \text{ kips} \]

BY INSPECTION, SHEAR K.F. E. IS ACCEPTABLE

\[ (a_1) = 9.128 \text{ kips} \]

\[ (a_2) = 8.518 \text{ kips} \]

\[ \theta = \sin^{-1} \left( \frac{1.264}{a_1} \right) = 38.71^\circ \]

\[ \theta_{\text{allowable}} = 20^\circ \]

\[ \theta_{\text{actual}} = 38.71^\circ \]

\[ \theta < \theta_{\text{allowable}} \]

\[ \text{SHEAR REINFORCEMENT OK} \]

\[ N_f = A_{\text{net}} f_{\text{y}} = 12 \text{ kips} \]

\[ M_0 = 63.07 \text{ kips} \]

\[ M_0 = 63.07 \times \frac{1.25}{100} = 7.88 \text{ kips} \]

\[ \theta = \sin^{-1} \left( \frac{1.264}{a_1} \right) = 38.71^\circ \]

\[ \text{DESIGN OK} \]
### Cantilevered Retaining Wall

**Criteria**
- Retained Height = 9.75 ft
- Wall height above soil = 0.25 ft
- Slope Behind Wall = 3.00 : 1
- Height of Soil over Toe = 24.00 in
- Water height over heel = 0.0 ft
- Vertical component of active
- Lateral soil pressure options:
  - NOT USED for Soil Pressure.
  - NOT USED for Sliding Resistance.
  - NOT USED for Overturning Resistance.

**Surcharge Loads**
- Surcharge Over Heel = 0.0 psf
- Surcharge Over Toe = 100.0 psf

**Axial Load Applied to Stem**
- Axial Dead Load = 250.0 lbs
- Axial Live Load = 250.0 lbs
- Axial Load Eccentricity = 2.0 in

**Design Summary**

#### Wall Stability Ratios
- Overtuming = 3.20 OK
- Sliding = 2.17 OK
- Total Bearing Load = 7,996 lbs
- ...resultant ecc. = 6.89 in
- Soil Pressure @ Toe = 1,704 psf OK
- Soil Pressure @ Heel = 580 psf OK
- Allowable = 3,000 psf

#### Soil Data
- Allow Soil Bearing = 3,000.0 psf
- Equivalent Fluid Pressure Method
  - Heel Active Pressure = 35.0 psf/ft
  - Toe Active Pressure = 35.0 psf/ft
  - Passive Pressure = 445.0 psf/ft
- Soil Density, Heel = 125.00pcf
- Soil Density, Toe = 125.00pcf
- Friction Coeff b/t Ftg & Soil = 0.400
- Soil height to ignore for passive pressure = 12.00 in

#### Lateral Load Applied to Stem
- Lateral Load = 0.0 psf
- ...Height to Top = 0.00 ft
- ...Height to Bottom = 0.00 ft

#### Adjacent Footing Load
- Adjacent Footing Load = 0.0 lbs
- Footing Width = 0.00 ft
- Eccentricity = 0.00 in
- Wall to Ftg CL Dist = 0.00 ft
- Footing Type = Line Load
- Base Above/Below Soil = 0.0 ft
- at Back of Wall
- Poisson's Ratio = 0.300

#### Wind on Exposed Stem
- 39.3 psf

#### Design Data
- fb/FB + fa/Fa
- Total Force @ Section = 562.8 lbs
- Moment.....Actual ft-lb = 994.1
- Moment.....Allowable ft-lb = 4,665.4
- Shear.....Actual psf = 7.5
- Shear.....Allowable psf = 75.0
- Wall Weight psf = 66.7
- Rebar Depth 'd' in = 6.25
- Lap splice if above in = 18.72
- Lap splice if below in = 18.72
- Hook embed into footing in = 18.72

#### Concrete Data
- f'c psf = 2,500.0
- f'c (2t) = 60,000.0

#### Stem Construction
<table>
<thead>
<tr>
<th>Stem</th>
<th>Top Stem</th>
<th>2nd</th>
<th>3rd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stem</td>
<td>OK</td>
<td>OK</td>
<td>Bar Lap/End</td>
</tr>
<tr>
<td>Wall Material Above 'Ht'</td>
<td>Concrete</td>
<td>Concrete</td>
<td>Concrete</td>
</tr>
<tr>
<td>Thickness</td>
<td>in = 8.00</td>
<td>8.00</td>
<td>8.00</td>
</tr>
<tr>
<td>Rebar Size</td>
<td># 4</td>
<td># 4</td>
<td># 6</td>
</tr>
<tr>
<td>Rebar Spacing</td>
<td>14.00</td>
<td>14.00</td>
<td>14.00</td>
</tr>
<tr>
<td>Rebar Placed at</td>
<td>Edge</td>
<td>Edge</td>
<td>Edge</td>
</tr>
</tbody>
</table>

### Stem Construction
- Top Stem
- 2nd
- 3rd

- Design Height Above Ftg ft = 5.33, 3.33, 0.00
- Wall Material Above 'Ht'
- Thickness: 8.00, 8.00, 8.00
- Rebar Size: # 4, # 4, # 6
- Rebar Spacing: 14.00, 14.00, 14.00
- Rebar Placed at: Edge, Edge, Edge

### Sliding Calcs
- (Vertical Component NOT Used)
- Lateral Sliding Force = 2,949.0 lbs
- less 100% Passive Force = 2,009.7 lbs
- less 100% Friction Force = 3,090.0 lbs
- Added Force Req'd = 0.0 lbs OK
- for 1.5 : 1 Stability = 0.0 lbs OK

### Load Factors
- Dead Load = 1,200
- Live Load = 1,600
- Earth, H = 1,600
- Wind, W = 1,600
- Seismic, E = 1,000
Cantilevered Retaining Wall

Footing Dimensions & Strengths

<table>
<thead>
<tr>
<th>Item</th>
<th>Force</th>
<th>Distance</th>
<th>Moment ft-lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heel Active Pressure</td>
<td>2,802.3</td>
<td>4.06</td>
<td>10,578.0</td>
</tr>
<tr>
<td>Surcharge over Heel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toe Active Pressure</td>
<td>-175.5</td>
<td>1.06</td>
<td>-185.2</td>
</tr>
<tr>
<td>Surcharge Over Toe</td>
<td>-98.7</td>
<td>1.58</td>
<td>-140.4</td>
</tr>
<tr>
<td>Adjacent Footing Load</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Added Lateral Load</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load @ Stem Above Soil</td>
<td>9.8</td>
<td>11.04</td>
<td>108.6</td>
</tr>
</tbody>
</table>

Total = 2,348.0 O.T.M. = 10,380.9

Resisting/Overturning Ratio = 3.20

Vertical Loads used for Soil Pressure = 7,994.7 lbs

Vertical component of active pressure NOT used for soil pressure

Footing Design Results

<table>
<thead>
<tr>
<th>Item</th>
<th>Toe</th>
<th>Heel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factored Pressure</td>
<td>2,067</td>
<td>703</td>
</tr>
<tr>
<td>Mu' : Upward</td>
<td>5,951</td>
<td>0</td>
</tr>
<tr>
<td>Mu' : Downward</td>
<td>2,084</td>
<td>0</td>
</tr>
<tr>
<td>Mu : Design</td>
<td>3,857</td>
<td>8,758</td>
</tr>
<tr>
<td>Actual 1-Way Shear</td>
<td>14.68</td>
<td>49.12</td>
</tr>
<tr>
<td>Allow 1-Way Shear</td>
<td>75.00</td>
<td>75.00</td>
</tr>
<tr>
<td>Toe Reinforcing</td>
<td># 6</td>
<td>@ 14.00 in</td>
</tr>
<tr>
<td>Heel Reinforcing</td>
<td># 5</td>
<td>@ 14.00 in</td>
</tr>
<tr>
<td>Key Reinforcing</td>
<td>None Spec'd</td>
<td></td>
</tr>
</tbody>
</table>

Other Acceptable Sizes & Spacings

Toe: #4@ 10.75 in, #5@ 16.50 in, #6@ 23.50 in, #7@ 31.75 in, #8@ 42.00 in, #9@ 4
Heel: #4@ 9.75 in, #5@ 15.00 in, #6@ 21.50 in, #7@ 29.00 in, #8@ 38.25 in, #9@ 48
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

<table>
<thead>
<tr>
<th>Item</th>
<th>Force</th>
<th>Distance</th>
<th>Moment ft-lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Over Heel</td>
<td>4,671.9</td>
<td>5.08</td>
<td>23,748.7</td>
</tr>
<tr>
<td>Sloped Soil Over Heel</td>
<td>306.1</td>
<td>5.72</td>
<td>1,751.8</td>
</tr>
<tr>
<td>Surcharge Over Heel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjacent Footing Load</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Axial Dead Load on Stem</td>
<td>250.0</td>
<td>2.67</td>
<td>666.7</td>
</tr>
<tr>
<td>Axial Live Load on Stem</td>
<td>250.0</td>
<td>2.67</td>
<td>666.7</td>
</tr>
<tr>
<td>Soil Over Toe</td>
<td>625.0</td>
<td>1.25</td>
<td>781.3</td>
</tr>
<tr>
<td>Surcharge Over Toe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stem Weight(s)</td>
<td>666.7</td>
<td>2.83</td>
<td>1,889.9</td>
</tr>
<tr>
<td>Earth @ Stem Transitions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Footing Weight</td>
<td>1,225.0</td>
<td>3.50</td>
<td>4,287.5</td>
</tr>
<tr>
<td>Key Weight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vert. Component</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total = 7,744.7 lbs R.M. = 33,124.8

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.
SOILS TEST REPORT

<table>
<thead>
<tr>
<th>Mechanical Analysis % Pass</th>
<th>Soil Properties</th>
<th>Soil Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass of Dry Sample</td>
<td>Liquid Limit</td>
<td>pH</td>
</tr>
<tr>
<td></td>
<td>259.0</td>
<td>Resistivity (ohm-cm)</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>0.0</td>
<td>Sample Moisture (%)</td>
</tr>
<tr>
<td></td>
<td>100.0</td>
<td>Organic</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>7.3</td>
<td>Plastic</td>
</tr>
<tr>
<td></td>
<td>97.2</td>
<td>Plasticity</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>9.2</td>
<td>Non Plastic</td>
</tr>
<tr>
<td></td>
<td>96.4</td>
<td></td>
</tr>
<tr>
<td>#4</td>
<td>12.8</td>
<td>pH</td>
</tr>
<tr>
<td></td>
<td>95.1</td>
<td>Resistivity</td>
</tr>
<tr>
<td>#8</td>
<td>41.8</td>
<td>Sample Moisture (%)</td>
</tr>
<tr>
<td></td>
<td>83.9</td>
<td>Organic</td>
</tr>
<tr>
<td>#16</td>
<td>100.0</td>
<td>Plastic</td>
</tr>
<tr>
<td></td>
<td>61.4</td>
<td>Plasticity</td>
</tr>
<tr>
<td>#30</td>
<td>154.4</td>
<td>Non Plastic</td>
</tr>
<tr>
<td></td>
<td>40.4</td>
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U.S. SIEVE OPENING IN INCHES | U.S. SIEVE NUMBERS | HYDROMETER

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<th>GRAIN SIZE IN MILLIMETERS</th>
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Remarks: This report covers only material as represented by sample and does not necessarily cover all soil from this layer or source.
SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. See 1.3, Page 1, General Information of ITD requirements.
2. Project information.
4. Work by Owner.
5. Owner-furnished products.
6. Access to site.
7. Work restrictions.
8. Specification and drawing conventions.

B. Related Requirements:

1. Section 01500 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION


1. Project Location: Nampa, Idaho.

B. Owner: Idaho Transportation Department, P.O. Box 7129, Boise, Idaho, 83707.

1. Owner's Representative: S. Todd Sorenson

C. Architect: Hutchison - Smith Architects.

1. Architect’s Representative: Joe Presher.

D. Consultants: ITD has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. Structural Engineer: AHJ Engineering, Boise, ID.
1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. The purpose of this ITB is to solicit sealed bids to establish a contract between ITD and a Contractor for the structural design and construction of a rigid 60’ x 120’ frame metal building based on the contract documents structural, footings, foundation, electrical and site improvements at Nampa Maintenance Yard, Nampa, Idaho.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

B. Preceding Work: Owner will perform the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.

1. Excavation, remove the soil, add and compact the structural fill and bring the compacted base at finished floor. (There is no concrete slab).

1.6 ACCESS TO SITE

A. Use of Site: Limit use of Project site to areas within the limits set by ITD. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

a. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.7 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 4:00 p.m., Monday through Friday, unless otherwise indicated.
1. Weekend Hours: With written permission of ITD
2. Early Morning Hours: With written permission of ITD.
3. Hours for Utility Shutdowns: With written permission of ITD.
4. Noise: Equipment must have original exhaust mufflers or equivalent.

C. Existing Utility Interruptions: Do not interrupt utilities serving adjacent facilities unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
   1. Notify Owner not less than two days in advance of proposed utility interruptions.
   2. Obtain Owner’s written permission before proceeding with utility interruptions.

D. Noise, Vibration, Dust and Odors: Coordinate operations that may result in high levels of noise, dust, vibration, odors, or other disruption with Owner and Authority having jurisdiction. Maintain low dust using low pressure water spray to maintain clean air

E. Nonsmoking: Smoking is not permitted on the entire site.

F. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

H. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
   1. Maintain list of approved screened personnel with Owner's representative.

I. Trash: Contractor shall maintain onsite dumpster and arrange for pickup to maintain a clean site.

J. Burning: Onsite burning is prohibited.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
   1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
   2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01100
SECTION 01250 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

B. Related Sections include the following:

1. Division 1 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Design Professional will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Design Professional will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by Design Professional are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.

2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

c. Include costs of labor and supervision directly attributable to the change.
d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Design Professional.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal, Design Professional will issue a Change Order for signatures of Owner and Contractor on Change Order Form provided by Architect.

1.6 CONSTRUCTION CHANGE DIRECTIVE


1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PRODUCTS (Not Used)
PART 2 - EXECUTION (Not Used)
END OF SECTION 01250
SECTION 01290 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
   B. Related Sections include the following:
      1. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
      2. Division 1 Section “Project Closeout” for additional requirements related to Final Payment application.

1.3 DEFINITIONS
   A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES
   A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
      1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
         a. Application for Payment forms with Continuation Sheets.
         b. Submittals Schedule.
         c. Contractor's Construction Schedule showing Phased Construction.
      2. Submit the Schedule of Values to Design Professional at Pre-Construction Meeting.
   B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one-line item for each Specification Section.
      1. Identification: Include the following Project identification on the Schedule of Values:
a. Project name and location.
b. Project Number.
c. Name of Design Professional.
d. Design Professional's project number.
e. Contractor's name and address.
f. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
   a. Related Specification Section or Division.
   b. Description of the Work.
   c. Change Orders (numbers) that affect value.
   d. Dollar value.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.

4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
   a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.

6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
   a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

8. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

9. Project Closeout – Provide a separate line item for performing project closeout procedures.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Design Professional and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
B. Payment Application Times: Progress payments shall be submitted to Design Professional by the fifth day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month or as otherwise agreed to.

C. Payment Application Forms: Use AIA G702 and G703 Applications for Payment or pre-approved application by the Architect that has similar format.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Design Professional will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Transmittal: Submit one (1) signed and notarized original copy of each Application for Payment to Design Professional by a method ensuring receipt.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
2. All signatures shall be in blue ink.

F. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of Values.
3. Contractor's Construction Schedule (preliminary if not final).
4. Submittals Schedule (preliminary if not final).
5. List of Contractor's staff assignments.

G. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete (Phased). Provide documents per Section 01770 – Project Closeout.

H. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted per Specification Section 01770 – Project Closeout and Specification Section 01781 – Project Record Documents.

1. As-Built Drawings

END OF SECTION 01290
SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1  RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and other Division 1 Specification Sections, apply to this Section.

1.2  SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General project coordination procedures.
2. Administrative and supervisory personnel.
3. Requests for Information (RFIs).
4. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Sections:

1. Division 1 Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Division 1 Section "Execution Requirements" for procedures for coordinating general installation.
3. Division 1 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3  DEFINITIONS

A. RFI: Request from Owner, Design Professional, or Contractor seeking information from each other during construction.

1.4  COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 KEY PERSONNEL

A. Key Personnel Names: At Pre-Construction Meeting, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in designated location. Keep list current at all times.

1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Design Professional will return RFIs submitted to Design Professional by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project No.
2. Project name and location
3. Date.
4. Name of Contractor.
5. Name of Design Professional.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

   a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Standard Request for Information Form.

D. Design Professional's Action: Design Professional will review each RFI, determine action required, and respond. Allow seven working days for Design Professional's response for each RFI. RFIs received by Design Professional after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:

   a. Requests for approval of submittals.
   b. Requests for approval of substitutions.
   c. Requests for coordination information already indicated in the Contract Documents.
   d. Requests for adjustments in the Contract Time or the Contract Sum.
   e. Requests for interpretation of Design Professional's actions on submittals.
   f. Incomplete RFIs or inaccurately prepared RFIs.

2. Design Professional's action may include a request for additional information, in which case Design Professional's time for response will date from time of receipt of additional information.

3. Design Professional's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 1 Section "Contract Modification Procedures."

   a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Design Professional in writing within seven days of receipt of the RFI response.

E. On receipt of Design Professional's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Design Professional within seven days if Contractor disagrees with response.

F. RFI Log: Prepare, maintain, and submit a tabular log in digital format of RFIs organized by the RFI number. Log shall contain the following:

1. Project No.
2. Project name and location.
3. Name and address of Contractor.
4. Name and address of Design Professional.
5. RFI number including RFIs that were dropped and not submitted.
6. RFI description.
7. Date the RFI was submitted.
8. Date Design Professional's response was received.

1.7 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Design Professional of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Design Professional, within three days of the meeting.

B. Preconstruction Conference: The Architect will schedule a preconstruction conference before starting construction, at a time convenient to the Owner and the Contractor. The meeting will review responsibilities and personnel assignments. The Design Professional will chair the meeting and the Design Professional will distribute minutes within three (3) days after the meeting.

1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of Owner, Design Professional, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:
   a. Tentative construction schedule.
   b. Phasing.
   c. Critical work sequencing and long-lead items.
   d. Designation of key personnel and their duties.
   e. Lines of communications.
   f. Procedures for processing field decisions and Change Orders.
   g. Procedures for RFIs.
   h. Procedures for testing and inspecting.
   i. Procedures for processing Applications for Payment.
   j. Distribution of the Contract Documents.
   k. Submittal procedures.
   l. Preparation of record documents.
   m. Use of the premises and existing building.
   n. Work restrictions.
   o. Working hours.
   p. Owner's occupancy requirements.
   q. Responsibility for temporary facilities and controls.
   r. Procedures for disruptions and shutdowns.
   s. Construction waste management and recycling.
t. Parking availability.
u. Office, work, and storage areas.
v. Equipment deliveries and priorities.
w. First aid.
x. Security.
y. Progress cleaning.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Design Professional and Owner of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
   
b. Options.
c. Related RFI's.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Review of mockups.
i. Possible conflicts.
j. Compatibility problems.
k. Time schedules.
l. Weather limitations.
m. Manufacturer's written recommendations.
n. Warranty requirements.
o. Compatibility of materials.
p. Acceptability of substrates.
q. Temporary facilities and controls.
r. Space and access limitations.
s. Regulations of authorities having jurisdiction.
t. Testing and inspecting requirements.
u. Installation procedures.
v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.

5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at monthly intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Design Professional, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

   a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

      1) Review schedule for next period.

   b. Review present and future needs of each entity present, including the following:

      1) Interface requirements.
      2) Sequence of operations.
      3) Status of submittals.
      4) Deliveries.
      5) Off-site fabrication.
      6) Access.
      7) Site utilization.
      8) Temporary facilities and controls.
      9) Progress cleaning.
     10) Quality and work standards.
     11) Status of correction of deficient items.
     12) Field observations.
     13) Status of RFIs.
     14) Status of proposal requests.
     15) Pending changes.
     16) Status of Change Orders.
     17) Pending claims and disputes.
     18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

   a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01310
SECTION 01320 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and other Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's construction schedule.
2. Construction schedule updating reports.
3. Daily construction reports.
4. Site condition reports.
5. Special reports.

B. Related Requirements:

1. Section 01330 "Submittal Procedures" for submitting schedules and reports.
2. Section 01400 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

C. Event: The starting or ending point of an activity.

D. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:
   1. One paper copy.

B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
   1. Submit a pdf of schedule and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

C. Construction Schedule Updating Reports: Submit with Applications for Payment.

D. Daily Construction Reports: Submit at weekly intervals.

1.5 COORDINATION

A. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.
   1. Secure time commitments for performing critical elements of the Work from entities involved.
   2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
   1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date.

B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
   1. Activity Duration: Define activities so no activity is longer than 20 days.
   2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 30 days, as separate activities in schedule.
Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.


4. Startup and Testing Time: Include no fewer than 5 days for startup and testing.

5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Design Professional's administrative procedures necessary for certification of Substantial Completion.

6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.

2. Work Restrictions: Show the effect of the following items on the schedule:
   a. Coordination with existing construction.
   b. Limitations of continued occupancies.
   c. Uninterruptible services.
   d. Use of premises restrictions.

3. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
   a. Submittals.
   b. Fabrication.
   c. Deliveries.
   d. Installation.
   e. Tests and inspections.
   f. Adjusting.
   g. Startup and placement into final use and operation.

4. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion and the following interim milestones:

1. Start of on-site work in each building.
2. Substantial Completion of each building.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART OR BAR CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 10 days of date established for the Notice to Proceed or at the Contractors’ option provide a Bar Chart Type Construction Schedule
B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

2.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events.
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Construction Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.

B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

A. General: Submit special reports to Owner and Design Professional within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At two-week intervals, update schedule to reflect actual construction progress and activities. Issue schedule two days before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Design Professional, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01320
SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Sections include the following:

1. Division 1 Section “Product Requirements” for submittal of substitution request.
2. Division 1 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
3. Division 1 Section "Project Closeout" for submitting warranties.
4. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
5. Division 1 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
6. Divisions 2 through 16 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Design Professional's responsive action.

B. Informational Submittals: Written information that does not require Design Professional's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. General: Electronic copies of CAD Drawings of the Contract Drawings will be provided by Design Professional for Contractor's use in preparing submittals.

1. Contractor will be required to sign Design Professional’s release form prior to Design Professional’s release of Electronic Drawing files.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

   a. Design Professional reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Design Professional’s receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

   1. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Design Professional will advise Contractor when a submittal being processed must be delayed for coordination.
   2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
   3. Resubmittal Review: Allow 5 working days for review of each resubmittal.

D. Identification: Place a permanent label or title block on each submittal for identification.

   1. Indicate name of firm or entity that prepared each submittal on label or title block.
   2. Provide a space approximately 4 x 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Design Professional.
   3. Include the following information on label for processing and recording action taken:
      
      a. Project name and Project number.
      b. Date.
      c. Name and address of Design Professional.
      d. Name and address of Contractor.
      e. Name and address of subcontractor.
      f. Name and address of supplier.
      g. Name of manufacturer.
      h. Number and title of appropriate Specification Section.
      i. Drawing number and detail references, as appropriate.
      j. Location(s) where product is to be installed, as appropriate.
      k. Other necessary identification.

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

F. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Design Professional will return submittals, without review, discard submittals received from sources other than Contractor.

   1. Transmittal Form: Contractor's standard transmittal form. Provide locations on form for the following information:
      
      a. Project name and project number.
      b. Date.
      c. Destination (To:).
      d. Source (From:).
      e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Specification Section number and title.
i. Drawing number and detail references, as appropriate.
j. Transmittal number, numbered consecutively.
k. Remarks.
l. Signature of transmitter.

2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Design Professional on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.

G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked "Reviewed" or “Furnish as Corrected”.

H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

I. Use for Construction: Use only final submittals with mark indicating "Reviewed” or “Furnish as Corrected" taken by Design Professional.

1.5 CONTRACTOR'S USE OF DESIGN PROFESSIONAL’S CAD FILES

A. General: At Contractor's written request, copies of Design Professional's CAD files may be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:

1. CAD files may only be used for purposes related to the specific project for which they were requested.
2. All designs, images and representations are to remain solely the copyright of the Design Professional.
3. The Design Professional does not warrant the accuracy of any CAD files and assumes no responsibility for errors, omissions or discrepancies contained therein.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

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

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

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.

3. Include the following information, as applicable:
   a. Manufacturer's written recommendations.
   b. Manufacturer's product specifications.
   c. Manufacturer's installation instructions.
   d. Standard color charts.
   e. Manufacturer's catalog cuts.
   f. Wiring diagrams showing factory-installed wiring.
   g. Printed performance curves.
   h. Operational range diagrams.
   i. Standard product operation and maintenance manuals.
   j. Compliance with specified referenced standards.
   k. Testing by recognized testing agency.
   l. Application of testing agency labels and seals.
   m. Notation of coordination requirements.

4. Submit Product Data before or concurrent with Samples.

5. Number of Copies: Submit six (6) copies of Product Data, unless otherwise indicated. Design Professional will return two copies. Mark up and retain one returned copy as a Project Record Document.

C. Shop Drawings: Prepare Project-specific information, verified on site and drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Dimensions.
   b. Identification of products.
   c. Fabrication and installation drawings.
   d. Roughing-in and setting diagrams.
   e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
   f. Shop work manufacturing instructions.
   g. Templates and patterns.
   h. Schedules.
   i. Design calculations.
   j. Compliance with specified standards.
   k. Notation of coordination requirements.
   l. Notation of dimensions established by field measurement.
   m. Relationship to adjoining construction clearly indicated.
   n. Seal and signature of professional engineer if specified.
   o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.

3. Number of Copies: Submit six (6) opaque (bond) copies of each submittal. Design Professional will return two copies.
D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

2. Identification: Attach label on unexposed side of Samples that includes the following:
   a. Generic description of Sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Number and title of appropriate Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
   a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Design Professional will return submittal with options selected.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
   a. Number of Samples: Submit three sets of Samples. Design Professional will retain two Sample sets; remainder will be returned.
     1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
     2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit sets of units that show approximate limits of variations.

E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product.
2. Number and name of room or space.
3. Location within room or space.
4. Number of Copies: Submit six copies of product schedule or list, unless otherwise indicated. Design Professional will return two copies.

F. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation" for Construction Manager's action.

G. Submittals Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."

H. Application for Payment: Comply with requirements specified in Division 1 Section "Payment Procedures."

I. Schedule of Values: Comply with requirements specified in Division 1 Section "Payment Procedures."

2.2 INFORMATIONAL SUBMITTALS

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

1. Number of Copies: Submit six (6) copies of each submittal, unless otherwise indicated. Design Professional will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

B. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."

C. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.
8. Design Professional will review submittals that include MSDSs.
PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Design Professional.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 DESIGN PROFESSIONAL'S ACTION

A. General: Design Professional will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Design Professional will review each submittal, make marks to indicate corrections or modifications required, and return it. Design Professional will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

1. Reviewed.
2. Furnish as Corrected.
3. Revise and resubmit.
4. Rejected.

C. Informational Submittals: Design Professional will review each submittal and will not return it, or will return it if it does not comply with requirements. Design Professional will forward each submittal to appropriate party.

D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01330
SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY
   A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.3 USE CHARGES
   A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
   B. Sewer Service: Pay sewer-service use charges for sewer usage by all entities for construction operations.
   C. Water Service: Pay water-service use charges for water used by all entities for construction operations.
   D. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations.
   E. Natural Gas Service: Pay natural gas use charges used by Architects and construction operations.

1.4 INFORMATIONAL SUBMITTALS
   A. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
   B. Dust and HVAC-Control Plan: Submit narrative that indicates the dust control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate.
   C. Fuel Spill: Contractor shall comply with all regulations to handle any fuel spills, containment shall be available on site at all times.
1.5 QUALITY ASSURANCE
A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS
A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES
A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
   1. Store combustible materials apart from building.

2.2 EQUIPMENT
A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL
A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

C. Heating: Provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

D. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

E. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

F. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.

1. At each telephone, post a list of important telephone numbers.
   a. Police and fire departments.
   b. Ambulance service.
   c. Contractor's home office.
   d. Contractor's emergency after-hours telephone number.
   e. Architect's office.
   f. Engineers' offices.
   g. Owner's office.
   h. Principal subcontractors' field and home offices.

2. Provide superintendent with cellular telephone.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
B. Temporary Roads: Construct and maintain temporary roads adequate for construction operations.

C. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
   1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
   2. Remove snow and ice as required to minimize accumulations.

E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction.

F. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
   1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of the current EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
   1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
   2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
   3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
   4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
E. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

F. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

G. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

H. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating is needed and permanent enclosure is incomplete, insulate temporary enclosures.

I. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary fire extinguishers for fire protection.

3.5 MOISTURE AND MOLD CONTROL

A. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

B. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard, replace, or clean stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.
   1. Maintain operation of temporary enclosures, heating, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
   1. Materials and facilities that constitute temporary facilities are property of Contractor.
   2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01770 "Closeout Procedures."

END OF SECTION 01500
SECTION 01635 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
A. Section includes administrative and procedural requirements for substitutions.
B. Related Sections:
   1. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
   2. Divisions 2 through 16 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS
A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
   1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
   2. Substitutions for Convenience: Changes proposed by Contractor that are not required in order to meet other Project requirements but may offer advantage to Contractor.

1.4 SUBMITTALS
A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Substitution Request Form: Use CSI Form 13.1A.
   2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
      a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
      b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

e. Samples, where applicable or requested.

f. Certificates and qualification data, where applicable or requested.

g. List of similar installations for completed projects with project names and addresses and names and addresses of Design Professionals and owners.

h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.

j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

k. Cost information, including a proposal of change, if any, in the Contract Sum.

l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.

m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Design Professional's Action: If necessary, Design Professional will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Design Professional will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Design Professional's Supplemental Instructions for minor changes in the Work.

b. Use product specified if Design Professional does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.
1.6 PROCEDURES

A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Design Professional will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Design Professional will return requests without action, except to record noncompliance with these requirements:

   a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
   b. Substitution request is fully documented and properly submitted.
   c. Requested substitution will not adversely affect Contractor's construction schedule.
   d. Requested substitution has received necessary approvals of authorities having jurisdiction.
   e. Requested substitution is compatible with other portions of the Work.
   f. Requested substitution has been coordinated with other portions of the Work.
   g. Requested substitution provides specified warranty.
   h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed after 10 days prior to bid opening.

C. Substitutions for Convenience: Design Professional will consider requests for substitution if received before 10 days prior to bid opening. Requests received after that time may be considered or rejected at discretion of Design Professional.

1. Conditions: Design Professional will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Design Professional will return requests without action, except to record noncompliance with these requirements:

   a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Design Professional for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
   b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01635
SECTION 01730 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.

B. Related Requirements:

1. Section 01100 "Summary" for limits on use of Project site.
2. Section 01330 "Submittal Procedures" for submitting surveys.
3. Section 01770 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

C. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

D. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.3 PREINSTALLATION MEETINGS

A. Cutting and Patching Conference: Conduct conference at Project site unless covered during pre-construction meeting.

1. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:
a. Contractor's superintendent.
b. Trade supervisor responsible for cutting operations.
c. Trade supervisor(s) responsible for patching of each type of substrate.
d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affecting by cutting and patching operations.

2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.4 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, if different than indicated, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety that are not indicated to be cut. Field verify prior to cutting.
3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and Owner that may be necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before
fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01310 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

C. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
   1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
   2. Allow for building movement, including thermal expansion and contraction.
   3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Repair or remove and replace damaged, defective, or nonconforming Work.
   1. Comply with Section 01770 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
   1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Temporary Support: Provide temporary support and shoring of work to be cut.
C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

D. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01100 "Summary."

E. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

F. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
   a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
   b. Restore damaged pipe covering to its original condition.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
   a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

G. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
   1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
   2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
   2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
   3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
      a. Use containers intended for holding waste materials of type to be stored.
   4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   1. Remove liquid spills promptly.
   2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with Owner and Contractor.

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.10 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01730
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:

1. Inspection procedures.
2. Reinspection.
3. Final Acceptance.
4. Closeout Procedures

B. Related Sections include the following:

1. Division 1, Section "PROJECT RECORD DOCUMENTS" for project record document requirements.
2. Division 1, Section “OPERATION AND MAINTENANCE DATA" for operating and maintenance manual requirements.
3. Division 1, Section “PRODUCT REQUIREMENTS” for warranty requirements.

C. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions-2 through -16.

1.3 SUBSTANTIAL COMPLETION

A. Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. (List exceptions in the request).

1. Advise Owner/Agency of pending change-over requirements.
2. Obtain and submit releases enabling the Owner/Agency unrestricted use of the Work and access to services and utilities.
3. Submit record drawings, maintenance and operational manuals, and similar final record information.
   a. Submittal of record drawings, O & M Manuals, etc., must occur a minimum of 15 days prior to a written request for Substantial Completion inspection.
4. Deliver tools, spare parts, extra stock, and similar items, if any required in Divisions 2 through 16.
5. Complete start-up testing of systems, and instruction of the Owner/Agency's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.

6. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.

7. All systems, including emergency systems, shall have been completely tested in the presence of the appropriate Project Engineer. Submit a form signed by the appropriate engineer stating this has been done in their presence and all systems are working as designed and satisfactorily.

B. Substantial Completion Inspection Procedures: On receipt by the Design Professional of a written request from the Contractor for substantial completion inspection (punch list items), the Design Professional will either proceed with inspection or advise the Contractor of unfilled requirements (paragraph A under 1.3 above). The Design Professional will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The certificate of substantial completion will be issued when the project is substantially complete.

2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE TO MAKE FINAL PAYMENT

A. Procedures: Before requesting final inspection for certification of final acceptance and final payment the following has to be completed. List exceptions in the request.

1. Submit the final payment request at the end of the final phase of work with required releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.

2. Submit a certified copy of the Design Professional's substantial completion inspection list of items that were to be completed and corrected, stating that each item has been completed or otherwise resolved for acceptance.

3. Record Drawings must have been submitted to the Design Professional and approved (paragraph A under 1.3, Item 3 above).

4. Maintenance and Operations manuals must have been submitted to the Design Professional and approved (paragraph A under 1.3, Item 3 above).

5. Submit specific warranties, final certifications and similar documents.

6. Any maintenance and operational training of Agency personnel must have been completed (paragraph A under 1.3, Item 3 above).

7. Consent of Surety (A.I.A. Form G707) Release of Claims and Contractor's Affidavit of Payment of Debts and Claims (A.I.A. Form G706) must be executed by the contractor and submitted to the Design Professional.

8. A final pay estimate must be submitted requesting 100% payment including retainage. The documents in item 7 must be attached to the Final Pay Request.

9. State of Idaho Tax Release. Request for Tax Release Form is included in the agreement and is to be submitted to the Idaho State Tax Commission. The Tax Release issued by the Tax Commission is to be submitted with Closeout Documents.
B. Final Inspection Procedure: The Design Professional will reinspect the Work upon receipt of notice that the Work, including punch list items from earlier inspections have been completed.

1. Upon completion of reinspection, the Design Professional will prepare a letter of final acceptance or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

A. Operating and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with the Owner/Agency's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:

1. Maintenance manuals.
2. Record documents.
3. Spare parts and materials (if any).
4. Tools.
5. Lubricants.
6. Fuels.
7. Identification systems.
8. Control sequences.
9. Hazards.
10. Cleaning.
11. Warranties.
12. Maintenance and similar continuing commitments.

3.2 FINAL ACCEPTANCE

A. The Contractor is required to submit to the Design Professional required documents.

1. The Design Professional will not approve final payment until all items have been received, reviewed and found to be acceptable and in compliance with the Contract Documents.

END OF SECTION 01770
SECTION 01781 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for Project Record Documents.

B. Project Record Documents required include:

1. Marked-up (red line corrected) copies of Contract Drawings.
2. Marked-up (red line corrected) copies of Shop Drawings and Product Data Submittals.
3. Marked-up (red line corrected) copies of Specifications, addenda and Change Orders.
4. Field records for variable and concealed conditions.

C. Specific record copy requirements that expand requirements of this Section are included in the individual Sections of Divisions-2 through -16.

D. General project closeout requirements are included in Division 1 Section "Project Closeout."

E. Maintenance of Documents: Store record documents in the field office apart from Contract Documents used for construction. Do not permit Project Record Documents to be used for construction purposes. Maintain record documents in good order, and in a clean, dry, legible condition. Make documents available at all times for inspection by the Design Professional.

1.3 RECORD DRAWINGS

A. Mark-up (red line corrected) Procedure: During the construction period, maintain a set of (1 copy) black-line white-prints of Contract Drawings and Shop Drawings for Project Record Document purposes.

1. Mark these Drawings to indicate the actual installation where the installation varies appreciably from the installation shown originally. Give particular attention to information on concealed elements which would be difficult to identify or measure and record later. Items required to be marked include but are not limited to:

a. Dimensional changes to the Drawings.
b. Revisions to details shown on the Drawings.
c. Locations and depths of underground utilities.
d. Revisions to routing of piping and conduits.
e. Revisions to electrical circuitry.
f. Actual equipment locations.
g. Locations of concealed internal utilities.
h. Changes made by Change Order.
i. Details not on original Contract Drawings.

2. Mark completely and accurately record prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.

3. Mark record sets with red erasable colored pencil; use other colors to distinguish between changes for different categories of the Work at the same location.

4. Mark important additional information which was either shown schematically or omitted from original Drawings.

5. Note construction change directive numbers, alternate numbers, Change Order numbers and similar identification.

6. Responsibility for Markup: Where feasible, the individual or entity who obtained record data, whether the individual or entity is the installer, subcontractor, or similar entity, is required to prepare the mark-up on record Drawings.

   a. Accurately record information in an understandable Drawing technique. Record drawings will be returned to the contractor to correct the information that is not understandable or not clearly annotated.

   b. Record data as soon as possible after it has been obtained. In the case of concealed installations, record and check the mark-up prior to concealment.

7. At time of Substantial Completion, submit record Drawings to Design Professional for Owner/Agency's records. Organize into sets, bind and label sets for Owner/Agency's continued use.

B. Copies and Distribution: After completing the preparation of record drawings bind each set with durable paper cover sheets, with appropriate identification, including titles, dates and other information on cover sheets prior to submitting to Design Professional for Owner/Agency's records.

1.4 RECORD SPECIFICATIONS

A. During the construction period, maintain one (1) copy of the Project Specifications, including addenda and modifications issued, for Project Record Document purposes.

1. Mark the Specifications to indicate the actual installation where the installation varies substantially from that indicated in Specifications and modifications issued. Note related Project Record Drawing information, where applicable. Give particular attention to information on concealed installations that would be difficult to identify or measure and record later.

   a. In each Specification Section where products, materials or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.

   b. Note related record Product Data, where applicable. For each principal product specified, indicate whether record Product Data has been submitted in maintenance manual instead of submitted as record Product Data.
2. Upon completion of mark-up, submit record Specifications to the Design Professional for Owner/Agency's records.
   
a. The Contractor for General Construction is responsible for submitting the complete set of record Specifications as specified.

1.5 RECORD PRODUCT DATA

A. During the construction period, maintain one (1) copy of each Product Data submittal for Project Record Document purposes.

1. Mark Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Product Data submitted. Include significant changes in the product delivered to the site, and changes in manufacturer's instructions and recommendations for installation.
2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
3. Note related Change Orders and mark-up of record Drawings, where applicable.
4. Upon completion of mark-up, submit a complete set of record Product Data to the Design Professional for the Owner/Agency's records.
5. Where record Product Data is required as part of maintenance manuals, submit marked-up Product Data as an insert in the manual, instead of submittal as record Product Data.

1.6 MISCELLANEOUS RECORD SUBMITTALS

A. Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Design Professional for the Owner/Agency's records.

1. Categories of requirements resulting in miscellaneous records include, but are not limited to the following:
   
a. Locations and elevations of underground lines.
   b. Certifications received in lieu of labels on bulk products.
   c. Final inspection and correction procedures.
   d. Inspections and certifications by governing authorities.
   e. Final inspection and correction procedures.

PART 2 - PRODUCTS (not applicable)
PART 3 - EXECUTION

3.1 RECORDING

A. Post changes and modifications to the Documents as they occur. Do not wait until the end of the Project. The Design Professional will periodically review record documents to assure compliance with this requirement.

END OF SECTION 01781
SECTION 01782 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Operation manuals for systems, subsystems, and equipment.
3. Maintenance manuals for the care and maintenance of systems and equipment as well as specialty products, materials, and finishes.

B. Related Sections include the following:

1. Division 1 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Division 1 Section "Closeout Procedures" for submitting operation and maintenance manuals.
3. Division 1 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
4. Divisions 2 through 16 Sections for specific operation and maintenance manual requirements for products in those Sections.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

A. Initial Submittal: Submit (2) two draft copies of each manual at least (15) fifteen days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Design Professional will return (1 copy) of draft and mark whether general scope and content of manual are acceptable.

1. Final Submittal: Submit (3) copies of each manual in final form prior to substantial completion inspection.
1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with the same designation used in the Contract Documents.

2.2 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Project Number.
4. Name and address of Owner.
5. Date of submittal.
6. Name, address, and telephone number of Contractor.
7. Name and address of Design Professional.
8. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (115-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
   a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
   b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, Project Number and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.

3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.

4. Supplementary Text: Prepared on 8-1/2-by-11-inch (115-by-280-mm), 20-lb/sq. ft. (75-g/sq. m) white bond paper.

5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
   a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
   b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Precautions against improper use.
9. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Engineering data and tests.
8. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Routine and normal operating instructions.
3. Regulation and control procedures.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

2.4 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
5. Reordering information for specially manufactured products.
D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
1. Do not use original Project Record Documents as part of operation and maintenance manuals.

2. Comply with requirements of newly prepared Record Drawings in Division 1 Section "Project Record Documents."

F. Comply with Division 1 Section "Closeout Procedures" for the schedule for submitting operation and maintenance documentation.

END OF SECTION 01782
SECTION 02300 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The building site will be excavated and graded by ITD’s own Forces to an approximate 1” above or below -11” of finished shop floor elevation. The Contractor shall complete final (6”) 3/4” minus base along with all concrete slab work, foundations etc. and other trenching excavations and backfill as required.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Geotextiles (if required).
2. Controlled low-strength material, including design mixture (if required).

B. Samples for Verification: For the following products, in sizes indicated below:

2. Warning Tape: 12 inches long; of each color.

1.4 INFORMATIONAL SUBMITTALS

A. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D 2487.
2. Laboratory compaction curve according to ASTM D 698.

1.5 QUALITY ASSURANCE

A. Blasting: Not allowed.

B. Geotechnical Testing Agency Qualifications: See enclosed prepared by ITD.
1.6 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining without written permission.

C. Utility Locator Service: Notify location services as required for area where Project is located before beginning earth moving operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Material under footings and foundations shall be compacted to the requirements of Class A in accordance with ITD Standard Specifications, Section 205 – Excavation and Embankment. All backfill around foundations and footings shall be an approved granular material placed and compacted to the requirements of Class A by the Contractor in accordance with Section 205.

B. Trash shall not be allowed to accumulate in spaces to be backfilled; such spaces shall be thoroughly cleaned before backfill is placed therein. Frozen particles, large stones, vegetable matter or trash shall not be used in fill or backfill.

C. Fill, which is exterior to the building site and not under Portland cement concrete, except driveways and approaches, will be considered non-load-bearing. Non-load-bearing fill shall be placed in layers of not more than 12-inch loose measurement and thoroughly compacted. Driveway and approach fills shall be compacted in accordance with all applicable provisions of ITD Standard Specifications, Section 205-Compaction, Class A. Compaction.

D. No fill or backfill shall be placed without approval.

E. The Contractor shall conduct work in an orderly manner and so as not to create a nuisance. Dirt shall not be permitted to accumulate on streets or sidewalks nor to be washed into sewers.

F. The Contractor shall remove from the site and legally dispose of all debris. Excavated material not required for fill shall be removed or spread on the site as directed.

2.2 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150
(50 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:

2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Protect and maintain erosion and sedimentation controls installed by ITD during earth moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION

A. Excavation shall be made in accordance with the applicable provisions of ITD Standard Specifications, Section 210 – Excavation for Structures, and shall include all excavating and backfilling of sewers, water, plumbing, heating and electrical work. Provisions shall be made for the installation of all work as the building progresses. Cutting and patching to install omitted work shall be avoided.
B. Excavation shall be made to the indicated elevation or dimension plus sufficient space to permit erection of forms and shoring, to allow proper installation of below-grade materials, and to allow proper inspection of foundations and below-grade installations. Excavations shall be shored and braced if necessary to prevent cave-in. Such shoring and bracing shall be removed before backfill is completed, but not until permanent supports are in place. Excavations shall be kept free from water.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections.

3.6 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 02300
SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.
2. Foundation walls.

B. Related Sections:

1. Section 02300 "Earthwork" for drainage fill under slabs-on-grade.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

1. Location of construction joints is subject to approval of the Architect.
1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Welding certificates.

C. Material Certificates: For each of the following, signed by manufacturers:
   1. Cementitious materials.
   2. Admixtures.
   3. Form materials and form-release agents.
   4. Steel reinforcement and accessories.
   5. Fiber reinforcement.
   6. Curing compounds.
   7. Floor and slab treatments.
   10. Vapor retarders.
   11. Semirigid joint filler.

D. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
   1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

E. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

F. Field quality-control reports.

G. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an 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 an ACI-certified Concrete Laboratory Testing Technician - Grade II.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."

F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

G. Concrete Testing Service: ITD will provide material testing and evaluation of tests and all review of concrete mixtures.

H. Preinstallation Conference: Conduct conference at Project site.

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

   a. Contractor's superintendent.
   b. Independent testing agency responsible for concrete design mixtures.
   c. Ready-mix concrete manufacturer.
   d. Concrete subcontractor.
   e. Special concrete finish subcontractor.

2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
   a. High-density overlay, Class 1 or better.
   b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
   c. Structural 1, B-B or better; mill oiled and edge sealed.
   d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.


E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.


F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

   1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
   2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
   3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
C. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.

D. Deformed-Steel Wire: ASTM A 496/A 496M.


2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

   1. Portland Cement: ASTM C 150, Type I/II. Supplement with the following:

      a. Fly Ash: ASTM C 618, Class F.
      b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

   2. Blended Hydraulic Cement: ASTM C 595, Type IS, portland blast-furnace slag, Type IP, portland-pozzolan, Type I (PM), pozzolan-modified portland, Type I (SM), slag-modified portland cement.

B. Silica Fume: ASTM C 1240, amorphous silica.

C. Normal-Weight Aggregates: ASTM C 33, Class 3S, Class 3M, Class 1N coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years’ satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

   2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.


2.5 ADMIXTURES


B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

   1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   2. Retarding Admixture: ASTM C 494/C 494M, Type B.
   3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Axim Italcementi Group, Inc.; CATEXOL CN-CI.
   b. BASF Construction Chemicals - Building Systems; Rheocrete CNI.
   c. Euclid Chemical Company (The), an RPM company;
   d. Grace Construction Products, W. R. Grace & Co.; DCI.
   e. Sika Corporation; Sika CNI.

D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. BASF Construction Chemicals - Building Systems; Rheocrete 222+.
   b. Cortec Corporation; MCI-2005NS.
   c. Grace Construction Products, W. R. Grace & Co.; DCI-S.
   d. Sika Corporation; FerroGard 901.

2.6 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Axim Italcementi Group, Inc.; CATEXOL CimFilm.
   b. BASF Construction Chemicals - Building Systems; Confilm.
   c. ChemMasters; SprayFilm.
   d. Conspec by Dayton Superior; Aquafilm.
   e. Dayton Superior Corporation; Sure Film (J-74).
   f. Edoco by Dayton Superior; BurkeFilm.
   g. Euclid Chemical Company (The), an RPM company; Eucobar.
   h. Kaufman Products, Inc.; Vapor-Aid.
   i. Lambert Corporation; LAMBCO Skin.
   j. L&M Construction Chemicals, Inc.; E-CON.
   k. Meadows, W. R., Inc.; EVAPRE.
   l. Metalcrete Industries; Waterhold.
   m. Nox-Crete Products Group; MONOFILM.
B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
   b. BASF Construction Chemicals - Building Systems; Kure 200.
   c. ChemMasters; Safe-Cure Clear.
   d. Conspec by Dayton Superior; W.B. Resin Cure.
   e. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
   f. Edoco by Dayton Superior; Res X Cure WB.
   g. Euclid Chemical Company (The), an RPM company; Kurez W VOX; TAMMSCURE WB 30C.
   i. Lambert Corporation; AQUA KURE - CLEAR.
   j. L&M Construction Chemicals, Inc.; L&M Cure R.
   k. Meadows, W. R., Inc.; 1100-CLEAR.
   l. Nox-crete Products Group; Resin Cure E.
   m. Right Pointe; Clear Water Resin.
   n. SpecChem, LLC; Spec Rez Clear.
   o. Symons by Dayton Superior; Resi-Chem Clear.
   p. TK Products, Division of Sierra Corporation; TK-2519 DC WB.
   q. Vexcon Chemicals, Inc.; Certi-Vex Envio Set.

F. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. BASF Construction Chemicals - Building Systems; Kure-N-Seal 25 LV.
   b. ChemMasters; Spray-Cure & Seal Plus.
   c. Conspec by Dayton Superior; Sealcure 1315.
   d. Dayton Superior Corporation; Day-Chem Cure and Seal (J-22UV).
   e. Edoco by Dayton Superior; Cureseal 1315.
   f. Euclid Chemical Company (The), an RPM company; Super Diamond Clear; LusterSeal 300.
g. Kaufman Products, Inc.; Sure Cure 25.
h. Lambert Corporation; UV Super Seal.
i. L&M Construction Chemicals, Inc.; Lumiseal Plus.
k. Metalcrete Industries; Seal N Kure 30.
l. Right Pointe; Right Sheen 30.
m. Vexcon Chemicals, Inc.; Certi-Vex AC 1315.

2. VOC Content: Curing and sealing compounds shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.7 RELATED MATERIALS


B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.

C. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

E. Reglets: Fabricate reglets of not less than 0.022-inch thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

F. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.8 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6.4 mm) and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.

2.9 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 20 percent.
2. Combined Fly Ash and Pozzolan: 20 percent.
3. Ground Granulated Blast-Furnace Slag: 40 percent.
4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 40 percent portland cement minimum, with fly ash or pozzolan not exceeding 20 percent.
5. Silica Fume: 5 percent.
6. Combined Fly Ash, Pozzolans, and Silica Fume: 30 percent with fly ash or pozzolans not exceeding 20 percent and silica fume not exceeding 5 percent.
7. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 40 percent with fly ash or pozzolans not exceeding 20 percent and silica fume not exceeding 5 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.10 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture indicated on plans.
B. Foundation Walls: Proportion normal-weight concrete mixture indicated on plans.
C. Building Walls: Proportion normal-weight concrete mixture indicated on plans.

2.11 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.12 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and furnish batch ticket information.
   1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
   1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
   2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
   3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
   1. Install keyways, reglets, recesses, and the like, for easy removal.
   2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

   1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
   2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
   3. Install dovetail anchor slots in concrete structures as indicated.
3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORES AND RESHORES

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
E. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.

F. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material according to ASTM A 780. Use galvanized steel wire ties to fasten zinc-coated steel reinforcement.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
   1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
   2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
   3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
   2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.7 FINISHING FORMED SURFACES

A. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.

3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing
operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
   a. Water.
   b. Continuous water-fog spray.
   c. Absorbent cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorbent covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
   a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
   b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
   c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
   a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.
3.10 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.11 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.

4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.12 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner may engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.
D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
   a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.

6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

7. Compression Test Specimens: ASTM C 31/C 31M.
   a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
   b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
   a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
   b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive
strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.

14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

15. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION 03300
SECTION 09911 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Steel, including but not limited to structure steel frames and other items indicated.

B. Related Sections include the following:

1. Division 9 Section "Interior Painting" for surface preparation and the application of paint systems on interior substrates.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of topcoat product indicated.

C. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated in schedules.

2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.4 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."


B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
   a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
   b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on benchmark samples.
   a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

   1. Quantity: Furnish an additional 1 new and full unopened gallon of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include manufacturers that meet and have MPI certification as specified.

   1. Sherwin Williams
   2. Others by pre-approval.
2.2 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
D. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.

E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions.

1. Spray steel doors and frames.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:

1. Owner may engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.

2. Testing agency will perform tests for compliance of paint materials with product requirements.

3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Steel Substrates: (Primer & 2 Finish Coats Minimum)

   c. Topcoat: Exterior alkyd enamel (Gloss Level 5).

END OF SECTION 09911
SECTION 13125 - METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Structural-steel framing.
2. Metal roof panels.
3. Metal wall panels.
4. Metal soffit panels.
5. Accessories.

1.3 DEFINITIONS

A. Terminology Standard: See MBMA's "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in referenced standards.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of metal building system component. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:

1. Structural-steel-framing system engineering drawing/design including calculations.
2. Metal roof panels.
3. Metal wall panels.
4. Flashing and trim.
5. Accessories.

B. Shop Drawings Stamped by State of Idaho Licensed Engineer: For all of the following metal building system components. Include plans, elevations, sections, details, and attachments to other work.

1. Anchor-Bolt Plans: Submit anchor-bolt plans and templates before foundation work begins. Include location, diameter, and projection of anchor bolts required to attach metal building to foundation. Indicate column reactions at each location.
2. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.

3. Metal Roof and Wall Panel Layout Drawings: Show layouts of metal panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.
   a. Show roof-mounted items including pipe penetrations.
   b. Show wall-mounted items including doors, windows and lighting fixtures.

4. Accessory Drawings: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches (1:8):
   a. Flashing and trim.
   b. Roof crickets and braces.

C. Samples for Initial Selection: For units with factory-applied color finish.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of sizes indicated below:
   1. Metal Panels: Nominal 12 inches long by actual panel width. Include fasteners, closures, and other exposed panel accessories.
   2. Flashing and Trim: Nominal 12 inches long. Include fasteners and other exposed accessories.
   3. Accessories: Nominal 12-inch- long Samples for each type of accessory.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified erector manufacturer and professional engineer.

B. Welding certificates.

C. Metal Building System Certificates: For each type of metal building system, from manufacturer.

   1. Letter of Design Certification: Signed and sealed by a qualified professional engineer licensed in Idaho. Include the following:
      a. Name and location of Project.
      b. Order number.
      c. Name of manufacturer.
      d. Name of Contractor.
      e. Building dimensions including width, length, height, and roof slope.
      f. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
      g. Governing building code and year of edition.
h. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration.

i. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.

j. Building-Use Category: Indicate category of building use and its effect on load importance factors.

D. Erector Certificates: For each product, from manufacturer.

E. Manufacturer Certificates: For each product, from manufacturer.

F. Material Test Reports: For each of the following products:

1. Structural steel including chemical and physical properties.
2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
3. Tension-control, high-strength, bolt-nut-washer assemblies.
4. Shop primers.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for insulation and vapor-retarder facings. Include reports for thermal resistance, fire-test-response characteristics, water-vapor transmission, and water absorption.

H. Source quality-control reports.

I. Field quality-control reports.

J. Warranties: Sample of special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panel finishes to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer.

1. AISC Certification for Category MB: An AISC-Certified Manufacturer that designs and produces metal building systems and components in an AISC-Certified Facility.
2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified Idaho professional engineer.

B. Erector Qualifications: An experienced erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

C. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
D. Source Limitations: Obtain metal building system components, including primary and secondary framing and metal panel assemblies, from single source from single manufacturer.

E. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3, "Structural Welding Code - Sheet Steel."

F. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings," for design requirements and allowable stresses.

G. Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.

H. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to metal building systems including, but not limited to, the following:
   a. Condition of foundations and other preparatory work performed by other trades.
   b. Structural load limitations.
   c. Construction schedule. Verify availability of materials and erector's personnel, equipment, and facilities needed to make progress and avoid delays.
   d. Required tests, inspections, and certifications.
   e. Unfavorable weather and forecasted weather conditions.

2. Review methods and procedures related to metal roof panel assemblies including, but not limited to, the following:
   a. Compliance with requirements for purlin and rafter conditions, including flatness and attachment to structural members.
   b. Structural limitations of purlins and rafters during and after roofing.
   c. Flashings, special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect metal roof panels.
   d. Temporary protection requirements for metal roof panel assembly during and after installation.
   e. Roof observation and repair after metal roof panel installation.

3. Review methods and procedures related to metal wall panel assemblies including, but not limited to, the following:
   a. Compliance with requirements for support conditions, including alignment between and attachment to structural members.
   b. Structural limitations of girts and columns during and after wall panel installation.
   c. Flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal wall panels.
   d. Temporary protection requirements for metal wall panel assembly during and after installation.
   e. Wall observation and repair after metal wall panel installation.
1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

1.9 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when weather conditions permit metal panels to be installed according to manufacturers' written instructions and warranty requirements.

B. Field Measurements:

1. Established Dimensions for Foundations: Comply with established dimensions on approved anchor-bolt plans, establishing foundation dimensions and proceeding with fabricating structural framing without field measurements. Coordinate anchor-bolt installation to ensure that actual anchorage dimensions correspond to established dimensions.

2. Established Dimensions for Metal Panels: Where field measurements cannot be made without delaying the Work, either establish framing and opening dimensions and proceed with fabricating metal panels without field measurements, or allow for field trimming metal panels. Coordinate construction to ensure that actual building dimensions, locations of structural members, and openings correspond to established dimensions.

1.10 COORDINATION

A. Coordinate sizes and locations of concrete foundations and casting of anchor-bolt inserts into foundation walls and footings. Concrete, reinforcement, and formwork requirements are specified in Section 03300 "Cast-in-Place Concrete."

B. Coordinate metal panel assemblies with flashing, trim, and construction of supports and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

A. Special Warranty on Metal Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

B. Special Weather Tightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that leak or otherwise fail to remain weathertight within specified warranty period.

1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. R & M Steel Buildings, 20595 Farmway Road, Caldwell, Idaho.
2. Varco Pruden
3. American Steel Buildings
4. Other pre-approved manufacturers prior to bid.

2.2 METAL BUILDING SYSTEMS

A. Description: Provide a complete, integrated set of metal building system manufacturer's standard mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior.

1. Provide metal building system of size and with bay spacings, roof slopes, and spans indicated.

B. Primary-Frame Type:

1. Rigid Clear Span: Solid-member, structural-framing system without interior columns.

C. End-Wall Framing: Manufacturer's standard, for buildings not required to be expandable.

D. Secondary-Frame Type: Manufacturer's standard purlins and joists and exterior-framed (bypass) girts.

E. Eave Height: As indicated by nominal height on Drawings.

F. Bay Spacing: As indicated on drawings.

G. Roof Slope: As indicated on drawings.
H. Roof System: See Section 2.5 Metal Roof Panel for concealed fastener, vertical-rib, standing-seam double fold metal roof panels with field-installed insulation.

I. Exterior Wall System: Manufacturer's standard exposed-fastener metal wall panels with field-installed insulation.

2.3 METAL BUILDING SYSTEM PERFORMANCE

A. Delegated Design: Design metal building system, including comprehensive engineering analysis by a qualified Idaho professional engineer, using performance requirements and design criteria indicated. Submit drawings and calculations.

B. Structural Performance: Metal building systems shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to procedures in MBMA's "Metal Building Systems Manual."

1. Design Loads: As indicated on Drawings.
2. Deflection Limits: Design metal building system assemblies to withstand design loads with deflections no greater than the following:
   b. Girts: Horizontal deflection of 1/180 of the span.
   c. Metal Roof Panels: Vertical deflection of 1/180 of the span.
   d. Metal Wall Panels: Horizontal deflection of 1/180 of the span.
   e. Design secondary-framing system to accommodate deflection of primary framing and construction tolerances, and to maintain clearances at openings.

3. Drift Limits: Engineer building structure to withstand design loads with drift limits no greater than the following:
   a. Lateral Drift: Maximum of 1/200 of the building height.

4. Metal panel assemblies shall withstand the effects of gravity loads and loads and stresses within limits and under conditions indicated according to ASTM E 1592.

C. Seismic Performance: Metal building systems shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

D. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient 180 deg F, material surfaces.

E. Air Infiltration for Metal Wall Panels: Air leakage through assembly of not more than 0.06 cfm/sq. ft. of wall area when tested according to ASTM E 283 at static-air-pressure difference of 1.57 lbf/sq. ft.
F. Water Penetration for Metal Wall Panels: No water penetration.

G. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for Class 90.

H. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E 1980 based on testing identical products by a qualified testing agency.

2.4 STRUCTURAL-STEEL FRAMING

A. Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafter, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.

   a. Slight variations in span and spacing may be acceptable if necessary to comply with manufacturer's standard, as approved by Architect.

2. Rigid Clear-Span Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Interior columns are not permitted.


4. Exterior Column Type: Uniform depth or tapered.

5. Rafter Type: Uniform depth or tapered.

B. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following:

1. End-Wall and Corner Columns: I-shaped sections fabricated from structural-steel shapes; shop-welded, built-up steel plates; or C-shaped, cold-formed, structural-steel sheet.

C. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating, to comply with the following:

1. Purlins: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; minimum 2-1/2-inch-wide flanges.
   a. Depth: As needed to comply with system performance requirements.

2. Girts: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees from flange, with minimum 2-1/2-inch- (64-mm-) wide flanges.
   a. Depth: As required to comply with system performance requirements.
3. Eave Struts: Unequal-flange, C-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; to provide adequate backup for metal panels.
7. Purlin and Girt Clips: Manufacturer's standard clips fabricated from steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
8. Secondary End-Wall Framing: Manufacturer's standard sections fabricated from structural-steel sheet.
9. Framing for Openings: Channel shapes; fabricated from cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings and head, jamb, and sill of other openings.
10. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.

D. Bracing: Provide adjustable wind bracing as follows:

1. Rods: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 (345); or ASTM A 529/A 529M, Grade 50 (345); minimum 1/2-inch- diameter steel; threaded full length or threaded a minimum of 6 inches at each end.
2. Rigid Portal Frames: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.

E. Bolts: Provide plain-finish bolts for structural-framing components that are primed or finish painted. Provide hot-dip galvanized bolts for structural-framing components that are galvanized.

F. Materials:

1. W-Shares: ASTM A 992/A 992M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).
2. Channels, Angles, M-Shapes, and S-Shapes: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).
3. Plate and Bar: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).
4. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
5. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B or C, structural tubing.
6. Structural-Steel Sheet: Hot-rolled, ASTM A 1011/A 1011M, Structural Steel (SS), Grades 30 through 55 (205 through 380), or High-Strength Low-Alloy Steel (HSLAS), Grades 45 through 70 (310 through 480); or cold-rolled, ASTM A 1008/A 1008M, Structural Steel (SS), Grades 25 through 80 (170 through 550), or High-Strength Low-Alloy Steel (HSLAS), Grades 45 through 70 (310 through 480).
7. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
a. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grades 33 through 80 (230 through 550,) or High-Strength Low-Alloy Steel (HSLAS), Grades 50 through 80 (340 through 550); with G90 (Z275) coating designation.
b. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Structural Steel (SS), Grade 50 or 80 (340 or 550); with Class AZ50 (AZM150) coating.


9. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.

10. High-Strength Bolts, Nuts, and Washers: ASTM A 490 (ASTM A 490M), Type 1, heavy-hex steel structural bolts or tension-control, bolt-nut-washer assemblies with spline ends; ASTM A 563 (ASTM A 563M) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers, plain.

11. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex-head steel structural bolts with spline ends.


14. Threaded Rods: ASTM A 36/A 36M.

G. Finish: Factory primed. Apply specified primer immediately after cleaning and pretreating.
1. Apply primer to primary and secondary framing to a minimum dry film thickness of 1 mil (0.025 mm).
   a. Prime secondary framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil (0.013 mm) on each side.

2. Prime galvanized members with specified primer after phosphoric acid pretreatment.
3. Primer: SSPC-Paint 15, Type I, red oxide.

2.5 METAL ROOF PANELS

A. Vertical-Rib, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels. Roof panels shall be 2” high rib, mechanically double-folded with factory applied inseam sealant.

   b. Color: As selected by Architect from manufacturer's full range.

2. Clips: Manufacturer's standard, floating type to accommodate thermal movement; fabricated from zinc-coated (galvanized) steel or aluminum-zinc alloy-coated steel, sheet.
3. Joint Type: Mechanically seamed, double folded.
5. Panel Height: 2 inches.
7. Inseam sealant.
8. Double-folded rib.

2.6 METAL WALL PANELS

A. Tapered-Rib-Profile, Exposed-Fastener Metal Wall Panels: Formed with raised, trapezoidal major ribs and intermediate stiffening ribs symmetrically spaced between major ribs; designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.

1. Material: Zinc-coated (galvanized) steel sheet, 26 gauge.
   b. Color: As selected by Architect from manufacturer's full range.

2. Major-Rib Spacing: 12 inches.
4. Panel Height: 1.125 inches.

B. Finishes:

1. Exposed Coil-Coated Finish:
a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

b. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.7 ACCESSORIES

A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.

1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

B. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same material as metal wall panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

C. Flashing and Trim: Formed from 0.022-inch nominal-thickness, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match adjacent metal panels.

1. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.
2. Opening Trim: Formed from 0.022-inch nominal-thickness, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating. Trim head and jamb of door openings, and head, jamb, and sill of other openings.
D. Materials:

1. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of plastic caps or factory-applied coating.

   a. Fasteners for Metal Roof Panels: Self-drilling, Type 410 stainless-steel or self-tapping, Type 304 stainless-steel or zinc-alloy-steel hex washer head, with EPDM washer under heads of fasteners bearing on weather side of metal panels.

   b. Fasteners for Metal Wall Panels: Self-drilling, Type 410 stainless-steel or self-tapping, Type 304 stainless-steel or zinc-alloy-steel hex washer head, with EPDM sealing washers bearing on weather side of metal panels.

   c. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.

   d. Blind Fasteners: High-strength aluminum or stainless-steel rivets.

2. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

3. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

4. Metal Panel Sealants:


   b. Joint Sealant: ASTM C 920; one-part elastomeric polyurethane or polysulfide; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended by metal building system manufacturer.

2.8 SOURCE QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified testing agency to evaluate product.

B. Special Inspector: Owner will engage a qualified special inspector to perform the following tests and inspections and to submit reports. Special inspector will verify that manufacturer maintains detailed fabrication and quality-control procedures and will review the completeness and adequacy of those procedures to perform the Work.

   1. Special inspections will not be required if fabrication is performed by manufacturer registered and approved by authorities having jurisdiction to perform such Work without special inspection.

      a. After fabrication, submit copy of certificate of compliance to authorities having jurisdiction, certifying that Work was performed according to Contract requirements.
C. Testing: Test and inspect shop connections for metal buildings according to the following:

1. Bolted Connections: Shop-bolted connections shall be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
2. Welded Connections: In addition to visual inspection, shop-welded connections shall be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at inspector's option:
   a. Liquid Penetrant Inspection: ASTM E 165.
   b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
   c. Ultrasonic Inspection: ASTM E 164.
   d. Radiographic Inspection: ASTM E 94.

D. Product will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

2.9 FABRICATION

A. General: Design components and field connections required for erection to permit easy assembly.

1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.


C. Primary Framing: Shop fabricate framing components to indicated size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.

1. Make shop connections by welding or by using high-strength bolts.
2. Join flanges to webs of built-up members by a continuous, submerged arc-welding process.
3. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin web or girt web, so flange compressive strength is within allowable limits for any combination of loadings.
4. Weld clips to frames for attaching secondary framing.
5. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary framing with specified primer after fabrication.

D. Secondary Framing: Shop fabricate framing components to indicated size and section by roll-forming or break-forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.
1. Make shop connections by welding or by using non-high-strength bolts.
2. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary framing with specified primer after fabrication.

E. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.

1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with erector present, for compliance with requirements and metal building system manufacturer's tolerances.

C. Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition.

B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION OF STRUCTURAL FRAMING

A. Erect metal building system according to manufacturer's written erection instructions and erection drawings.

B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.

C. Set structural framing accurately in locations and to elevations indicated, according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

E. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.

F. Primary Framing and End Walls: Erect framing level, plumb, rigid, secure, and true to line. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist-cure grout for not less than seven days after placement.

1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for bolt type and joint type specified.
   a. Joint Type: Snug tightened or pretensioned.

G. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing.

1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
2. Locate and space wall girts to suit openings such as doors and windows.
3. Locate canopy framing as indicated.
4. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.

H. Steel Joists: Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Standard Specifications and Load Tables for Steel Joists and Joist Girders," joist manufacturer's written instructions, and requirements in this Section.

1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.
3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
4. Bolt joists to supporting steel framework using carbon-steel bolts unless otherwise indicated.
5. Bolt joists to supporting steel framework using high-strength structural bolts unless otherwise indicated. Comply with RCSC’s "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for high-strength structural bolt installation and tightening requirements.

6. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

I. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.

1. Tighten rod and cable bracing to avoid sag.
2. Locate interior end-bay bracing only where indicated.

J. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.

K. Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.

3.4 METAL PANEL INSTALLATION, GENERAL

A. Examination: Examine primary and secondary framing to verify that structural-panel support members and anchorages have been installed within alignment tolerances required by manufacturer.

1. Examine roughing-in for components and systems penetrating metal panels, to verify actual locations of penetrations relative to seams before metal panel installation.

B. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.
   a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.

2. Install metal panels perpendicular to structural supports unless otherwise indicated.
3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Locate metal panel fastenings over, but not attached to, structural supports with end laps in alignment.
6. Lap metal flashing over metal panels to allow moisture to run over and off the material.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.
D. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated; or, if not indicated, provide types recommended by metal panel manufacturer.

1. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommended by metal panel manufacturer.
2. Prepare joints and apply sealants to comply with requirements in Section 07920 "Joint Sealants."

3.5 METAL ROOF PANEL INSTALLATION

A. General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.

1. Install ridge caps as metal roof panel work proceeds.
2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.

B. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint, at location and spacing and with fasteners recommended by manufacturer.

1. Install clips to supports with self-drilling or self-tapping fasteners.
2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
3. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so that clip, metal roof panel, and factory-applied sealant are completely engaged.
4. Rigidly fasten eave end of metal roof panels and allow ridge end free movement due to thermal expansion and contraction. Predrill panels for fasteners.
5. Provide metal closures at peaks, rake edges, rake walls and each side of ridge caps.

C. Metal Fascia Panels: Align bottom of metal panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws. Flash and seal metal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

D. Metal Roof Panel Installation Tolerances: Shim and align metal roof panels within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 METAL WALL PANEL INSTALLATION

A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
2. Shim or otherwise plumb substrates receiving metal wall panels.
3. When two rows of metal panels are required, lap panels 4 inches (102 mm) minimum.
4. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
5. Rigidly fasten base end of metal wall panels and allow eave end free movement due to thermal expansion and contraction. Predrill panels.
6. Flash and seal metal wall panels with weather closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws.
8. Install flashing and trim as metal wall panel work proceeds.
9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated; or, if not indicated, as necessary for waterproofing.
10. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.
11. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

B. Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer.

C. Installation Tolerances: Shim and align metal wall panels within installed tolerance of 1/4 inch in 20 feet noncumulative, on level, plumb, and on location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.7 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
2. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be
used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1-inch-deep, filled with mastic sealant (concealed within joints).

3.8 FIELD QUALITY CONTROL

A. Special Inspections: Owner may engage a qualified special inspector to perform the following special inspections:

1. Inspection of fabricators.
2. Steel construction.

B. Tests and Inspections:

1. High-Strength, Field-Bolted Connections: Connections shall be inspected during installation according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
2. Welded Connections: In addition to visual inspection, field-welded connections shall be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at inspector's option:

   a. Liquid Penetrant Inspection: ASTM E 165.
   b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
   c. Ultrasonic Inspection: ASTM E 164.
   d. Radiographic Inspection: ASTM E 94.

C. Product will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.9 CLEANING AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

C. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing, bearing plates, and accessories.

1. Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or by SSPC-SP 3, "Power Tool Cleaning."
2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
D. Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 13125
DIVISION 16 ELECTRICAL

16000 GENERAL

PART 1 GENERAL

1.1 General Conditions and Architectural Special Provisions apply to this division.

1.2 Description:

A. Includes But Not Limited To -
   1. Provide labor, materials, and equipment necessary for completion of this Division
      as described in Contract Documents.

1.3 Quality Assurance:

A. Requirements of Regulatory Agencies -
   1. NEC and local ordinances and regulations shall govern.

B. Source Quality Control -
   1. Material and equipment provided shall be new, meet standards of NEMA or UL,
      and bear their label wherever standards have been established and label service
      is available.

1.4 Prior Approval:

A. General:
   1. Catalog and manufacturer's numbers are for the purpose of establishing
      standards of quality and types of materials to be used. Products of other
      manufacturers may be used if equal in quality and design in the opinion of the
      Engineer and are specifically approved by the Engineer. All submittals for "or
      equal" approval shall be made no less than ten days prior to bidding.
   2. Any conflict arising from the use of substituted equipment shall be the
      responsibility of the supplier of that equipment. The contractor and his supplier
      shall bear all costs required to make equipment comply with the intent of the
      plans and specifications.

1.5 Submittals:

A. Record Drawings:

B. Shop Drawings:
   1. Prepare submittal for each item of equipment and attach written approval to each
      indicating that Architectural Special Provisions has been complied with and that
      shop drawings are correct.
   2. Do not purchase equipment before completion of shop drawing review.
   3. Engineer will not review shop drawings before the contractor has reviewed the
      shop drawings. The contractor shall stamp all drawings with a statement that he
      has reviewed all shop drawings and that they conform to the intent of the
      drawings and specifications.
C. Submittals shall contain:
   1. The first section of the manual shall contain:
      a. Names, addresses, and telephone numbers of Electrical Engineer, General
         Contractor, and any other contractors involved.
   2. Date of submission and dates of any previous submissions.
   3. Project title and number.
   5. The names of Contractor, Supplier, and Manufacturer.
   6. Identification of the product, with the Specification Section number.
   7. Field dimensions, clearly identified as such.
   8. Relation to adjacent or critical features of the Work or materials.
   9. Applicable standards, such as ASTM or Federal Specification numbers.
  11. Identification of revisions on resubmittals.
  12. An 8"x3" space for Engineer's and Contractor's stamps.
  13. Contractor stamp, initialed or signed, certifying to review of submittal, verification
      of products, field measurements and field construction criteria, and coordination
      of the information within the submittal with requirements of the Work and of the
      Contract Documents.
  14. Submittals shall be furnished on the following equipment:
      a. Overcurrent Protective Devices
      b. Panelboards
      c. Light Fixtures
      d. Switches
      e. Receptacles

D. O & M Manuals:
  1. Provide 3 copies of O & M manual with data for all equipment furnished.
     Submittals shall be furnished on the following equipment:
     a. Overcurrent Protective Devices
     b. Panelboards
     c. Light Fixtures
     d. Switches
     e. Receptacles
  2. Provide one copy of contractor's written warranty in each manual.

1.6 Workmanship:
   A. All workmanship shall meet "NECA Standards of Installation".

1.7 Fees And Permits:
   A. All permits, fees and charges for inspections required by public authorities shall be
      paid for by the contractor.

PART 2 PRODUCTS

2.1 Material:
   A. Where Manufacturer's names appear, other Manufacturers may be substituted upon
      obtaining written approval of Architect or Engineer at least 10 days prior to opening of
PART 3  EXECUTION

3.1 Preparation:

A. Confirm dimensions, ratings, and specification of equipment to be installed and coordinate these with site dimensions and with other Section.

3.2 Equipment Identification:

A. Properly identify panelboards, convertible circuit breakers in panelboards, motor disconnect switches, starters, other apparatus used for operation of, or control of, circuits, appliances or equipment by means of engraved laminated plastic descriptive nameplates mounted on apparatus using round head brass machine screws, pop rivets and contact cement. Cardholders in any form are not acceptable.

B. All pull boxes and splice boxes shall identify circuits that are inside pull and splice boxes. Label outside of box cover with black ink markers.

C. Label inside of all switch plates and cover plates with panel and circuit numbers.

3.3 Equipment Final Cleaning:

A. At completion of project contractor shall clean all panels which includes vacuuming inside of panel and wiping down all panels.

B. Clean all light fixtures and lamps and remove all dirt, dust, fingerprints, packing etc.

3.4 Field Quality Control:

A. Test systems in presence of Engineer and demonstrate equipment as working and operating properly. Rectify defects at no cost to Owner.
PART 1 GENERAL

1.1 Division 16000 General applies to this Section.

16060 MOUNTING HEIGHTS

PART 1 GENERAL

1.1 Related Documents:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Architectural Special Provisions sections, apply to work of this section.

PART 2 PRODUCTS

2.1 Not used

PART 3 EXECUTION

3.1 Installation:

A. Match existing mounting heights in rooms with existing equipment. Unless otherwise indicated, mount center of outlets or boxes at following heights above finish floor:

- Receptacles: 18"
- Switches: 4’ 0"
- Distribution Panels: 24” above floor min
- Motor Disconnects: 5’ 0” to top
- Push Buttons: 4’ 0”

B. Refer special conditions to Architect and locate outlet under his direction.

C. Meet ADA requirements where applicable.

16110 RACEWAYS

PART 1 GENERAL

1.1 Description:

A. Includes But Not Limited To -

1. Quality of material and installation procedures for all conduit and fittings used on Project, except as excluded below.

B. Related Work Specified Elsewhere -

1. See Sections relating to power and lighting systems for additional requirements.
PART 2 PRODUCTS

2.1 Material:

A. Conduit -
   1. 3/4 inch unless indicated otherwise and use restricted as indicated by product.
   2. Galvanized rigid steel (Type RMC) -
      a. May be used in all areas.
   3. Schedule 40 Polyvinyl Chloride (PVC) (Type RNC) 3/4 inch minimum -
      a. May be used -
         1) Underground.
         2) In or below concrete.
   4. Flexible Metal Conduit (Type FMC) - 1/2 inch minimum
      a. Use in indoor final connections to -
         1) Mechanical equipment, not to exceed 36 inches.
         2) Recessed fluorescent lighting fixtures, not to exceed 72 inches with ground wire.
         3) FMC shall not be used in wet locations.
   5. Liquid-tight flexible steel conduit (Type LFMC) -
      a. Use in outdoor final connections to mechanical equipment, not to exceed 36 inches.

B. Fittings -
   1. Compression or set-screw steel housing type for EMT, flexible steel, and liquid-tight flexible steel conduits.
   2. PVC -
      a. PVC fittings shall be PVC type. Use PVC adapters at all boxes.
      b. Brush apply PVC cement.
      c. All PVC components, (conduit, fittings, cement) shall be from same Manufacturer.

C. Use of the following is prohibited -
   1. Aluminum conduit.
   2. Electrical non-metallic tubing.
   3. EMT crimp-on, tap-on, indenter type fittings.
   4. Malleable iron or cast set-screw fittings.
   5. Spray (aerosol) PVC cement.
   6. PVC 90 degree bends.
   7. Metalclad cable

PART 3 EXECUTION

3.1 Installation:

A. Conceal raceways within ceilings, walls and floors except where exposed raceways are specifically permitted.

B. Keep raceway runs a minimum distance of six inches from hot water pipes.

C. Support conduit and boxes 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.

D. Secure conduit with approved supports within three feet of every bend, outlet box, junction box, gutter, panel, fitting, etc. Do not space supports further apart than ten feet. MC cable shall be supported and anchored in accordance with the NEC.

E. Cap conduit ends during construction.

F. Clean or replace conduits in which water or foreign matter have accumulated.

G. Install grounding type insulated bushings on each end of conduit 1-1/4 inch and larger.

H. Install grounding conductor in PVC conduit.

I. Bending of PVC shall be by hot box bender and for PVC two inches in diameter and larger, expanding plugs.

J. Install conduits into the bottom of panels with adequate space between all conduits to install locknuts and bushings.

K. The following are prohibited -
   1. Use of wooden plugs inserted in concrete or masonry units as base for fastening conduits, tubing, boxes, cabinets, or other equipment.
   2. Installation of conduit or tubing which has been crushed or deformed.
   3. Torches for bending PVC conduit.

L. All 90 degree bends in power and communication conduit systems shall be rigid steel conduit. No PVC 90 degree bends from floor slab up to first outlet box allowed.

M. Run conduit under concrete slabs, not encased in slab.

16120 WIRE & CABLE

PART 1 GENERAL

1.1 Description:

A. Includes But Not Limited To -
   1. All conductors as required to complete project.

PART 2 PRODUCTS

2.1 Material:

A. Conductors -
   1. Copper except where aluminum is allowed to be used.
   2. Minimum size shall be No. 12 except where specified otherwise.
   3. Conductor size No. 8 and larger shall be stranded.
B. Aluminum conductors may be used for service and feeder conductors. Conductors shall bear the UL marking. Aluminum conductor installation shall meet the following requirements:

1. Aluminum conductor size shall be determined in accordance with the NEC ampacity tables. Aluminum conductor size shall meet the same intent of the design in terms of ampacity and voltage drop as the copper conductors specified for services and feeders. Conduits shall be sized in accordance with the aluminum wire size selected.

2. Splices and terminals shall be made in an approved manner with connectors specially designed and approved for use with aluminum conductors.

3. All conductor ends shall be stripped of insulation being careful to avoid nicking the metal. Approved types of oxide-inhibiting compounds containing abrasive conducting particles shall be applied to the conductor and shall thoroughly penetrate spaces between strands.

4. At lugs in all panels a terminating adaptor shall be installed. Adaptor shall be a Burndy “Hyplug” or equal.

5. Where bolted, pressure—type connectors are used, they shall be of a type specially designed and approved for use with aluminum conductors. They shall be of exact size to fit the conductors and shall be drawn up tight to manufacturer’s recommendations.

6. Where high—compression—type connectors are used, they shall be of a type specially designed and approved for use with aluminum conductors. They shall be of exact size to fit the conductors and shall be drawn up tight to manufacturer’s recommendations.

7. Where connections are made between aluminum and copper (two dissimilar metals), provision shall be made to prevent electrolytic action, and all connectors used for this purpose shall be approved.

8. Conductor size shall be determined in accordance with NEC ampacity tables and shall meet the intent in terms of ampacity and voltage drop.

C. Insulation -

1. Local codes shall apply.

2. Conductor size No. 10 and smaller -
   a. Type THWN/THHN. Branch circuit conductors which run through ballast compartments of lighting fixtures shall be code approved for such use.

3. Conductor Size No. 8 and larger - Type THWN/THHN or XHHW.

D. Steel spring wire connectors or pressure type terminal lugs as specified.

1. Connectors shall only be used as specified by manufacturer.

2. Spring type pressure connectors such as "Scotchlock," shall be used for splicing No. 8 and smaller.

3. Splitbolt and/or lug type connectors such as "Burndy," shall be used for splicing No. 6 and larger.

4. Crimp on spade or ring tongue lug connectors for connection to terminal boards such as Thomas & Betts, “Sta-Kon,” shall be used.

PART 3 EXECUTION

3.1 Performance:

A. Install conductors in raceway unless indicated otherwise.
B. Pulling Conductors -
   1. Do not pull conductors into conduit until raceway system is complete and cabinets and outlet boxes are free of foreign matter and moisture.
   2. Do not use heavy mechanical means for pulling conductors.
   3. Only wire pulling lubricant may be used.

C. Conductors shall be routed in panels in a neat and orderly manner with adequate wiring length to route to all breakers. Wiring shall be routed with 90 degree bends into circuit breakers and shall be tied at points to keep wiring neatly dressed.

D. Conductors shall be continuous from outlet to outlet.

E. Make splices for conductors No. 8 and smaller with steel spring wire connections. Splice larger conductors with pressure type terminal lugs.

F. Route circuits at own discretion, however, circuit numbers shall be according to drawings.

G. All circuits shall have separate neutral installed to meet requirements of NEC 210.4 (B).

H. Run conductors of same circuit in same conduit.

I. Run conductors of different voltage system in separate conduits.

J. Color code conductors as follows -

   240/120V
   Single Phase

   1. Phase A - Black
   2. Phase B - Red
   3. Phase C - --
   4. Neutral - White
   5. Ground - Green

16121 WIRE CONNECTIONS & CONNECTING DEVICES GENERAL

PART 1 DESCRIPTION:

1.1 Includes But Not Limited To -

   A. Furnish and install wiring devices complete with plates as described in Contract Documents.

PART 2 PRODUCTS

2.1 Material:

   A. Switches & Receptacles -
1. Switches and receptacles listed are 15 ampere and switches are single pole. Where three-way, four-way, two pole, or higher ampere switches are required, they shall be of same series as those listed. Devices of a similar type shall be of same Manufacturer.

2. Color shall be same as plate.

3. Approved Manufacturers for Switches -

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<tr>
<th>15A Switches</th>
<th>20A Switches</th>
<th>15A Three-Way Switches</th>
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<td>a. Cooper Wiring Devices</td>
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<td>b. Hubbell</td>
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<td>HBL1221</td>
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<td>c. Leviton</td>
<td>1201</td>
<td>1202</td>
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<td>d. Pass &amp; Seymour</td>
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4. Approved Manufacturers for Receptacles -

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<th>20A Receptacles</th>
<th>15A GFI Receptacles</th>
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<td>a. Cooper Wiring Devices</td>
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<td>b. Hubbell</td>
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<td>c. Leviton</td>
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<td>5362</td>
</tr>
<tr>
<td>d. Pass &amp; Seymour</td>
<td>5262</td>
<td>5362</td>
</tr>
</tbody>
</table>

B. In Use Weatherproof Receptacles -

1. Approved Manufacturer -
   a. Taymac MX3200 Extra Heavy Duty
   b. Intermatic WP3110MXD, WP1030MXD, WP1010MXD, WP1010HMXD
   c. Engineer approved equal.

16134 OUTLET BOXES

PART 1 GENERAL

1.1 Description:
   A. Includes But Not Limited To -
      1. Furnish and install outlet boxes at outlet locations described in Contract Documents.

1.2 Job Conditions:
   A. Coordination -
      1. Coordinate location of outlets which are intended to be above or adjacent to millwork.
PART 2  PRODUCTS

2.1 Material:

A. Outlet Boxes -
   1. Galvanized steel and correct size and shape.
   2. Provide metal supports and other accessories for installation of each box.
   3. Equip ceiling and bracket fixture boxes with fixture studs where required.
   4. Equip outlets with extensions as required to bring box flush with finish surface.

PART 3  EXECUTION

3.1 Installation:

A. Boxes shall be readily accessible and installed with approved cover.
B. Sectional boxes shall not be used in concrete.
C. Locate boxes so outlets are not obstructed by pipes, ducts, or other items.
D. Install outlets flush or not more than 1/4 inch behind finished surface and level and plumb.
E. Boxes for switches shall generally be located within six inches of door jamb.
F. Properly center single outlets in each room. Where two or more outlets occur, space them uniformly and in straight lines with each other.
G. All outlets on J-Boxes not used shall have blank covers installed.

16180  OVERCURRENT PROTECTIVE DEVICES

PART 1  GENERAL

1.1 Division 16000 General applies to this Section.

1.2 Description:

A. Includes But Not Limited To -
   1. Extent of overcurrent protective device work is indicated by project plans and schedules. Overcurrent protective devices specified herein are for installation as individual components in separate enclosures; and for installation as integral components of switchboards and panelboards. See Section 16470, Panelboards.
   2. Types of overcurrent protective devices in this section include the following for operation at 600 volts and below:
      a. Molded case circuit breakers.
1.3 Quality Assurance:
   
   A. Comply with NEC requirements and NEMA and ANSI standards as applicable to construction and installation of overcurrent protective devices.

PART 2 PRODUCTS

2.1 Acceptable Manufacturers:
   
   A. Subject to compliance with requirements, provide products of one of the following (main and branch device manufacturer must be same as panelboard and/or switchboard manufacturer):
      1. Cutler Hammer
      2. General Electric
      3. Square D
      4. Siemens

2.2 Molded Case Circuit Breakers:
   
   A. Provide factory-assembled, molded case circuit breakers for power distribution panelboards and switchboards; and for individual mounting, as indicated. Provide breakers for amperage voltage, and RMS interrupting rating shown, with permanent thermal trip and adjustable instantaneous magnetic trip in each pole. Construct with overcenter, trip free toggle type operating mechanisms with quick-make, quick-break action and positive handle indication. Construct breakers for mounting and operating in any physical position and in ambient temperature of 40 degrees C. Provide with mechanical screw type removable connector lugs, AL/CU rated.

2.3 Maintenance Stock, Fuses:
   
   A. For types and ratings required, furnish additional fuses, amounting to one unit for every 5 installed units, but not less than two units of each size and type.

PART 3 EXECUTION

3.1 Installation of Overcurrent Protective Devices:
   
   A. Install overcurrent protective devices as indicated, in accordance with the manufacturer's written instructions and with recognized industry practices to ensure that protective devices comply with requirements. Comply with NEC and NEMA standards for installation of overcurrent protective devices.

   B. Coordinate with other work as necessary to interface installation of overcurrent protective devices with other work.

   C. Set field-adjustable circuit breakers for trip settings as indicated, subsequent to installation of devices.

   D. Install fuses in overcurrent protective devices.
E. Field test all ground fault protective devices for proper operation; test to be performed by representative of the manufacturer. Include verification of complete time current trip characteristics.

3.2 Field Quality Control

A. Prior to energization of overcurrent protective devices, test devices for continuity of circuitry and for short-circuits. Correct malfunctioning units, and then demonstrate compliance with requirements.
SECTION 16400 SERVICE AND DISTRIBUTION

PART 1 GENERAL

1.1 Division 16000 General applies to this Section.

16450 GROUNDING

PART 1 GENERAL

1.1 Description:

A. Includes But Not Limited To -
   1. Provide grounding for entire electrical installation as shown below and described in Contract Documents.
      a. Electrical service, its equipment and enclosures.
      b. Neutral or identified conductor of interior wiring system.
      c. Main panelboard, power and lighting panelboards.
      d. Conduits and other conductor enclosures.
      e. Non-current-carrying metal parts of fixed equipment such as motors, starter, and controller cabinets, instrument cases, and lighting fixtures.

PART 2 PRODUCTS

2.1 Material:

A. Size materials as shown on Drawings and in accordance with applicable codes.

B. Ground wires No. 6 and smaller shall have green insulation. Ground wires No. 4 and larger shall be bare or shall have green tape at conductor connections.

C. Ground rods shall be 5/8" x 8' copperweld.

D. Make grounding conductor connections to ground rods and water pipes using approved bolted clamps of bronze or brass designed for such use.

PART 3 EXECUTION

3.1 Installation:

A. Grounding connection to main water supply shall be accessible for inspection and made within 6 inches of point of entrance to building or ahead of dielectric, if used, on meter side.

B. Connect No. 4 copper wire to 20 foot of No. 2 rebar in footing (UFER Ground) and bond to service ground.

C. Install additional ground rods as required by applicable codes and as indicated on Drawings.
D. Ground identified grounded (neutral) conductor of electrical system on supply side of main service disconnect.

E. Pull ground conductors in non-metallic raceways and in flexible steel conduit exceeding 6 feet long. Use same size ground as phase conductors up through #10 AWG. Use NEC Table 250-122 for all others unless noted otherwise on Drawings.

16470 PANELBOARDS

PART 1 GENERAL

1.1 Description:

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

PART 2 PRODUCTS

2.1 Material:

A. Sub-Panelboard -
   1. Circuit breakers of type and size shown on Drawings. Multi-pole breakers shall be common trip.
   2. Minimum interrupting capacity of 10,000 amperes or as shown otherwise.
   3. Bussing arranged as required.
   5. Ground bus bonded to cabinet.
   6. Quality Standard - Square D "NQOD".
   7. Hinged door cover.

B. Panelboard Cabinets -
   1. Mono-flat (no screws) for flush or surface mounting as indicated with locking doors with card index holders and three keys.
   2. Key locks alike.

C. Approved Manufacturers -
   1. Cutler Hammer
   2. General Electric
   3. Siemens
   4. Square D

PART 3 EXECUTION

3.1 Installation:

A. Identify panelboards with black laminated plastic name plates with white 1/8 inch engraved letters. Attach with screws.
B. Provide typewritten circuit schedules in panelboard to identify panelboard and each branch breaker.

C. All panelboards shall have hinged door covers.

D. At completion of project contractor shall clean all panels which includes vacuuming inside of panel and wiping down all panels.
SECTION 16500 LIGHTING

PART 1 GENERAL

1.1 Section 16000 applies to this Section.

16510 INTERIOR BUILDING LIGHTING

PART 1 GENERAL

1.1 Description:

A. Includes But Not Limited To -
   1. Furnish and install lighting system as described in Contract Documents complete
      with lamps.

B. Related Work Specified Elsewhere -
   1. See Section 16050 for general requirements.

1.2 Job Conditions:

A. Coordination -
   Coordinate with ceiling layout to obtain symmetrical arrangement of fixtures in
   acoustical tile ceiling.

PART 2 PRODUCTS

2.1 Material:

A. Lighting Fixtures -
   1. See Fixture Schedule on Drawings.
   2. All alternate light fixture packages shall be submitted a minimum of 10 days prior
      to bid for approval.

PART 3 EXECUTION

3.1 Installation:

A. Do not locate light fixtures in closet or storage areas within 18 inches of shelves. Do
   not locate fluorescent fixtures within six inches of shelves.

B. Securely fasten fixtures in place in all areas. Fixtures located in secure areas shall be
   anchored at four corners.

C. Where recessed lighting fixtures are to be installed, provide openings, plaster rings,
   etc., of exact dimensions for such fixtures to be inserted in openings. Terminate
   circuits for recessed fixtures in an extension outlet box near fixture and connect with
   1/2 inch flexible conduit in accordance with Contract Documents.

D. Where fluorescent units are shown installed end to end, provide suitable connectors
or collars to connect adjoining units to appear as a continuous unit.

E. Each fixture shall be wired with a 72 inch piece of flexible conduit connected to a blank covered junction box located in the accessible ceiling space within 36 inches of the fixture connection point.

F. Do not install fixture lens enclosures or louvers in fixtures until general construction work is complete, including painting.

G. All light fixtures and lamps shall be left clean at the time of substantial completion of the work. It is the responsibility of the electrical contractor for protection and final cleaning of fixtures. If fixtures are dirty at completion of the project, the Contractor shall clean them at no additional cost to the Owner.

3.2 Light Fixture Attachment:

A. Light fixtures in ceiling grid shall be mechanically attached to grid per NEC 410-16 (two per fixture unless independently supported).
   1. Pendant-hung fixtures shall be directly supported from structure with 9-gauge wire (or approved alternative).