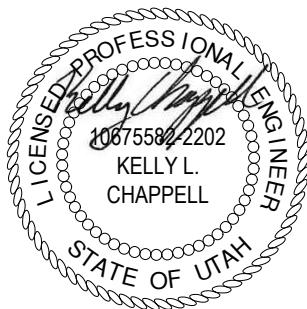


2020

DIXON MIDDLE SCHOOL PROJECT

Provo School District
Utah County, Utah



MAY 2020



Ensign Engineering & Land Surveying
45 West 10000 South, Suite 500
Sandy, Utah 84070
www.ensignutah.com
Office: (801) 255-0529
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PROVO SCHOOL DISTRICT

DIXON MIDDLE SCHOOL PROJECT

BIDDING DOCUMENTS

MAY 2020

OWNER:

**Provo School District
District Administration Office
280 West 940 North
Provo, Utah 84604**

PROJECT ENGINEER:



**Ensign Engineering & Land Surveying
45 West 10000 South, Suite 500
Sandy, Utah 84070
Office: (801) 225-0529
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Web Site: www.ensigneng.com**

5/21/2020

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PART 00
BIDDING REQUIREMENTS

SECTION 001113 - ADVERTISEMENT FOR BIDS

Provo School District is requesting bids for the Dixon Middle School Site Improvements project. Electronic copies of the bid documents will be made available on Ensign Engineering's website at <http://www.ensignutah.com/bid-access/> on **Monday June 15, 2020 at 2:00 pm**. Questions regarding bid document access should be directed toward Kelly Chappell at kchappell@ensignutah.com with the subject line Dixon Middle School Site Improvements project. A non-mandatory but highly encouraged pre-bid conference will be held via zoom or google meets on **Monday June 22, 2020 at 2:00 PM**. Kelly Chappell from Ensign Engineering & Land Surveying will be available and can be reached at kchappell@ensigneng.com or at 801.255.0529 for questions regarding this bid. Sealed bids are due on **Tuesday June 25, 2020 at 2:00 PM**. sharp. Late bids may not be accepted at the Districts discretion. Sealed bids are to be delivered to Provo School District, Attn: Tina Fluehe 280 West 940 North Provo, UT. Bids must be accompanied by a Bid Bond equivalent to 5% of the total bid amount, and contractor qualifications as stated in the bid form. The bid must be clearly marked on the outside of the envelope **"Dixon Middle School Site Improvements Project"**. The District reserves the right to waive any formalities and accept or reject any bid it deems in its best interest.

END OF SECTION 001113

SECTION 002113 - SUGGESTED INSTRUCTIONS TO BIDDERS

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ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. *Issuing Office* – The office from which the Bidding Documents are to be issued.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents may be obtained from the Issuing Office in the number and format stated in the advertisement or invitation to bid.

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

- 2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

- 3.01 To demonstrate Bidder's qualifications to perform the Work, Bidder shall submit with its Bid (a) selection criteria as outlined in Article 5 of Section 004113 Bid Form. This shall include:
- A. Approach to Project
 - B. Past Experience of Bidder and Construction Foreman
 - C. Subcontractor and Supplier qualification information; coordinate with provisions of Article 12 of these Instructions, "Subcontractors, Suppliers, and Others."
- 3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.
- 3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.
- 3.04 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

ARTICLE 4 – SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

4.01 *Site and Other Areas*

- A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

4.02 *Existing Site Conditions*

- A. Subsurface and Physical Conditions; Hazardous Environmental Conditions
 - 1. The Supplementary Conditions identify:
 - a. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site.
 - b. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
 - c. reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
 - d. Technical Data contained in such reports and drawings.
 - 2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.
4. Geotechnical Baseline Report: The Bidding Documents contain a Geotechnical Baseline Report (GBR). The GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations (“Baseline Conditions”). The GBR is a Contract Document.

The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.

Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.

- B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or adjacent to the Site are set forth in the Contract Documents and are based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.
- C. Adequacy of Data: Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 5.03, 5.04, and 5.05 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 5.06 of the General Conditions.

4.03 *Site Visit and Testing by Bidders*

- A. Bidder shall conduct the required Site visit during normal working hours, and shall not disturb any ongoing operations at the Site.
- B. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.
- C. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner’s authority regarding the Site.
- D. Bidder shall comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.
- E. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

4.04 *Owner's Safety Program*

- A. Site visits and work at the Site may be governed by an Owner safety program. As the General Conditions indicate, if an Owner safety program exists, it will be noted in the Supplementary Conditions.

4.05 *Other Work at the Site*

- A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 5 – BIDDER'S REPRESENTATIONS

5.01 It is the responsibility of each Bidder before submitting a Bid to:

- A. examine and carefully study the Bidding Documents, and any data and reference items identified in the Bidding Documents;
- B. visit the Site, conduct a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfy itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
- C. become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work ...including but not limited to American Iron and Steel requirements as mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference which apply to the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.
- D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings;
- E. consider the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs;
- F. agree, based on the information and observations referred to in the preceding paragraph, that at the time of submitting its Bid no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;

- G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;
- H. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder;
- I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and
- J. agree that the submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 6 – PRE-BID CONFERENCE

- 6.01 A pre-Bid conference will be held at the time and location stated in the invitation or advertisement to bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

- 7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all parties recorded as having received the Bidding Documents. Questions received less than seven days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 7.02 Addenda may be issued to clarify, correct, supplement, or change the Bidding Documents.

ARTICLE 8 – BID SECURITY

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of [5] percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Paragraphs 6.01 and 6.02 of the General Conditions.
- 8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults.
- 8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.

- 8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within seven days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

- 9.01 The number of days within which, or the dates by which, the Work is to be substantially completed, and completed and ready for final payment, are set forth in the Agreement.

ARTICLE 10 – LIQUIDATED DAMAGES

- 10.01 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

ARTICLE 11 – SUBSTITUTE AND “OR-EQUAL” ITEMS

- 11.01 The Contract for the Work, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those “or-equal” or substitute materials and equipment subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by Engineer as an “or-equal” or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids in the case of a proposed substitute and 5 days prior in the case of a proposed “or-equal.” Each such request shall comply with the requirements of Paragraphs 7.04 and 7.05 of the General Conditions. Each such request shall include Manufacturer’s Certification letter for compliance with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference, if applicable. Refer to Manufacturer’s Certification Letter provided in these Contract Documents.” The burden of proof of the merit of the proposed item is upon Bidder. Engineer’s decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner. Substitutes and “or-equal” materials and equipment may be proposed by Contractor in accordance with Paragraphs 7.04 and 7.05 of the General Conditions after the Effective Date of the Contract.
- 11.02 All prices that Bidder sets forth in its Bid shall be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder’s sole risk.
- 11.03 If an award is made, Contractor shall be allowed to submit proposed substitutes and “or-equals” in accordance with the General Conditions.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- 12.01 A Bidder shall be prepared to retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of the Work if required by the Bidding Documents (most commonly in the Specifications) to do so. If a prospective Bidder objects to retaining any such Subcontractor, Supplier, or other individual or entity, and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.
- 12.02 Subsequent to the submittal of the Bid, Owner may not require the Successful Bidder or Contractor to retain any Subcontractor, Supplier, or other individual or entity against which Contractor has reasonable objection.

- 12.03 If required by the bid documents, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of the Subcontractors or Suppliers proposed for the following portions of the Work: N/A
- If requested by Owner, such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder shall submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.
- 12.04 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, or other individuals or entities. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.06 of the General Conditions.
- 12.05 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objections.
- 12.06 The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC7.06A.

ARTICLE 13 – PREPARATION OF BID

- 13.01 The Bid Form is included with the Bidding Documents.
- A. All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.
- B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."
- 13.02 A Bid by a corporation shall be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be shown.
- 13.03 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The partnership's address for receiving notices shall be shown.
- 13.04 A Bid by a limited liability company shall be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the firm's address for receiving notices shall be shown.
- 13.05 A Bid by an individual shall show the Bidder's name and address for receiving notices.
- 13.06 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture's address for receiving notices shall be shown.
- 13.07 All names shall be printed in ink below the signatures.

- 13.08 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.09 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.
- 13.10 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 – BASIS OF BID

14.01 *Lump Sum*

- A. Bidders shall submit a Bid on a lump sum basis as set forth in the Bid Form.

14.02 *Unit Price*

- A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.
- B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity" (which Owner or its representative has set forth in the Bid Form) for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.
- C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

14.03 *Allowances*

- A. For cash allowances the Bid price shall include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 13.02.B of the General Conditions.

ARTICLE 15 – SUBMITTAL OF BID

- 15.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 7 of the Bid Form.
- 15.02 A Bid shall be received no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to Ensign Engineering, 1870 N Main St Suite 104, Cedar City, UT 84721.
- 15.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

- 16.01 A Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.
- 16.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 16.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 17 – OPENING OF BIDS

- 17.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

- 18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

- 19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible. If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, then the Owner will reject the Bid as nonresponsive; provided that Owner also reserves the right to waive all minor informalities not involving price, time, or changes in the Work.
- 19.02 If Owner awards the contract for the Work, such award shall be to the responsible Bidder submitting the lowest responsive Bid.
- 19.03 Evaluation of Bids
- A. In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.
 - B. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.
 - C. Bid prices will be compared after adjusting for differences in time of Substantial Completion (total number of calendar days to substantially complete the Work) designated by Bidders. The adjusting amount will be determined at the rate set forth in the Agreement for liquidated damages for failing to achieve Substantial Completion, or such other amount that Owner has designated in the Bid Form.

- 19.04 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.
- 19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 20 – BONDS AND INSURANCE

- 20.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the Agreement (executed by Successful Bidder) to Owner, it shall be accompanied by required bonds and insurance documentation.

ARTICLE 21 – SIGNING OF AGREEMENT

- 21.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder shall execute and deliver the required number of counterparts of the Agreement (and any bonds and insurance documentation required to be delivered by the Contract Documents) to Owner. Within ten days thereafter, Owner shall deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 22 –

ARTICLE 23 –

SECTION 004113 – BID FORM

DIXION MIDDLE SCHOOL PROJECT

5133DIX

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ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Provo School District

Project Name: Dixon Middle School Project

Project Number: 5133DIX

Address: Provo School District, Attn: Tina Fluehe 280 West 940 North Provo, UT

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER’S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER’S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

<u>Addendum No.</u>	<u>Addendum, Date</u>
_____	_____
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work... and including all American Iron and Steel requirements.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations

obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.

- F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.
- J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:
 - 1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;
 - 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 - 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
 - 4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 5 – SELECTION CRITERIA

- 5.01 BIDDER acknowledges that the following selection criteria will be used to award this project, and has attached the required information to enable that evaluation:
- A. This project is to be awarded based on four criteria, each to be weighted as noted. The four criteria are: (1) Bid price, 30%; (2) Approach to Project, 20%; (3) Past experience of Bidder and Bidder's construction foreman assigned to this project, and past experience of Provo School District with Bidder, 20%; and (4) Date of Completion 30%. Each of the four areas will be scored separately by the Owner, who will rank each Bidder. The best-ranked Bidder in each area will be given a 1, the second best a 2, and so forth. The ranking will then be totaled and the Bidder with the lowest total score will be awarded the project. Bidder should include information with his bid that addresses the three areas noted above, as described below:
 - B. Base Bid, (30%): Bidder to completely fill out the Bid Schedule included in these specifications. The Base Bid and Bid Bond are to be sealed in a separate envelope labeled 'Base Bid', and placed in the envelope with the Bidder's other information. The opening of this Base Bid envelope will constitute the Public Bid Opening.
 - C. Approach to Project (20%): Bidder to prepare a written narrative describing his approach to this project specifically addressing traffic control, access to business and private owner properties, public relations, how construction is to progress, and any other aspect to this project the Bidder views as crucial to its success.
 - D. Past Experience of Bidder's Construction Foreman assigned to this project, and past experience of Provo School District with this Bidder (20%): Bidder to prepare information highlighting his and his foreman's past experience on at least three (3) similar projects, including references. Provo School District will also consider any past experience the District has had with the Bidder on any prior projects performed by the Bidder for the District. Also list experience and names of sub contractors.
 - E. Date of Completion (30%): Bidder shall write in the Bid Form, the estimated Date of Completion if a Notice to Proceed were given to the bidder on July 6, 2020
 - F. The above information is to be attached to the Bid Form and made a part of the bid.

ARTICLE 6 – BASIS OF BID

- 6.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

ITEM	DESCRIPTION	UNIT	QUANTIT Y	UNIT COST	TOTAL
1	MOBILIZATOIN	LS	-	-	
2	REMOVE EXISTING CURB AND GUTTER	LF	200		
3	SAWCUT AND REMOVE ASPHALT	SF	35,415		

4	REMOVE CONCRETE FLATWORK AND SIDEWALK	SF	26,065		
5	INSTALL 18' CLASS III RCP STORM DRAIN PIPE (A-1a OR A-1B Bedding and fill)	LF	60		
6	INSTALL SDCB-CURB	EA	1		
7	INSTALL SQUARE SDCB – W/GRATE	EA	1		
8	INSTALL CAST IN PLACE STORM DRAIN CLEAN OUT	EA	1		
9	MODIFY EXISTING STORM DRAIN BOX	EA	2		
10	4' WIDE CONCRETE WATERWAY	LF	236		
11	INSTALL 8" UNTREATED BASE COURSE	SF	47,555		
12	INSTALL 4" THICK SIDEWALK/FLATWORK	SF	4,900		
13	INSTALL CONCRETE DRIVE APPROACH	SF	425		
14	INSTALL APWA TYPE E CURB AND GUTTER	LF	135		
15	INSTALL REVERSE PAN CURB AND GUTTER	LF	1560		
16	INSTALL SOD AND TOP SOIL	SF	8,450		
17	INSTALL ADA ACCESS RAMP	EA	5		
18	INSTALL HANDICAP ACCESSIBLE RAMP AND RAILING	LS	-		
19	ELECTRICAL LIGHT POLES (DOUBLE HEAD) PER PLAN	EA	4		
20	ELECTRICAL CONDUIT, CONDUCTOR, CONNECTIONS & TIE-INS	LS	1		
21	INSTALL STRIPING AND ROADWAY MESSAGING	LS	1		
22	INSTALL SIGNAGE	EA	5		
23	INSTALL 3" HMA	SF	47,555		
24	REMOVE TENNIS COURT FENCING, BOLLARDS, STAIRS, CURBS, WALLS	LS	1		

25	REMOVE CUT MATERIAL	CY	1,350		
26	IMPORT STRUCTURAL FILL	CY	205		
27	IRRIGATION IMPROVEMENTS ALLOWANCE	AL	-	-	\$15,000
28	SOFT SPOT ALLOWANCE	AL	-	-	\$20,000
29	CONSTRUCTION STAKING	LS	-	-	\$5,200
TOTAL					

Bidder acknowledges that (1) each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and (2) estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

ESTIMATED DATE OF COMPLETION: _____

ARTICLE 7 – TIME OF COMPLETION

- 7.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 7.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 8 – ATTACHMENTS TO THIS BID

- 8.01 The following documents are submitted with and made a condition of this Bid:
- A. Required Bid security;
 - B. List of Proposed Subcontractors;
 - C. List of Proposed Suppliers;
 - D. List of Project References;
 - E. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids;
 - F. Contractor's License No.: [REDACTED] [or] Evidence of Bidder's ability to obtain a State Contractor's License and a covenant by Bidder to obtain said license within the time for acceptance of Bids;
 - G. Required Bidder Qualification Statement with supporting data; and

ARTICLE 9 – DEFINED TERMS

- 9.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 10 – BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

By:

[Signature] _____

[Printed name] _____

(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:

[Signature] _____

[Printed name] _____

Title: _____

Submittal Date: _____

Address for giving notices:

Telephone Number: _____

Fax Number: _____

Contact Name and e-mail address: _____

Bidder's License No.: _____

(where applicable)

DOCUMENT 004243.1 - PROJECT REFERENCES

Each bidder shall list below the name, type, address, and total bidding price of each project that he or she has completed in the past and/or completing now. The following form with this information must be completed and presented with the CONTRACTOR'S BID.

Project Name/Type/Address/Reference Name and Telephone

1.

Name:

Type of Project

Address or Location:

Reference Name:

Reference Telephone:

Total Bidding Price:

Total value of Contractor's Portion of Bidding:

2.

Name:

Type of Project

Address or Location:

Reference Name:

Reference Telephone:

Total Bidding Price:

Total value of Contractor's Portion of Bidding:

Project Name/Type/Address/Reference Name and Telephone

3.

Name:

Type of Project

Address or Location:

Reference Name:

Reference Telephone:

Total Bidding Price:

Total Value of Contractor's Portion of Bidding:

4.

Name:

Type of Project

Address or Location:

Reference Name:

Reference Telephone:

Total Bidding Price:

Total value of Contractor's Portion of Bidding:

- END OF SECTION -

SECTION 004313 – BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER (Name and Address):

SURETY (Name, and Address of Principal Place of Business):

OWNER (Name and Address):

Provo School District
280 West 940 North
Provo, UT 84604

BID

Bid Due Date:
Description (Project Name— Include Location):
Dixon Middle School Project
750 West 200 North
Provo, Utah

BOND

Bond Number:
Date:
Penal sum

_____ \$ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER _____ (Seal) **SURETY** _____ (Seal)
Bidder's Name and Corporate Seal Surety's Name and Corporate Seal

By: _____ By: _____
Signature Signature (Attach Power of Attorney)

Print Name Print Name

Title Title

Attest: _____ Attest: _____
Signature Signature

Title Title

Note: Addresses are to be used for giving any required notice.
Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
 - 3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2 All Bids are rejected by Owner, or
 - 3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

SECTION 004336 - LIST OF SUB CONTRACTORS

Each bidder shall list below the name, business address, and Utah Contractor’s License Number of each SUBCONTRACTOR who will perform work or render service under this CONTRACT. The BIDDERS will use these SUBCONTRACTORS in making up the BID and these SUBCONTRACTORS will be used for the work on which BID is made. If no SUBCONTRACTORS are to be employed, the word “NONE” should be placed in the appropriate space. The form must be completed and presented with the CONTRACTOR’S BID.

Portion of Work

1. _____

_____ Name

_____ Street

_____ City, State Zip

_____ Utah Contractor’s License #

2. _____

_____ Name

_____ Street

_____ City, State Zip

_____ Utah Contractor’s License #

Portion of Work

3. _____

_____ Name

_____ Street

4.

City, State Zip

Utah Contractor's License #

Name

Street

City, State Zip

Utah Contractor's License #

The undersigned further agrees:

1. No verbal agreement or conversation with any officer, agent or employee of the OWNER, either before or after the execution of the agreement, shall affect or modify any terms or obligations of this proposal.
2. The appropriate quantities shown in the Bid Schedule are solely for the purpose of facilitating the comparison of bids and that the CONTRACTOR'S compensation will be the based on unit prices bid, or as adjusted by changes authorized by ENGINEER during the time of contract based on the actual quantities in the completed work. Whether there are more or less quantities than those shown herein will be based on the provisions of the Technical Specifications.

**DOCUMENT 004513
QUALIFICATIONS STATEMENT**

THE INFORMATION SUPPLIED IN THIS DOCUMENT IS CONFIDENTIAL TO THE EXTENT PERMITTED BY LAWS AND REGULATIONS

1. SUBMITTED BY:

Official Name of Firm: ENSIGN ENGINEERING & LAND SURVEYING

Address: 45 WEST 10000 SOUTH

SANDY, UTAH 84070

2. SUBMITTED TO:

3. SUBMITTED FOR:

Owner: PROVO SCHOOL DISTRICT

Project Name: DIXION MIDDLE SCHOOL PROJECT

TYPE OF WORK: CIVIL SITE IMPROVMENTS INCLUDING HARDSCAPE, APHALT PARKING,

DRAINAGE IMPROVMENTS

4. CONTRACTOR'S CONTACT INFORMATION

Contact Person: _____

Title: _____

Phone: _____

Email: _____

5. AFFILIATED COMPANIES:

Name: _____

Address: _____

6. TYPE OF ORGANIZATION:

SOLE PROPRIETORSHIP

Name of Owner: _____

Doing Business As: _____

Date of Organization: _____

PARTNERSHIP

Date of Organization: _____

Type of Partnership: _____

Name of General Partner(s): _____

CORPORATION

State of Organization: _____

Date of Organization: _____

Executive Officers:

- President: _____

- Vice President(s): _____

- Treasurer: _____

- Secretary: _____

LIMITED LIABILITY COMPANY

State of Organization:

Date of Organization:

Members:

JOINT VENTURE

Sate of Organization:

Date of Organization:

Form of Organization:

Joint Venture Managing Partner

- Name:

- Address:

Joint Venture Managing Partner

- Name:

- Address:

Joint Venture Managing Partner

- Name:

- Address:

7. LICENSING

Jurisdiction: _____

Type of License: _____

License Number: _____

Jurisdiction: _____

Type of License: _____

License Number: _____

8. CERTIFICATIONS

CERTIFIED BY:

Disadvantage Business Enterprise: _____

Minority Business Enterprise: _____

Woman Owned Enterprise: _____

Small Business Enterprise: _____

Other (_____): _____

9. BONDING INFORMATION

Bonding Company: _____

Address: _____

Bonding Agent: _____

Address: _____

Contact Name: _____

Phone: _____

Aggregate Bonding Capacity: _____

Available Bonding Capacity as of date of this submittal: _____

10. FINANCIAL INFORMATION

Financial Institution: _____

Address: _____

Account Manager: _____

Phone: _____

INCLUDE AS AN ATTACHMENT AN AUDITED BALANCE SHEET FOR EACH OF THE LAST 3 YEARS

11. CONSTRUCTION EXPERIENCE:

Current Experience:

List on **Schedule A** all uncompleted projects currently under contract (If Joint Venture list each participant's projects separately).

Previous Experience:

List on **Schedule B** all projects completed within the last 5 Years (If Joint Venture list each participant's projects separately).

Has firm listed in Section 1 ever failed to complete a construction contract awarded to it?

YES NO

If YES, attach as an Attachment details including Project Owner's contact information.

Has any Corporate Officer, Partner, Joint Venture participant or Proprietor ever failed to complete a construction contract awarded to them in their name or when acting as a principal of another entity?

YES NO

If YES, attach as an Attachment details including Project Owner's contact information.

Are there any judgments, claims, disputes or litigation pending or outstanding involving the firm listed in Section 1 or any of its officers (or any of its partners if a partnership or any of the individual entities if a joint venture)?

YES NO

If YES, attach as an Attachment details including Project Owner's contact information.

12. SAFETY PROGRAM:

Name of Contractor's Safety Officer: _____

Include the following as attachments:

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) OSHA No. 500- Log & Summary of Occupational Injuries & Illnesses for the past 5 years.

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) list of all OSHA Citations & Notifications of Penalty (monetary or other) received within the last 5 years (indicate disposition as applicable) - IF NONE SO STATE.

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) list of all safety citations or violations under any state all received within the last 5 years (indicate disposition as applicable) - IF NONE SO STATE.

Provide the following for the firm listed in Section V (and for each proposed Subcontractor furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) the following (attach additional sheets as necessary):

Workers' compensation Experience Modification Rate (EMR) for the last 5 years:

YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____

Total Recordable Frequency Rate (TRFR) for the last 5 years:

YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____

Total number of man-hours worked for the last 5 Years:

YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____

YEAR _____

TOTAL NUMBER OF MAN-HOURS _____

Provide Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) Days Away From Work, Days of Restricted Work Activity or Job Transfer (DART) incidence rate for the particular industry or type of Work to be performed by Contractor and each of Contractor's proposed Subcontractors and Suppliers) for the last 5 years:

YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____

13. EQUIPMENT:

MAJOR EQUIPMENT:

List on **Schedule C** all pieces of major equipment available for use on Owner's Project.

I HEREBY CERTIFY THAT THE INFORMATION SUBMITTED HEREWITH, INCLUDING ANY ATTACHMENTS, IS TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

NAME OF ORGANIZATION: _____

BY: _____

TITLE: _____

DATED: _____

NOTARY ATTEST:

SUBSCRIBED AND SWORN TO BEFORE ME

THIS _____ DAY OF __, 20__

NOTARY PUBLIC - STATE OF _____

MY COMMISSION EXPIRES: _____

REQUIRED ATTACHMENTS

1. Schedule A (Current Experience).
2. Schedule B (Previous Experience).
3. Schedule C (Major Equipment).
4. Audited balance sheet for each of the last 3 years for firm named in Section 1.
5. Evidence of authority for individuals listed in Section 7 to bind organization to an agreement.
6. Resumes of officers and key individuals (including Safety Officer) of firm named in Section 1.
7. Required safety program submittals listed in Section 13.
8. Additional items as pertinent.

SCHEDULE A

CURRENT EXPERIENCE

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

	Name: Address: Telephone:	Name: Company: Telephone:				
--	---------------------------------	---------------------------------	--	--	--	--

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

	Name: Address: Telephone:	Name: Company: Telephone:				
--	---------------------------------	---------------------------------	--	--	--	--

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

	Name: Address: Telephone:	Name: Company: Telephone:				
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SCHEDULE C - LIST OF MAJOR EQUIPMENT AVAILABLE

ITEM	PURCHASE DATE	CONDITION	ACQUIRED VALUE

DOCUMENT 005100

NOTICE OF AWARD

Date of Issuance:

Owner: Provo School District Owner's Contract No.: <CONTRACT NUMBER>

Engineer: Ensign Engineering and Land Surveying Engineer's Project No.: <PROJECT NUMBER>

Project: Dixon Middle School Project Contract Name: <CONTRACT NAME>

Bidder:

Bidder's Address:

TO BIDDER:

You are notified that Owner has accepted your Bid dated [_____] for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

_____.
[describe Work, alternates, or sections of Work awarded]

The Contract Price of the awarded Contract is: \$ _____ *[note if subject to unit prices, or cost-plus]*

[] unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically. *[revise if multiple copies accompany the Notice of Award]*

a set of the Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner [] counterparts of the Agreement, fully executed by Bidder.
2. Deliver with the executed Agreement(s) the Contract security *[e.g., performance and payment bonds]* and insurance documentation as specified in the Instructions to Bidders and General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any):

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner: <OWNER>

Authorized Signature

By: <CLIENT REPRESENTATIVE>

Title: <TITLE>

Copy: Engineer

SECTION 005253 - AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR
CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and
between

PROVO SCHOOL DISTRICT (“Owner”) and

_____ (“Contractor”).

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

ARTICLE 2 – THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: Dixon Middle School Parking Lot

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by Ensign Engineering and Land Surveying.

3.02 The Owner has retained Ensign Engineering and Land Surveying (“Engineer”) to act as Owner’s representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES**4.01 *Time of the Essence***

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Contract Times: Days*

A. The Work will be substantially completed within 45 days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 60 days after the date when the Contract Times commence to run.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of

B. requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. Substantial Completion: Contractor shall pay Owner \$750 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.

4.04 [Deleted]

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract:

- A. According to Bid Form Contained herein.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 5th day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.
 1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract
 - a. 95 percent of Work completed (with the balance being retainage); ~~If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and~~
 - b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
- B. Upon Substantial Completion of the entire construction to be provided under the Contract Documents, Owner shall pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 200 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 Final Payment

- A. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 15.06.

ARTICLE 7 – INTEREST

- 7.01 All amounts not paid when due shall bear interest at the rate of 1.5 percent per annum.

ARTICLE 8 – CONTRACTOR’S REPRESENTATIONS

- 8.01 In order to induce Owner to enter into this Contract, Contractor makes the following representations:
 - A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.
 - B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 - C. Contractor is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
 - D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.
 - E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor’s safety precautions and programs.
 - F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
 - G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
 - H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
 - I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

- J. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

- A. The Contract Documents consist of the following:
1. This Agreement (pages 1 to █, inclusive).
 2. Performance bond (pages █ to █, inclusive).
 3. Payment bond (pages █ to █, inclusive).
 4. Other bonds.
 - a. █ (pages █ to █, inclusive).
 5. General Conditions (pages █ to █, inclusive).
 6. Supplementary Conditions (pages █ to █, inclusive).
 7. Specifications as listed in the table of contents of the Project Manual.
 8. Drawings (not attached but incorporated by reference) consisting of █ sheets with each sheet bearing the following general title: █ [or] the Drawings listed on the attached sheet index.
 9. Addenda (numbers █ to █, inclusive).
 10. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid (pages █ to █, inclusive).
 11. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
 - a. Notice to Proceed.
 - b. Work Change Directives.
 - c. Change Orders.
 - d. Field Orders.
- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 9.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

- A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 *Assignment of Contract*

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 *Successors and Assigns*

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 *Severability*

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:
1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
 4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on _____ (which is the Effective Date of the Contract).

OWNER:

CONTRACTOR:

PROVO SCHOOL DISTRICT _____

By: <CLIENT REPRESENTATIVE> _____

By: _____

Title: <TITLE> _____

Title: _____

(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest: _____

Attest: _____

Title: _____

Title: _____

Address for giving notices:

Address for giving notices:

<OWNER ADDRESS> _____

<OWNER ADDRESS> _____

License No.: _____
(where applicable)

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

NOTE TO USER: Use in those states or other jurisdictions where applicable or required.

DOCUMENT 005500 NOTICE TO PROCEED

Owner: Provo School District Owner's Project No.: <PROJECT #>
 Engineer: Ensign Engineering and Land Surveying Engineer's Project No.: 5133DIX
 Contractor: _____ Contractor's Project No.: _____
 Project: Dixon Middle School
 Contract Name: _____
 Effective Date of Contract: _____

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on <DATE CONTRACT TIMES ARE TO START> pursuant to Paragraph 4.01 of the General Conditions.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work will be done at the Site prior to such date.

In accordance with the Agreement:

The number of days to achieve Substantial Completion is 45 days from the date stated above for the commencement of the Contract Times, resulting in a date for Substantial Completion of _____; and the number of days to achieve readiness for final payment is 60 DAYSs from the commencement date of the Contract Times, resulting in a date for readiness for final payment of _____

Before starting any Work at the Site, Contractor must comply with the following:

N/A

Owner: _____
 By (signature): _____
 Name (printed): <CLIENT REPRESENTATIVE>
 Title: <TITLE>
 Date Issued: _____

Copy: Engineer

DOCUMENT 006113.13

PERFORMANCE BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

Provo School District
280 West 940 North
Provo, Utah 84604

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location)*:

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:

Amount:

Modifications to this Bond Form: None See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

Contractor's Name and Corporate Seal *(seal)*

Surety's Name and Corporate Seal *(seal)*

By: _____
Signature

By: _____
Signature *(attach power of attorney)*

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed

by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims

for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

DOCUMENT 006113.16
PAYMENT BOND

CONTRACTOR *(name and address):*

SURETY *(name and address of principal place of business):*

OWNER *(name and address):*

Provo School District
280 West 940 North
Provo, Utah 84604

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location):*

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract):*

Amount:

Modifications to this Bond Form: None See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

(seal)
Contractor's Name and Corporate Seal

(seal)
Surety's Name and Corporate Seal

By: _____
Signature

By: _____
Signature *(attach power of attorney)*

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond shall arise after the following:
 - 5.1 Claimants who do not have a direct contract with the Contractor,
 - 5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
 - 5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).
 - 5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
 - 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
 - 7.2 Pay or arrange for payment of any undisputed amounts.
 - 7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.
8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including

changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. Definitions

16.1 **Claim:** A written statement by the Claimant including at a minimum:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
4. A brief description of the labor, materials, or equipment furnished;
5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;

7. The total amount of previous payments received by the Claimant; and
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4 **Owner Default:** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

18. Modifications to this Bond are as follows:

DOCUMENT 006363

Change Order No. _____

Date of Issuance:	Effective Date:
Owner: Provo School District	Owner's Contract No.: <CONTRACT #>
Contractor:	Contractor's Project No.:
Engineer: Ensign Engineering and Land Surveying	Engineer's Project No.: 5133DIX
Project: Dixon Middle School	Contract Name:

The Contract is modified as follows upon execution of this Change Order:

Description:

Attachments: *[List documents supporting change]*

CHANGE IN CONTRACT PRICE	CHANGE IN CONTRACT TIMES <i>[note changes in Milestones if applicable]</i>
Original Contract Price: \$ _____	Original Contract Times: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] from previously approved Change Orders No. __ to No. __: \$ _____	[Increase] [Decrease] from previously approved Change Orders No. __ to No. __: Substantial Completion: _____ Ready for Final Payment: _____ days
Contract Price prior to this Change Order: \$ _____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] of this Change Order: \$ _____	[Increase] [Decrease] of this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
Contract Price incorporating this Change Order: \$ _____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for Final Payment: _____ days or dates

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____ Engineer (if required)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

Approved by Funding Agency (if applicable)

By: _____ Date: _____
Title: _____

DOCUMENT 006500**PROJECT CLOSEOUT****PART 1 GENERAL****1.01 FINAL CLEANUP**

- A. CONTRACTOR shall promptly remove from the vicinity of the completed work, all rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. Final acceptance of the work by OWNER will be withheld until CONTRACTOR has satisfactorily complied with the foregoing requirements for final cleanup of the project site.

1.02 TOUCH-UP AND REPAIR

- A. CONTRACTOR shall touch up or repair all finished surfaces on structures, equipment, fixtures, ditches or whatever, that have been damaged prior to final acceptance. Surfaces on which such touch-up or repair cannot be successfully accomplished shall be completely refinished or in the case of hardware and similar small items, the item shall be replaced.

1.03 CLOSEOUT TIMETABLE

- A. CONTRACTOR shall establish dates for equipment testing, acceptance periods and on-site instructional periods (as required under the Contract). Such dates shall be established not less than one week prior to beginning any of the foregoing items, to allow OWNER, the ENGINEER, and their authorized representatives sufficient time to schedule attendance at such activities.

1.04 OPERATION AND MAINTENANCE MANUAL SUBMITTALS

- A. CONTRACTOR's attention is directed to the condition that any monies due CONTRACTOR as progress payments shall be retained if at the 75 percent construction completion point, the approved technical manuals have not been submitted in accordance with Section 01300 entitled "Contractor Submittals" of the Technical Specification. The aforementioned amount will be retained by OWNER until the technical manuals have been submitted. Any such retention of money for failure to submit the approved technical manuals on or before the 75 percent construction completion point shall be in addition to the retention of any payments due to CONTRACTOR as specified in Article 8 of the General Conditions.

1.05 MAINTENANCE AND GUARANTEE

- A. CONTRACTOR shall comply with the maintenance and guarantee requirements contained in Article 9 of the General Conditions.
- B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as part of such required repair work, and any repair or resurfacing which becomes necessary by reason of such required repair work shall be completed by CONTRACTOR at no cost to OWNER.
- C. CONTRACTOR shall make all repairs and replacements promptly upon receipt of written order from OWNER. If CONTRACTOR fails to make such repairs or replacement promptly, OWNER reserves the right to do the work and CONTRACTOR and his surety shall be liable to OWNER for the cost thereof.
- D. The CONTRACTOR shall obtain a signed release from the property owner approving restoration of work in the construction easements across or bordering private property.

1.06 FINAL ACCEPTANCE

- A. Final acceptance and final payment shall not be made until all provisions of the General Conditions Article 8 have been satisfied.

1.07 MEASUREMENT AND PAYMENT

- A. Project closeout shall not be measured or paid as a separate item, but shall be included as part of the various items to which it relates.

- END OF SECTION -

**DOCUMENT 006516
CERTIFICATE OF SUBSTANTIAL COMPLETION**

Owner: Provo School District	Owner's Contract No.: <CONTRACT #>
Contractor:	Contractor's Project No.:
Engineer: Ensign Engineering and Land Surveying	Engineer's Project No.: 5133DIX
Project: Dixon Middle School	Contract Name:

This [preliminary] [final] Certificate of Substantial Completion applies to:

All Work The following specified portions of the Work:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work shall be as provided in the Contract, except as amended as follows: *[Note: Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see Paragraph 15.03.D of the General Conditions.]*

Amendments to Owner's responsibilities: None
 As follows

Amendments to Contractor's responsibilities: None
 As follows:

The following documents are attached to and made a part of this Certificate: *[punch list; others]*

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract.

EXECUTED BY ENGINEER:	RECEIVED:	RECEIVED:
By: _____ (Authorized signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

DOCUMENT 00700 GENERAL CONDITIONS

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the Controlling Law.

STANDARD
GENERAL CONDITIONS
OF THE
CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By



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AMERICAN SOCIETY OF CIVIL ENGINEERS

This document has been approved and endorsed by

The Associated General Contractors of America

Construction Specifications Institute

These General Conditions have been prepared for use with the Owner-Contractor Agreements (No. 1910-8-A-1 or 1910-8-A-2) (1996 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the EJDC User's Guide (No. 1910-50). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. 1910-17) (1996 Edition).

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GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Contract Documents and printed with initial or all capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the Contract Documents.

2. *Agreement*--The written instrument which is evidence of the agreement between OWNER and CONTRACTOR covering the Work.

3. *Application for Payment*--The form acceptable to ENGINEER which is to be used by CONTRACTOR during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*--Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*--The offer or proposal of a bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

7. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, Bid security form, if any, and the Bid form with any supplements.

8. *Bonds*--Performance and payment bonds and other instruments of security.

9. *Change Order*--A document recommended by ENGINEER which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the

Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by OWNER or CONTRACTOR seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the OWNER and CONTRACTOR concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*--The Contract Documents establish the rights and obligations of the parties and include the Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders, and ENGINEER's written interpretations and clarifications issued on or after the Effective Date of the Agreement. Approved Shop Drawings and the reports and drawings of subsurface and physical conditions are not Contract Documents. Only printed or hard copies of the items listed in this paragraph are Contract Documents. Files in electronic media format of text, data, graphics, and the like that may be furnished by OWNER to CONTRACTOR are not Contract Documents.

13. *Contract Price*--The moneys payable by OWNER to CONTRACTOR for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: (i) achieve Substantial Completion; and (ii) complete the Work so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment.

15. *CONTRACTOR*--The individual or entity with whom OWNER has entered into the Agreement.

16. *Cost of the Work*--See paragraph 11.01.A for definition.

17. *Drawings*--That part of the Contract Documents prepared or approved by ENGINEER which graphically shows the scope, extent, and character of the Work to be performed by CONTRACTOR. Shop Drawings and other CONTRACTOR submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*--The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *ENGINEER*--The individual or entity named as such in the Agreement.

20. *ENGINEER's Consultant*--An individual or entity having a contract with ENGINEER to furnish services as ENGINEER's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions.

21. *Field Order*--A written order issued by ENGINEER which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

22. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

23. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

24. *Hazardous Waste*--The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

25. *Laws and Regulations; Laws or Regulations*--Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

26. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

27. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

28. *Notice of Award*--The written notice by OWNER to the apparent successful bidder stating that upon timely compliance by the apparent successful bidder with the conditions precedent listed therein, OWNER will sign and deliver the Agreement.

29. *Notice to Proceed*--A written notice given by OWNER to CONTRACTOR fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform the Work under the Contract Documents.

30. *OWNER*--The individual, entity, public body, or authority with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be performed.

31. *Partial Utilization*--Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

32. *PCBs*--Polychlorinated biphenyls.

33. *Petroleum*--Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

34. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part as may be indicated elsewhere in the Contract Documents.

35. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

36. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

37. *Resident Project Representative*--The authorized representative of ENGINEER who may be assigned to the Site or any part thereof.

38. *Samples*--Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

39. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate some portion of the Work.

40. *Site*--Lands or areas indicated in the Contract Documents as being furnished by OWNER upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by OWNER which are designated for the use of CONTRACTOR.

41. *Specifications*--That part of the Contract Documents consisting of written technical descriptions of materials, equipment, systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

42. *Subcontractor*--An individual or entity having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the Site.

43. *Substantial Completion*--The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

44. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

45. *Supplier*--A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.

46. *Underground Facilities*--All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum

products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

47. *Unit Price Work*--Work to be paid for on the basis of unit prices.

48. *Work*--The entire completed construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

49. *Work Change Directive*--A written statement to CONTRACTOR issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

50. *Written Amendment*--A written statement modifying the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly construction-related aspects of the Contract Documents.

1.02 Terminology

A. Intent of Certain Terms or Adjectives

1. Whenever in the Contract Documents the terms "as allowed," "as approved," or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of ENGINEER as to the Work, it is intended that such action or determination will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or

adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.10 or any other provision of the Contract Documents.

B. *Day*

1. The word “day” shall constitute a calendar day of 24 hours measured from midnight to the next midnight.

C. *Defective*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it does not conform to the Contract Documents or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with paragraph 14.04 or 14.05).

D. *Furnish, Install, Perform, Provide*

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of CONTRACTOR, “provide” is implied.

E. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 - PRELIMINARY MATTERS

2.01 *Delivery of Bonds*

A. When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish.

2.02 *Copies of Documents*

A. OWNER shall furnish to CONTRACTOR up to ten copies of the Contract Documents. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

A. CONTRACTOR shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

A. *CONTRACTOR’s Review of Contract Documents:* Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error, ambiguity, or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby;

however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless CONTRACTOR knew or reasonably should have known thereof.

B. *Preliminary Schedules:* Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for its timely review:

1. a preliminary progress schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary schedule of Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing, and processing such submittal; and

3. a preliminary schedule of values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

C. *Evidence of Insurance:* Before any Work at the Site is started, CONTRACTOR and OWNER shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which CONTRACTOR and OWNER respectively are required to purchase and maintain in accordance with Article 5.

2.06 *Preconstruction Conference*

A. Within 20 days after the Contract Times start to run, but before any Work at the Site is started, a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in paragraph 2.05.B, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 *Initial Acceptance of Schedules*

A. Unless otherwise provided in the Contract Documents, at least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to review for acceptability to ENGINEER as provided below the schedules submitted in accordance with paragraph 2.05.B. CONTRACTOR shall have an additional ten days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to CONTRACTOR until acceptable schedules are submitted to ENGINEER.

1. The progress schedule will be acceptable to ENGINEER if it provides an orderly progression of the Work to completion within any specified Milestones and the Contract Times. Such acceptance will not impose on ENGINEER responsibility for the progress schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility therefor.

2. CONTRACTOR's schedule of Shop Drawing and Sample submittals will be acceptable to ENGINEER if it provides a workable arrangement for reviewing and processing the required submittals.

3. CONTRACTOR's schedule of values will be acceptable to ENGINEER as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to OWNER.

C. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in Article 9.

3.02 *Reference Standards*

A. *Standards, Specifications, Codes, Laws, and Regulations*

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of OWNER, CONTRACTOR, or ENGINEER, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall any such provision or instruction be effective to assign to OWNER, ENGINEER, or any of ENGINEER's Consultants, agents, or employees any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, CONTRACTOR shall report it to ENGINEER in writing at once. CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as required by paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.04; provided, however, that CONTRACTOR shall not be liable to

OWNER or ENGINEER for failure to report any such conflict, error, ambiguity, or discrepancy unless CONTRACTOR knew or reasonably should have known thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways: (i) a Written Amendment; (ii) a Change Order; or (iii) a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways: (i) a Field Order; (ii) ENGINEER's approval of a Shop Drawing or Sample; or (iii) ENGINEER's written interpretation or clarification.

3.05 *Reuse of Documents*

A. CONTRACTOR and any Subcontractor or Supplier or other individual or entity performing or furnishing any of the Work under a direct or indirect contract with OWNER: (i) shall not have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER or ENGINEER's Consultant, including electronic media editions; and (ii) shall not reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific

written verification or adaption by ENGINEER. This prohibition will survive final payment, completion, and acceptance of the Work, or termination or completion of the Contract. Nothing herein shall preclude CONTRACTOR from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 - AVAILABILITY OF LANDS;
SUBSURFACE AND PHYSICAL CONDITIONS;
REFERENCE POINTS

4.01 *Availability of Lands*

A. OWNER shall furnish the Site. OWNER shall notify CONTRACTOR of any encumbrances or restrictions not of general application but specifically related to use of the Site with which CONTRACTOR must comply in performing the Work. OWNER will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If CONTRACTOR and OWNER are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in OWNER's furnishing the Site, CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

B. Upon reasonable written request, OWNER shall furnish CONTRACTOR with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and OWNER's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that ENGINEER has used in preparing the Contract Documents; and
2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except

Underground Facilities) that ENGINEER has used in preparing the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized:* CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER, or any of ENGINEER's Consultants with respect to:

1. the completeness of such reports and drawings for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by CONTRACTOR, and safety precautions and programs incident thereto; or
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
3. any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If CONTRACTOR believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which CONTRACTOR is entitled to rely as provided in paragraph 4.02 is materially inaccurate; or
2. is of such a nature as to require a change in the Contract Documents; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection

therewith (except in an emergency as required by paragraph 6.16.A), notify OWNER and ENGINEER in writing about such condition. CONTRACTOR shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *ENGINEER's Review:* After receipt of written notice as required by paragraph 4.03.A, ENGINEER will promptly review the pertinent condition, determine the necessity of OWNER's obtaining additional exploration or tests with respect thereto, and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER's findings and conclusions.

C. *Possible Price and Times Adjustments*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in CONTRACTOR's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in paragraph 4.03.A; and

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of paragraphs 9.08 and 11.03.

2. CONTRACTOR shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. CONTRACTOR knew of the existence of such conditions at the time CONTRACTOR made a final commitment to OWNER in respect of Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for CONTRACTOR prior to CONTRACTOR's making such final commitment; or

c. CONTRACTOR failed to give the written notice within the time and as required by paragraph 4.03.A.

3. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in paragraph 10.05. However, OWNER, ENGINEER, and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by CONTRACTOR on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities, including OWNER, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. OWNER and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and

2. the cost of all of the following will be included in the Contract Price, and CONTRACTOR shall have full responsibility for:

a. reviewing and checking all such information and data,

b. locating all Underground Facilities shown or indicated in the Contract Documents,

c. coordination of the Work with the owners of such Underground Facilities, including OWNER, during construction, and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility.

2. If ENGINEER concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price of Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that CONTRACTOR did not know of and could not reasonably have been expected to be aware of or to have anticipated. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, OWNER or CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

4.05 *Reference Points*

A. OWNER shall provide engineering surveys to establish reference points for construction which in ENGINEER's judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points

or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the ENGINEER in the preparation of the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized:* CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER or any of ENGINEER's Consultants with respect to:

1. the completeness of such reports and drawings for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto; or
2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
3. any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. CONTRACTOR shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. CONTRACTOR shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by CONTRACTOR, Subcontractors, Suppliers, or anyone else for whom CONTRACTOR is responsible.

D. If CONTRACTOR encounters a Hazardous Environmental Condition or if CONTRACTOR or anyone for whom CONTRACTOR is responsible creates a Hazardous Environmental Condition, CONTRACTOR shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such

condition and in any area affected thereby (except in an emergency as required by paragraph 6.16); and (iii) notify OWNER and ENGINEER (and promptly thereafter confirm such notice in writing). OWNER shall promptly consult with ENGINEER concerning the necessity for OWNER to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. CONTRACTOR shall not be required to resume Work in connection with such condition or in any affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by CONTRACTOR, either party may make a Claim therefor as provided in paragraph 10.05.

F. If after receipt of such written notice CONTRACTOR does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then OWNER may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in paragraph 10.05. OWNER may have such deleted portion of the Work performed by OWNER's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, OWNER shall indemnify and hold harmless CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, partners, employees, agents, other consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing in this paragraph

4.06.E shall obligate OWNER to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, other consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing in this paragraph 4.06.F shall obligate CONTRACTOR to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of paragraphs 4.02, 4.03, and 4.04 are not intended to apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 - BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. CONTRACTOR shall furnish performance and payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as provided otherwise by Laws or Regulations or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Contract Documents.

B. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

C. If the surety on any Bond furnished by CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.01.B, CONTRACTOR shall within 20 days thereafter substitute another Bond and surety, both of which shall comply with the requirements of paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All Bonds and insurance required by the Contract Documents to be purchased and maintained by OWNER or CONTRACTOR shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue Bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. CONTRACTOR shall deliver to OWNER, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by OWNER or any other additional insured) which CONTRACTOR is required to purchase and maintain. OWNER shall deliver to CONTRACTOR, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by CONTRACTOR or any other additional insured) which OWNER is required to purchase and maintain.

5.04 *CONTRACTOR's Liability Insurance*

A. CONTRACTOR shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR's performance of the Work and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed by CONTRACTOR, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained: (i) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (ii) by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance so required by this paragraph 5.04 to be purchased and maintained shall:

1. with respect to insurance required by paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insureds (subject to any customary exclusion in respect of professional liability) OWNER, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering CONTRACTOR's indemnity obligations under paragraphs 6.07, 6.11, and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least thirty days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the CONTRACTOR pursuant to paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when CONTRACTOR may be correcting, removing, or replacing defective Work in accordance with paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment (and CONTRACTOR shall furnish OWNER and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to OWNER and any such additional insured of continuation of such insurance at final payment and one year thereafter).

5.05 *OWNER's Liability Insurance*

A. In addition to the insurance required to be provided by CONTRACTOR under paragraph 5.04, OWNER, at OWNER's option, may purchase and maintain at OWNER's expense OWNER's own liability insurance as will protect OWNER against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, OWNER shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of

them, each of whom is deemed to have an insurable interest and shall be listed as an additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by OWNER prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by ENGINEER;

5. allow for partial utilization of the Work by OWNER;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by OWNER, CONTRACTOR, and ENGINEER with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. OWNER shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with paragraph 5.06 will contain a provision or endorsement that the coverage afforded will

not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with paragraph 5.07.

D. OWNER shall not be responsible for purchasing and maintaining any property insurance specified in this paragraph 5.06 to protect the interests of CONTRACTOR, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by CONTRACTOR, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If CONTRACTOR requests in writing that other special insurance be included in the property insurance policies provided under paragraph 5.06, OWNER shall, if possible, include such insurance, and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment. Prior to commencement of the Work at the Site, OWNER shall in writing advise CONTRACTOR whether or not such other insurance has been procured by OWNER.

5.07 *Waiver of Rights*

A. OWNER and CONTRACTOR intend that all policies purchased in accordance with paragraph 5.06 will protect OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. OWNER and CONTRACTOR waive all rights against each other and their respective officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary

Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by OWNER as trustee or otherwise payable under any policy so issued.

B. OWNER waives all rights against CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to OWNER's property or the Work caused by, arising out of, or resulting from fire or other peril whether or not insured by OWNER; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by OWNER during partial utilization pursuant to paragraph 14.05, after Substantial Completion pursuant to paragraph 14.04, or after final payment pursuant to paragraph 14.07.

C. Any insurance policy maintained by OWNER covering any loss, damage or consequential loss referred to in paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against CONTRACTOR, Subcontractors, ENGINEER, or ENGINEER's Consultants and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by paragraph 5.06 will be adjusted with OWNER and made payable to OWNER as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.08.B. OWNER shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on

account thereof, and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.

B. OWNER as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to OWNER's exercise of this power. If such objection be made, OWNER as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, OWNER as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, OWNER as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either OWNER or CONTRACTOR has any objection to the coverage afforded by or other provisions of the Bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by paragraph 2.05.C. OWNER and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the Bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent Bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but

the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. CONTRACTOR shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of OWNER or ENGINEER in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

B. At all times during the progress of the Work, CONTRACTOR shall assign a competent resident superintendent thereto who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the Site and shall have authority to act on behalf of CONTRACTOR. All communications given to or received from the superintendent shall be binding on CONTRACTOR.

6.02 *Labor; Working Hours*

A. CONTRACTOR shall provide competent, suitably qualified personnel to survey, lay out, and construct the Work as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday, or any legal holiday without OWNER's written consent (which will not be unreasonably withheld) given after prior written notice to ENGINEER.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the General Requirements, CONTRACTOR shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of OWNER. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. CONTRACTOR shall adhere to the progress schedule established in accordance with paragraph 2.07 as it may be adjusted from time to time as provided below.

1. CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.07) proposed adjustments in the progress schedule that will not result in changing the Contract Times (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of Article 12. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using

the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to ENGINEER for review under the circumstances described below.

1. *"Or-Equal" Items:* If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by ENGINEER as an "or-equal" item, in which case review and approval of the proposed item may, in ENGINEER's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment ENGINEER determines that: (i) it is at least equal in quality, durability, appearance, strength, and design characteristics; (ii) it will reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole, and;

b. CONTRACTOR certifies that: (i) there is no increase in cost to the OWNER; and (ii) it will conform substantially, even with deviations, to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items*

a. If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be

accepted by ENGINEER from anyone other than CONTRACTOR.

c. The procedure for review by ENGINEER will be as set forth in paragraph 6.05.A.2.d, as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances.

d. CONTRACTOR shall first make written application to ENGINEER for review of a proposed substitute item of material or equipment that CONTRACTOR seeks to furnish or use. The application shall certify that the proposed substitute item will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified, and be suited to the same use as that specified. The application will state the extent, if any, to which the use of the proposed substitute item will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute item and whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute item from that specified will be identified in the application, and available engineering, sales, maintenance, repair, and replacement services will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change, all of which will be considered by ENGINEER in evaluating the proposed substitute item. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute item.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by ENGINEER. CONTRACTOR shall submit sufficient information to allow ENGINEER, in ENGINEER's sole discretion, to determine that the

substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in subparagraph 6.05.A.2.

C. *Engineer's Evaluation:* ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.05.A and 6.05.B. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized until ENGINEER's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." ENGINEER will advise CONTRACTOR in writing of any negative determination.

D. *Special Guarantee:* OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute.

E. *ENGINEER's Cost Reimbursement:* ENGINEER will record time required by ENGINEER and ENGINEER's Consultants in evaluating substitute proposed or submitted by CONTRACTOR pursuant to paragraphs 6.05.A.2 and 6.05.B and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER approves a substitute item so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's Consultants for evaluating each such proposed substitute.

F. *CONTRACTOR's Expense:* CONTRACTOR shall provide all data in support of any proposed substitute or "or-equal" at CONTRACTOR's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. CONTRACTOR shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to OWNER as indicated in paragraph 6.06.B), whether initially or as a replacement, against whom OWNER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to OWNER in advance for acceptance by OWNER by a specified date

prior to the Effective Date of the Agreement, and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. CONTRACTOR shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of OWNER or ENGINEER to reject defective Work.

C. CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other individual or entity, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. CONTRACTOR shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR.

E. CONTRACTOR shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with ENGINEER through CONTRACTOR.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for CONTRACTOR by a Subcontractor or Supplier will be pursuant to an appropriate agreement between CONTRACTOR and the

Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in paragraph 5.06, the agreement between the CONTRACTOR and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against OWNER, CONTRACTOR, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, CONTRACTOR will obtain the same.

6.07 *Patent Fees and Royalties*

A. CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of OWNER or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees or agents, and other consultants of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all

construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto, such as plant investment fees.

6.09 *Laws and Regulations*

A. CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

B. If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, CONTRACTOR shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve CONTRACTOR of CONTRACTOR's obligations under paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work may be the subject of an adjustment in Contract Price or Contract Times. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in paragraph 10.05.

6.10 *Taxes*

A. CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by CONTRACTOR in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*

1. CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultant, and the officers, directors, partners, employees, agents, and other consultants of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against OWNER, ENGINEER, or any other party indemnified hereunder to the extent caused by or based upon CONTRACTOR's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work CONTRACTOR shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work CONTRACTOR shall clean the Site and make it ready for utilization by OWNER. At the completion of the Work CONTRACTOR shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures*: CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

A. CONTRACTOR shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to ENGINEER for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to ENGINEER for OWNER.

6.13 *Safety and Protection*

A. CONTRACTOR shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;
2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. CONTRACTOR shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property. All damage, injury, or loss to any property referred to in paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part,

by CONTRACTOR, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER or ENGINEER or ENGINEER's Consultant, or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them). CONTRACTOR's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

A. CONTRACTOR shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

A. CONTRACTOR shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, CONTRACTOR is obligated to act to prevent threatened damage, injury, or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If ENGINEER determines that a change in the Contract Documents is required because of the action taken by CONTRACTOR in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. CONTRACTOR shall submit Shop Drawings to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. All submittals will be identified as ENGINEER may require and in the number of copies specified in the General Requirements. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show ENGINEER the services, materials, and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by paragraph 6.17.E.

B. CONTRACTOR shall also submit Samples to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers, and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.17.E. The numbers of each Sample to be submitted will be as specified in the Specifications.

C. Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER as required by paragraph 2.07, any related Work performed prior to ENGINEER's review and approval of the pertinent submittal will be at the sole expense and responsibility of CONTRACTOR.

D. *Submittal Procedures*

1. Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:

a. all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

b. all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to means, methods, techniques, sequences, and procedures of

construction and safety precautions and programs incident thereto; and

d. CONTRACTOR shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to CONTRACTOR's review and approval of that submittal.

3. At the time of each submittal, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to ENGINEER for review and approval of each such variation.

E. *ENGINEER's Review*

1. ENGINEER will timely review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER. ENGINEER's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. ENGINEER's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. ENGINEER's review and approval of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation

from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of each submittal as required by paragraph 6.17.D.3 and ENGINEER has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.17.D.1.

F. *Resubmittal Procedures*

1. CONTRACTOR shall make corrections required by ENGINEER and shall return the required number of corrected copies of Shop Drawings and submit as required new Samples for review and approval. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals.

6.18 *Continuing the Work*

A. CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.04 or as OWNER and CONTRACTOR may otherwise agree in writing.

6.19 *CONTRACTOR's General Warranty and Guarantee*

A. CONTRACTOR warrants and guarantees to OWNER, ENGINEER, and ENGINEER's Consultants that all Work will be in accordance with the Contract Documents and will not be defective. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors, Suppliers, or any other individual or entity for whom CONTRACTOR is responsible; or
2. normal wear and tear under normal usage.

B. CONTRACTOR's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will

constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents:

1. observations by ENGINEER;
2. recommendation by ENGINEER or payment by OWNER of any progress or final payment;
3. the issuance of a certificate of Substantial Completion by ENGINEER or any payment related thereto by OWNER;
4. use or occupancy of the Work or any part thereof by OWNER;
5. any acceptance by OWNER or any failure to do so;
6. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER;
7. any inspection, test, or approval by others; or
8. any correction of defective Work by OWNER.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage:

1. is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom; and
2. is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose

acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such individual or entity.

B. In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of CONTRACTOR under paragraph 6.20.A shall not extend to the liability of ENGINEER and ENGINEER's Consultants or to the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

ARTICLE 7 - OTHER WORK

7.01 *Related Work at Site*

A. OWNER may perform other work related to the Project at the Site by OWNER's employees, or let other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to CONTRACTOR prior to starting any such other work; and

2. if OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in paragraph 10.05.

B. CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner (and OWNER, if OWNER is performing the other work with OWNER's employees) proper and safe access to the Site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, CONTRACTOR shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

C. If the proper execution or results of any part of CONTRACTOR's Work depends upon work performed by others under this Article 7, CONTRACTOR shall inspect such other work and promptly report to ENGINEER in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of CONTRACTOR's Work. CONTRACTOR's failure to so report will constitute an acceptance of such other work as fit and proper for integration with CONTRACTOR's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If OWNER intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
2. the specific matters to be covered by

such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, OWNER shall have sole authority and responsibility for such coordination.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.02 *Replacement of ENGINEER*

A. In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer to whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER.

8.03 *Furnish Data*

A. OWNER shall promptly furnish the data required of OWNER under the Contract Documents.

8.04 *Pay Promptly When Due*

A. OWNER shall make payments to CONTRACTOR promptly when they are due as provided in paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.01 and 4.05. Paragraph 4.02 refers to OWNER's identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by ENGINEER in preparing the Contract Documents.

8.06 *Insurance*

A. OWNER's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. OWNER is obligated to execute Change Orders as indicated in paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. OWNER's responsibility in respect to certain inspections, tests, and approvals is set forth in paragraph 13.03.B.

8.09 *Limitations on OWNER's Responsibilities*

A. The OWNER shall not supervise, direct, or have control or authority over, nor be responsible for, CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work. OWNER will not be responsible for CONTRACTOR's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. OWNER's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. If and to the extent OWNER has agreed to furnish CONTRACTOR reasonable evidence that financial arrangements have been made to satisfy OWNER's obligations under the Contract Documents, OWNER's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *OWNER'S Representative*

A. ENGINEER will be OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER's representative during construction are set forth

in the Contract Documents and will not be changed without written consent of OWNER and ENGINEER.

9.02 *Visits to Site*

A. ENGINEER will make visits to the Site at intervals appropriate to the various stages of construction as ENGINEER deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of CONTRACTOR's executed Work. Based on information obtained during such visits and observations, ENGINEER, for the benefit of OWNER, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. ENGINEER's efforts will be directed toward providing for OWNER a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defective Work.

B. ENGINEER's visits and observations are subject to all the limitations on ENGINEER's authority and responsibility set forth in paragraph 9.10, and particularly, but without limitation, during or as a result of ENGINEER's visits or observations of CONTRACTOR's Work ENGINEER will not supervise, direct, control, or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in providing more extensive observation of the Work. The responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in paragraph 9.10 and in the Supplementary Conditions. If OWNER designates another representative or agent to represent OWNER at the Site who is not ENGINEER's Consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Clarifications and Interpretations*

A. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents as ENGINEER may determine necessary, which shall be consistent with the intent of and reasonably inferable from the Contract Documents. Such written clarifications and interpretations will be binding on OWNER and CONTRACTOR. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a written clarification or interpretation, a Claim may be made therefor as provided in paragraph 10.05.

9.05 *Authorized Variations in Work*

A. ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER and also on CONTRACTOR, who shall perform the Work involved promptly. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of a Field Order, a Claim may be made therefor as provided in paragraph 10.05.

9.06 *Rejecting Defective Work*

A. ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be defective, or that ENGINEER believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER will also have authority to require special inspection or testing of the Work as provided in paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.07 *Shop Drawings, Change Orders and Payments*

A. In connection with ENGINEER's authority as to Shop Drawings and Samples, see paragraph 6.17.

B. In connection with ENGINEER's authority as to Change Orders, see Articles 10, 11, and 12.

C. In connection with ENGINEER's authority as to Applications for Payment, see Article 14.

9.08 *Determinations for Unit Price Work*

A. ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR the ENGINEER's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER's written decision thereon will be final and binding (except as modified by ENGINEER to reflect changed factual conditions or more accurate data) upon OWNER and CONTRACTOR, subject to the provisions of paragraph 10.05.

9.09 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work, the quantities and classifications of Unit Price Work, the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, and Claims seeking changes in the Contract Price or Contract Times will be referred initially to ENGINEER in writing, in accordance with the provisions of paragraph 10.05, with a request for a formal decision.

B. When functioning as interpreter and judge under this paragraph 9.09, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to this paragraph 9.09 with respect to any such Claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.07) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such Claim, dispute, or other matter.

9.10 *Limitations on ENGINEER's Authority and Responsibilities*

A. Neither ENGINEER's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or

performance of any authority or responsibility by ENGINEER shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. ENGINEER will not supervise, direct, control, or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work. ENGINEER will not be responsible for CONTRACTOR's failure to perform the Work in accordance with the Contract Documents.

C. ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. ENGINEER's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

E. The limitations upon authority and responsibility set forth in this paragraph 9.10 shall also apply to ENGINEER's Consultants, Resident Project Representative, and assistants.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Written Amendment, a Change Order, or a Work Change Directive. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If OWNER and CONTRACTOR are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A. CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in paragraph 3.04, except in the case of an emergency as provided in paragraph 6.16 or in the case of uncovering Work as provided in paragraph 13.04.B.

10.03 *Execution of Change Orders*

A. OWNER and CONTRACTOR shall execute appropriate Change Orders recommended by ENGINEER (or Written Amendments) covering:

1. changes in the Work which are: (i) ordered by OWNER pursuant to paragraph 10.01.A, (ii) required because of acceptance of defective Work under paragraph 13.08.A or OWNER's correction of defective Work under paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.18.A.

10.04 *Notification to Surety*

A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any Bond to be

given to a surety, the giving of any such notice will be CONTRACTOR's responsibility. The amount of each applicable Bond will be adjusted to reflect the effect of any such change.

10.05 *Claims and Disputes*

A. *Notice:* Written notice stating the general nature of each Claim, dispute, or other matter shall be delivered by the claimant to ENGINEER and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. Notice of the amount or extent of the Claim, dispute, or other matter with supporting data shall be delivered to the ENGINEER and the other party to the Contract within 60 days after the start of such event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of such Claim, dispute, or other matter). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to ENGINEER and the claimant within 30 days after receipt of the claimant's last submittal (unless ENGINEER allows additional time).

B. *ENGINEER's Decision:* ENGINEER will render a formal decision in writing within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any. ENGINEER's written decision on such Claim, dispute, or other matter will be final and binding upon OWNER and CONTRACTOR unless:

1. an appeal from ENGINEER's decision is taken within the time limits and in accordance with the dispute resolution procedures set forth in Article 16; or

2. if no such dispute resolution procedures have been set forth in Article 16, a written notice of intention to appeal from ENGINEER's written decision is delivered by OWNER or CONTRACTOR to the other and to ENGINEER within 30 days after the date of such decision, and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction within 60 days after the date of such decision or within 60 days after Substantial Completion, whichever is later (unless otherwise agreed in writing by OWNER and CONTRACTOR), to exercise such rights or remedies as the appealing party may have with

respect to such Claim, dispute, or other matter in accordance with applicable Laws and Regulations.

C. If ENGINEER does not render a formal decision in writing within the time stated in paragraph 10.05.B, a decision denying the Claim in its entirety shall be deemed to have been issued 31 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.

D. No Claim for an adjustment in Contract Price or Contract Times (or Milestones) will be valid if not submitted in accordance with this paragraph 10.05.

ARTICLE 11 - COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to CONTRACTOR will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. Such employees shall include without limitation superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be

included in the above to the extent authorized by OWNER.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

3. Payments made by CONTRACTOR to Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from subcontractors acceptable to OWNER and CONTRACTOR and shall deliver such bids to OWNER, who will then determine, with the advice of ENGINEER, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as CONTRACTOR's Cost of the Work and fee as provided in this paragraph 11.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of CONTRACTOR's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of CONTRACTOR.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by OWNER with the advice of ENGINEER, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by CONTRACTOR in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expressage, and similar petty cash items in connection with the Work.

i. When the Cost of the Work is used to determine the value of a Change Order or of a Claim, the cost of premiums for additional Bonds and insurance required because of the changes in the

Work or caused by the event giving rise to the Claim.

j. When all the Work is performed on the basis of cost-plus, the costs of premiums for all Bonds and insurance CONTRACTOR is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnerships and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by CONTRACTOR, whether at the Site or in CONTRACTOR's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.01.A.1 or specifically covered by paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the CONTRACTOR's fee.

2. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the Site.

3. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.

4. Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraphs 11.01.A and 11.01.B.

C. *CONTRACTOR's Fee:* When all the Work is performed on the basis of cost-plus, CONTRACTOR's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined

on the basis of Cost of the Work, CONTRACTOR's fee shall be determined as set forth in paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to paragraphs 11.01.A and 11.01.B, CONTRACTOR will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

11.02 *Cash Allowances*

A. It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums as may be acceptable to OWNER and ENGINEER. CONTRACTOR agrees that:

1. the allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. CONTRACTOR's costs for unloading and handling on the Site, labor, installation costs, overhead, profit, and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

B. Prior to final payment, an appropriate Change Order will be issued as recommended by ENGINEER to reflect actual amounts due CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER subject to the provisions of paragraph 9.08.

B. Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.

C. OWNER or CONTRACTOR may make a Claim for an adjustment in the Contract Price in accordance with paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect any other item of Work; and

3. if CONTRACTOR believes that CONTRACTOR is entitled to an increase in Contract Price as a result of having incurred additional expense or OWNER believes that OWNER is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the ENGINEER and the other party to the Contract in accordance with the provisions of paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in paragraph 11.01) plus a CONTRACTOR's fee for overhead and profit (determined as provided in paragraph 12.01.C).

C. *CONTRACTOR's Fee*: The CONTRACTOR's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under paragraphs 11.01.A.1 and 11.01.A.2, the CONTRACTOR's fee shall be 15 percent;

b. for costs incurred under paragraph 11.01.A.3, the CONTRACTOR's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and CONTRACTOR will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by CONTRACTOR to OWNER for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in CONTRACTOR's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in CONTRACTOR's fee shall be computed on the basis of the net change in accordance with para-

graphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times (or Milestones) may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Times (or Milestones) shall be based on written notice submitted by the party making the claim to the ENGINEER and the other party to the Contract in accordance with the provisions of paragraph 10.05.

B. Any adjustment of the Contract Times (or Milestones) covered by a Change Order or of any Claim for an adjustment in the Contract Times (or Milestones) will be determined in accordance with the provisions of this Article 12.

12.03 *Delays Beyond CONTRACTOR's Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in paragraph 12.02.A. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

12.04 *Delays Within CONTRACTOR's Control*

A. The Contract Times (or Milestones) will not be extended due to delays within the control of CONTRACTOR. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

12.05 *Delays Beyond OWNER's and CONTRACTOR's Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay.

12.06 *Delay Damages*

A. In no event shall OWNER or ENGINEER be liable to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from:

1. delays caused by or within the control of CONTRACTOR; or

2. delays beyond the control of both OWNER and CONTRACTOR including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

B. Nothing in this paragraph 12.06 bars a change in Contract Price pursuant to this Article 12 to compensate CONTRACTOR due to delay, interference, or disruption directly attributable to actions or inactions of OWNER or anyone for whom OWNER is responsible.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which OWNER or ENGINEER has actual knowledge will be given to CONTRACTOR. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

A. OWNER, ENGINEER, ENGINEER's Consultants, other representatives and personnel of OWNER, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

A. CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections,

tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. OWNER shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.04.B shall be paid as provided in said paragraph 13.04.B; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, CONTRACTOR shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish ENGINEER the required certificates of inspection or approval.

D. CONTRACTOR shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for OWNER's and ENGINEER's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to OWNER and ENGINEER.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by CONTRACTOR without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation.

F. Uncovering Work as provided in paragraph 13.03.E shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGI-

NEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's expense.

B. If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment. If it is found that such Work is defective, CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefor as provided in paragraph 10.05. If, however, such Work is not found to be defective, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times (or Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

13.05 *OWNER May Stop the Work*

A. If the Work is defective, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of OWNER to stop the Work shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

A. CONTRACTOR shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by ENGINEER, remove it from the Project and replace it with Work that is not defective. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for CONTRACTOR's use by OWNER or permitted by Laws and Regulations as contemplated in paragraph 6.11.A is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions: (i) repair such defective land or areas, or (ii) correct such defective Work or, if the defective Work has been rejected by OWNER, remove it from the Project and replace it with Work that is not defective, and (iii) satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or repaired or may have the rejected Work removed and replaced, and all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR.

B. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.

C. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

D. CONTRACTOR's obligations under this paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, OWNER (and, prior to ENGINEER's recommendation of final payment, ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to OWNER's evaluation of and determination to accept such defective Work (such costs to be approved by ENGINEER as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by CONTRACTOR pursuant to this sentence. If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and OWNER shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefor as provided in paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

13.09 *OWNER May Correct Defective Work*

A. If CONTRACTOR fails within a reasonable time after written notice from ENGINEER to correct defective Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.06.A, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days written notice to CONTRACTOR, correct and remedy any such deficiency.

B. In exercising the rights and remedies under this paragraph, OWNER shall proceed expeditiously. In connection with such corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the Site, take possession of all or part of the Work and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees, OWNER's other contractors, and ENGINEER and ENGINEER's Consultants access to the Site to enable OWNER to exercise the rights and remedies under this paragraph.

C. All Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by OWNER in exercising the rights and remedies under this paragraph 13.09 will be charged against CONTRACTOR, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, OWNER may make a Claim therefor as provided in paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of CONTRACTOR's defective Work.

D. CONTRACTOR shall not be allowed an extension of the Contract Times (or Milestones) because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies under this paragraph 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The schedule of values established as provided in paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments*

1. At least 20 days before the date established for each progress payment (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an Application for Payment filled out and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that OWNER has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect OWNER's interest therein, all of which must be satisfactory to OWNER.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of CONTRACTOR stating that all previous progress payments received on account of the Work have been applied on account to discharge CONTRACTOR's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to pro-gress payments will be as stipulated in the Agreement.

B. *Review of Applications*

1. ENGINEER will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to OWNER or return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make the necessary corrections and resubmit the Application.

2. ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER's observations on the Site of the executed Work as an experienced and qualified design professional and on ENGINEER's

review of the Application for Payment and the accompanying data and schedules, that to the best of ENGINEER's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.08, and to any other qualifications stated in the recommendation); and

c. the conditions precedent to CONTRACTOR's being entitled to such payment appear to have been fulfilled in so far as it is ENGINEER's responsibility to observe the Work.

3. By recommending any such payment ENGINEER will not thereby be deemed to have represented that: (i) inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents; or (ii) that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or entitle OWNER to withhold payment to CONTRACTOR.

4. Neither ENGINEER's review of CONTRACTOR's Work for the purposes of recommending payments nor ENGINEER's recommendation of any payment, including final payment, will impose responsibility on ENGINEER to supervise, direct, or control the Work or for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for CONTRACTOR's failure to comply with Laws and Regulations applicable to CONTRACTOR's performance of the Work. Additionally, said review or recommendation will not impose responsibility on ENGINEER to make any examination to ascertain how or for what purposes CONTRACTOR has used the moneys paid on account of the Contract Price, or to determine that title to any of the Work, materials, or

equipment has passed to OWNER free and clear of any Liens.

5. ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's opinion, it would be incorrect to make the representations to OWNER referred to in paragraph 14.02.B.2. ENGINEER may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Written Amendment or Change Orders;

c. OWNER has been required to correct defective Work or complete Work in accordance with paragraph 13.09; or

d. ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraph 15.02.A.

C. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to OWNER with ENGINEER's recommendation, the amount recommended will (subject to the provisions of paragraph 14.02.D) become due, and when due will be paid by OWNER to CONTRACTOR.

D. *Reduction in Payment*

1. OWNER may refuse to make payment of the full amount recommended by ENGINEER because:

a. claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where CONTRACTOR has delivered a specific Bond satisfactory to OWNER to secure the satisfaction and discharge of such Liens;

c. there are other items entitling OWNER to a set-off against the amount recommended; or

d. OWNER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.02.B.5.a through 14.02.B.5.c or paragraph 15.02.A.

2. If OWNER refuses to make payment of the full amount recommended by ENGINEER, OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action and promptly pay CONTRACTOR any amount remaining after deduction of the amount so withheld. OWNER shall promptly pay CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER's satisfaction the reasons for such action.

3. If it is subsequently determined that OWNER's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by paragraph 14.02.C.1.

14.03 *CONTRACTOR's Warranty of Title*

A. CONTRACTOR warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

A. When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Promptly thereafter, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If,

after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within 14 days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said 14 days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER in writing prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

B. OWNER shall have the right to exclude CONTRACTOR from the Site after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Use by OWNER at OWNER's option of any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which OWNER, ENGINEER, and CONTRACTOR agree constitutes a separately functioning and usable part of the Work that can be used by OWNER for its intended purpose without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work subject to the following conditions.

1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that such part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of

the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify OWNER and CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

2. No occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will promptly make a final inspection with OWNER and CONTRACTOR and will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment*

1. After CONTRACTOR has, in the opinion of ENGINEER, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, Bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in paragraph 6.12), and other documents, CONTRACTOR may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by subparagraph 5.04.B.7; (ii) consent of the surety, if any, to final payment; and (iii) complete and legally effective releases or waivers (satisfactory to OWNER) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in paragraph 14.07.A.2 and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full and an affidavit of CONTRACTOR that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

B. Review of Application and Acceptance

1. If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application for Payment to OWNER for payment. At the same time ENGINEER will also give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.09. Otherwise, ENGINEER will return the Application for Payment to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due

1. Thirty days after the presentation to OWNER of the Application for Payment and accompanying documentation, the amount recommended by ENGINEER will become due and, when due, will be paid by OWNER to CONTRACTOR.

14.08 Final Completion Delayed

A. If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed, and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 Waiver of Claims

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by OWNER against CONTRACTOR, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from CONTRACTOR's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by CONTRACTOR against OWNER other than those previously made in writing which are still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND
TERMINATION

15.01 OWNER May Suspend Work

A. At any time and without cause, OWNER may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes a Claim therefor as provided in paragraph 10.05.

15.02 OWNER May Terminate for Cause

A. The occurrence of any one or more of the following events will justify termination for cause:

1. CONTRACTOR's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.07 as adjusted from time to time pursuant to paragraph 6.04);
2. CONTRACTOR's disregard of Laws or Regulations of any public body having jurisdiction;
3. CONTRACTOR's disregard of the authority of ENGINEER; or
4. CONTRACTOR's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in paragraph 15.02.A occur, OWNER may, after giving CONTRACTOR (and the surety, if any) seven days written notice, terminate the services of CONTRACTOR, exclude CONTRACTOR from the Site, and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case, CONTRACTOR shall not be

entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by OWNER arising out of or relating to completing the Work, such excess will be paid to CONTRACTOR. If such claims, costs, losses, and damages exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such claims, costs, losses, and damages incurred by OWNER will be reviewed by ENGINEER as to their reasonableness and, when so approved by ENGINEER, incorporated in a Change Order. When exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

C. Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

15.03 OWNER May Terminate For Convenience

A. Upon seven days written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy of OWNER, elect to terminate the Contract. In such case, CONTRACTOR shall be paid (without duplication of any items):

1. for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
2. for expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
3. for all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. for reasonable expenses directly attributable to termination.

B. CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *CONTRACTOR May Stop Work or Terminate*

A. If, through no act or fault of CONTRACTOR, the Work is suspended for more than 90 consecutive days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within 30 days after it is submitted, or OWNER fails for 30 days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days written notice to OWNER and ENGINEER, and provided OWNER or ENGINEER do not remedy such suspension or failure within that time, terminate the Contract and recover from OWNER payment on the same terms as provided in paragraph 15.03. In lieu of terminating the Contract and without prejudice to any other right or remedy, if ENGINEER has failed to act on an Application for Payment within 30 days after it is submitted, or OWNER has failed for 30 days to pay CONTRACTOR any sum finally determined to be due, CONTRACTOR may, seven days after written notice to OWNER and ENGINEER, stop the Work until payment is made of all such amounts due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.04 are not intended to preclude CONTRACTOR from making a Claim under paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping the Work as permitted by this paragraph.

ARTICLE 16 - DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Dispute resolution methods and procedures, if any, shall be as set forth in the Supplementary Conditions. If no method and procedure has been set forth, and subject to the provisions of paragraphs 9.09 and 10.05, OWNER and CONTRACTOR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

ARTICLE 17 - MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Agreement.

17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

DOCUMENT 007314

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (EJCDC No. 1910-8, 1996 ed.) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

SC-1.

The terms used in these Supplementary Conditions which are defined in the Standard General Conditions of the Construction Contract (EJCDC No. 1910-8, 1996 ed.) have the meanings assigned to them in the General Conditions.

SC-4.02 – Subsurface and Physical Conditions

No reports of explorations and tests of subsurface conditions at the various work sites have been or will be conducted by the Owner.

SC-5 – Insurance

Under Section 5.02, delete any reference to the Owner purchasing or otherwise providing any coverage associated with this project.

Under Section 5.03, Insurance provided by the Contractor, List the names or other parties or entities to be included as additional insured, Provo School District.

Under Section 5.04, The limits of liability for the insurance required by the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

Worker's Compensation, etc., under paragraphs 5.04A and 5.04B shall be the statutory required coverages.

Comprehensive General Liability, under paragraphs 5.04A and 5.04B shall also include completed operations, and product liability coverage, and eliminate the exclusion with respect to property under the care, custody, and control of the CONTRACTOR.

- | | |
|---|-------------|
| 1. General Aggregate (Except Products – Completed Operations) | \$1,000,000 |
| 2. Products – Completed Operations Aggregate | \$1,000,000 |
| 3. Personal and Advertising Injury (Per person/organization) | \$1,000,000 |

- 4. Each Occurrence (Bodily Injury and Property Damage) \$1,000,000
- 5. Property Damage Liability Insurance will provide Explosion, Collapse, and Underground Coverage, where applicable \$1,000,000

Automobile Liability:

- 1. Bodily Injury (each occurrence) \$1,000,000
- 2. Property Damage – Statutory or combined single limit (each occurrence) \$1,000,000
- 3. Combined Single Limit (Bodily Injury and Property Damage (each accident) \$1,000,000

SC-5.04B7 Revise the third line of paragraph 5.04B.7 to read as follows:
“....for at least four years after...”

SC-5.04B Add a new paragraph as follows:

- 8. Contain a provision or endorsement that the coverage’s and limits afforded will apply exclusively to claims which may arise out of or result from Contractor’s performance and furnishing of the Work and Contractor’s other obligations under the Contract Documents, whether it is performed or furnished by Contractor, or a subcontractor, Supplier, or by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone else for whose acts any of them may be liable.

SC-5.05 The Contractual Liability coverage required in paragraph 5.05 shall provide coverage for not less than the following amounts:

- General Aggregate: \$1,000,000
- Each Occurrence (Bodily Injury and Property Damage) \$1,000,000

SC-5.06 Delete paragraph 5.06 in its entirety, and insert the following in its place:

- A. Contractor shall purchase and maintain property insurance upon Work at the site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplemental Conditions or required by Laws and Regulations). This insurance shall:
 - 1. Include the interests of OWNER, Contractor, subcontractors, and any other persons or entities identified in the Supplemental

- Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;
2. Builder's Risk, special peril, or risk of loss policy form that shall at least include insurance for physical loss and damage to the Work, temporary buildings, false work and Work in transit is not required;
 3. Include expenses incurred in the repair of replacement or any insured property (including, but not limited to fees and charges of engineers and architect);
 4. Cover materials and equipment in transit for incorporation in the Work, or stored at the site or at another location that was agreed to in writing by OWNER prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by the Engineer; and
 5. Be maintained in effect until final payment is made unless otherwise agreed to in writing by OWNER, Contractor, and Engineer with thirty days written notice to each other additional insured to whom a certificate of insurance has been issued.
- B. The policies of insurance to be purchased and maintained by Contractor in accordance with this paragraph shall comply with the requirements of 5.08.

SC-6.01B Add a new sentence to the end of paragraph 6.01B as follows:
"If, during the performance of the Work, the OWNER determines that the Contractor has provided an incompetent resident superintendent, the OWNER shall notify the Contractor in writing, and the Contractor shall replace the resident superintendent within (7) seven days with a competent resident superintendent.

SC-6.06B Add a new paragraph to the end of paragraph 6.06Bm as follows:

1. CONTRACTOR shall not be permitted, without the express written authorization of the OWNER, to subcontract more than 50% of the CONTRACTOR's Work. Said percentage shall be computed by dividing the summation of the total cost for all subcontracted Work by the CONTRACTOR's price, or the summation of all of the total man-hours for all subcontracted WORK by the total CONTRACTOR'S man-hours, whichever is less.
2. The CONTRACTOR shall not be permitted, without the express written permission of OWNER, to subcontract more than thirty percent (30%) of the CONTRACTOR'S Work to any one subcontractor. Said percentage shall be computed by dividing subcontractor's total cost by the

CONTRACTOR'S total contract price, or by dividing subcontractor's total man-hours by the CONTRACTOR'S total man-hours, whichever is less.

SC-6.08A **Delete** the first sentence of paragraph 6.08A, and substitute the following sentence:

Unless otherwise provided for in Section 01005, Administrative Provisions, Contractor shall obtain and pay for all construction permits and licenses required by law or ordinance.

SC-19A **Revise** paragraph 6.19A to read as follows:

A. Contractor warrants and guarantees to.....and will not be defective. The warranty period will be for a minimum of two (2) years, beginning at the date of final acceptance of the WORK, each year. Contractor's warranty and guarantee hereunder excludes defects of damage caused by:

SC-6.20A **Delete** paragraph 6.20A in its entirety and insert the following in its place:

A. To the fullest extent permitted by Law or Regulation, the Contractor shall indemnify hold harmless, and defend the OWNER, its agents, engineers, consultants, officers, employees, volunteers, and each of them (hereinafter referred individually and collectively as the "Indemnitees") from and against any and all liability claims, damages, injury, of any kind, or nature whatsoever (including death) and cost of defense to any person or property (including, without limitation, claims for injury to or death to any employees of Contractor, subcontractor, or Supplier) which result from, arise out of, or occur in connection with the execution of the WORK, whether or not such claims are based upon actual or alleged active or passive negligence or wrongdoing of any Indemnatee, except the Contractor shall not be required to indemnify an Indemnatee against a claim or loss that is the result of the Indemnatee's sole negligence or willful conduct. Contractor shall indemnify Indemnitees from and against all loss, cost, expense, liability, damage, or injury, including legal fees, that Indemnatee may directly or indirectly sustain, suffer or incur as a result thereof, and the Contractor agrees to and does hereby assume on behalf of Indemnitees the defense of any action at law of inequity which may be brought against Indemnitees by reason of such claim, and will pay on behalf of Indemnitees, upon their demand, the amount of any judgment that may be entered against Indemnitees or any of them in any such action. In the event that any such claims, loss, expenses, liability, damage or injury arise of, are made asserted to, or threatened against an Indemnatee for which the insurer of Contractor does not admit coverage, or if the OWNER deems such coverage to be inadequate, the OWNER shall have

the right to withhold any payments due to or to become due to the Contractor, an amount sufficient to protect Indemnitees from such claims, loss, costs, expense, liability, damage, or injury, including legal fees. The Contractor will require any and all subcontractors and suppliers to conform with the provisions of this clause prior to commencing any WORK and agrees to insure this clause is in conformity with Article 5, Bonds and Insurance, herein.

SC-8.02 **Add** the following paragraph 8.02B:

- B. Work on the project shall cease in such an event until a new ENGINEER is appointed and is on site.

SC-6.11.03C **Delete** paragraph 11.03C in its entirety, and insert the following in its place:

- C. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:
1. If the quantity of a particular item of Unit Price Work amounts to more than 200% above the estimated quantity indicated on the bid schedule; and
 2. If there is not corresponding adjustment with respect to any other item of Work; and
 3. If the CONTRACTOR believes that the CONTRACTOR has incurred additional expense as a result thereof; or, if OWNER believes that the quantity variation entitles OWNER to an adjustment in the unit price, either the OWNER or CONTRACTOR may make a claim for an adjustment in the Contract Price, in accordance with Article 11 if the parties are unable to agree as to the effect of any variation in the quantity of Unit Price Work performed.

SC-6.17.06 **Add** the following paragraph 14.06 to read as follows:

- 17.06 Survivability. If any provision or portion of the Contract Documents is held to be unconstitutional, invalid, or otherwise unenforceable, the rest of **the Contract Documents shall remain in full force and effect, and shall in** no way be affected, impaired, or invalidated. However, in such an event, the OWNER reserves the right at its sole option to declare the Contract void and to enter into negotiations with the CONTRACTOR for a new Contract.

END OF SECTION

**DOCUMENT 009113
BID & CONTRACT ADDENDA**

Addendum No. 1 _____ **(date)** _____
Addendum No. 2 _____
Addendum No. 3 _____
Addendum No. 4 _____

PART 01
GENERAL REQUIREMENTS

SECTION 011100 – SUMMARY OF WORK

PART 1 GENERAL

1.01 GENERAL CONDITIONS

- A. The work to be performed under this project shall consist of furnishing all labor, materials, and equipment necessary or required to complete the work in all respects as shown on the plans and as herein specified. All work, materials, and services not expressly shown or called for in the Contract Documents that may be necessary to complete the construction of the work in good faith shall be performed, furnished, and installed by CONTRACTOR as though originally so specified or shown, at no increase in cost to OWNER.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work for this contract comprises general construction which includes, demolition of existing hardscape, asphalt removal, earthwork and grading, hardscape improvements, asphalt paving, drainage improvements, and landscape improvements.

1.01 CONTRACT METHOD

- A. The work hereunder will be constructed under a unit price contract.
- B. CONTRACTOR shall include the General Conditions and Supplementary Conditions of the Contract as a part of all of its subcontract agreements.

1.02 WORK SEQUENCE

- A. The contract time for substantial and final completion is as indicated in the Agreement (Section 00521), and is on a calendar day basis commencing from the date of the Notice to Proceed.

1.03 CONTRACTOR USE OF PROJECT SITE

- A. CONTRACTOR shall be responsible for obtaining and securing a project site to serve as a construction yard. CONTRACTOR's use of the project site shall be limited to its construction operations, including on-site storage of materials, on-site fabrication facilities, and field offices.

1.04 PROJECT SECURITY

- A. CONTRACTOR shall make all necessary provisions to protect the project and CONTRACTOR's facilities from fire, theft, and vandalism, and the public from unnecessary exposure to injury.

1.05 CHANGES IN THE WORK

- A. It is mutually understood that it is inherent in the nature of municipal construction that some changes in the plans and specifications may be necessary during the course of construction to adjust them to field conditions, and that it is of the essence of the Contract to recognize a normal and expected margin of change. The ENGINEER shall have the right to make such changes, from time to time, in the plans, in the character of the work, and in the scope of the project as may be necessary or desirable to ensure the completion of the work in the most satisfactory manner without invalidating the Contract. A change order for work to be changed shall be submitted to the ENGINEER for approval. CONTRACTOR shall be paid only for the work included in the change order by OWNER if approved.

- END OF SECTION -

SECTION 012000 - MEASUREMENT AND PAYMENT

PART 1- GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Schedule of Values
- B. Application for Payment
- C. Unit Price Items

1.02 SCHEDULE OF VALUES

- A. In accordance with article 2.05 of the General Conditions, submit schedule of values for items of work in project within 15 days of date of Contract for review and approval.

1.03 APPLICATION FOR PAYMENT

- A. Submit three copies of each application for payment under procedures of Section 01300 on approved form in accordance with Article 14 of the General Conditions based on approved schedule of values.

1.04 UNIT PRICE ITEMS

- A. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made in accordance with Article 9.08 of the General Conditions and in accordance with individual Sections of Specifications.
- B. Payment will be for actual quantities and at the price stated in the Bid. Estimated quantities in the Bid are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Owner shall reserve the right to eliminate the work covered by any unit price bid item, should he decide it is in his best interest to do so. Contractor shall make no claim for anticipated profits or additional compensation for any elimination of unit price items.
- C. Bid prices for unit price items represent the total cost to the Owner. Such price shall constitute full compensation for furnishing and placing of materials required to complete the item, and for all labor, equipment, tools and incidentals needed to complete the work in conformity with the plans and specifications.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 METHOD OF PAYMENT

1. **Mobilization:** This item is to include all of the costs associated with mobilizing equipment needed to perform all work associated with this project. The cost of this item shall include all tools, equipment, traffic control, erosion control, labor, materials, bonds and appurtenances necessary to complete the WORK as described in the Technical Specifications contained herein.

Payment to be made under: **Mobilization.....per Lump Sum**

2. **Remove Existing Curb and Gutter:** This item shall include saw cutting, removal and proper disposal of existing curb and gutter, and 8” of basesource . Cost of this item shall include all labor, equipment, and materials necessary to remove and properly dispose existing concrete curb and gutter including necessary saw cuts.

Payment to be made under: **Remove Existing Curb and Gutter..... per Linear Foot**

3. **Sawcut and Remove Asphalt:** This item shall include sawcutting, removal and proper disposal of existing asphalt and 8” of basecourse. Cost of this item shall include all labor, equipment, materials and disposal fees necessary to remove and properly dispose of existing asphalt and basecourse. Asphalt thickness is approximately 3”.

Payment to be made under: **Sawcut and Remove Asphalt..... per Square Foot**

4. **Remove Concrete Flatwork and Sidewalk:** This item shall include saw cutting, removal and proper disposal of existing concrete flatwork and sidewalk and removal of basecourse to a thickness of 6”. Cost of this item shall include all labor, equipment, materials, and disposal fees necessary to remove and properly dispose the existing concrete flatwork and sidewalk including necessary saw cuts. Concrete thickness varies between 4” – 6” inches.

Payment to be made under: **Remove Concrete Flatwork and Sidewalk..... per Square Foot**

5. **Install 18” CLASS III RCP Storm Drain Pipe (A-1a or A-1b Bedding and fill):** This item shall include furnishing and installing 18” RCP storm drain pipe. Cost of this item shall include all labor, excavation, dewatering, shoring, equipment, materials, grouting pipes as indicated in details, A-1a or A-1b as bedding and backfill; backfilling, compacting; traffic control; restoration of all surface improvements; and all other appurtenant work, complete.

Payment to be made under: **Install 18” CLASS III RCP Storm Drain Pipe (A-1a or A-1b Fill and Bedding):..... per Each Lineal Foot**

6. **Install SDCB-Curb:** This item shall include excavating, dewatering, providing 6” of gravel base, furnishing and installing new storm drain catch basin with steel reinforcement, frame and hooded grate; furnishing import fill, backfilling and compacting import fill. The cost of this item shall include all tools, materials, equipment, labor, and incidentals necessary to complete this item. Restoration of existing improvements, if needed, is also included in this item and for this unit price.

Payment to be made under: **Install Cast in Place SDCB-Curb per Each**

- 7. **Install Square SDCB- w/Grate:** This item shall include excavating, dewatering, providing 6” of gravel base, furnishing and installing new square storm drain catch basin with steel reinforcement, frame and grate; furnishing import fill, backfilling and compacting import fill. The cost of this item shall include all tools, materials, equipment, labor, and incidentals necessary to complete this item. Restoration of existing improvements, if needed, is also included in this item and for this unit price.

Payment to be made under: **Install Square SDCB – w/Grate..... per Each**

- 8. **Install Cast in Place Storm Drain Clean Out:** This item shall include excavating/exposing the existing storm drain pipe, saw cutting pipe as required, dewatering, providing 6” of gravel base, forming and pouring new storm drain clean out with steel reinforcement, frame and cover; furnishing import fill, backfilling and compacting import fill. The cost of this item shall include all tools, materials, equipment, labor, and incidentals necessary to complete this item. Restoration of existing improvements, if needed, is also included in this item and for this unit price.

Payment to be made under: **Install Cast in Place Storm Drain Clean Out..... per Each**

- 9. **Modify Existing Storm Drain Box:** This item shall include excavating/exposing the existing storm drain box, saw cutting box as required, steel reinforcement, forming and pouring new box top with frame and cover. The cost of this item shall include all tools, materials, equipment, labor, and incidentals necessary to complete this item. Restoration of existing improvements, if needed, is also included in this item and for this unit price.

Payment to be made under: **Modify Existing Storm Drain Box: per Each**

- 10. **4’ Wide Concrete Waterway:** This item shall include the installation of a 4’ wide concrete waterway, 8” untreated base course, steel reinforcement, and any grading/installation/removal of subbase material according to the drawings and technical specifications contained herein. Cost of this item shall include all tools, equipment, labor, materials, excavation, compaction, removal and disposal of unsuitable materials, curing, clean-up, disposal fees, traffic control, testing, forming, and all incidentals necessary to complete this work. Restoration of any existing improvements (where and if needed) including but not limited to: sod, plantings, and irrigation systems, is also included in this Work and at this price.

Payment to be made under: **Install 4’ Wide Concrete Waterway..... per Linear Foot**

- 11. **Install 8” Untreated Base Course:** This item shall include all preparatory work in relation to installing 8” of UBC under the asphalt section. The cost of this item shall include all tools, equipment, labor, materials, machinery, and appurtenant work necessary to complete the work in accordance with the Technical Specifications and Stand Drawings, as contained herein.

Restoration of existing improvements, if needed, is also included in this item and for this unit price.

Payment to be made under: **Install Base Course: per Square Foot**

- 12. Install 4" Thick Sidewalk/Flatwork:** This item shall include the installation of 4" thick concrete sidewalk and 4" untreated base course, and any grading/installation/removal of subbase material according to the drawings and technical specifications contained herein. Cost of this item shall include all tools, equipment, labor, materials, curing, clean-up, fees, traffic control, testing, forming, and all incidentals necessary to complete this work. Restoration of any existing improvements (where and if needed) including but not limited to: sod, plantings, and irrigation systems, is also included in this Work and at this price.

Payment to be made under: **Install 4" Thick Sidewalk/Flatwork..... per Square Foot**

- 13. Install Concrete Drive Approach:** This item shall include the installation of 6" thick concrete flatwork and 6" untreated base course, and any grading/installation/removal of subbase material according to the drawings and technical specifications contained herein. Cost of this item shall include all tools, equipment, labor, materials, curing, clean-up, fees, traffic control, testing, forming, and all incidentals necessary to complete this work. Restoration of any existing improvements (where and if needed) including but not limited to: sod, plantings, and irrigation systems, is also included in this Work and at this price.

Payment to be made under: **Install Concrete Drive Approach..... per Square Foot**

- 14. Install APWA Type E Curb and Gutter:** This item shall include the installation of type E curb and gutter, 6" untreated base course and any grading/installation/removal of subbase material according to the drawings and technical specifications contained herein. Cost of this item shall include all tools, equipment, labor, materials, curing, clean-up, fees, traffic control, testing, forming, and all incidentals necessary to complete this work. Restoration of any existing improvements (where and if needed) including but not limited to: sod, plantings, and irrigation systems, is also included in this Work and at this price.

Payment to be made under: **Install Type E Curb and Gutter... per Linear Foot**

- 15. Install Reverse Pan Curb and Gutter:** This item shall include the installation of reverse pan curb and gutter, 6" untreated base course and any grading/installation/removal of subbase material according to the drawings and technical specifications contained herein. Cost of this item shall include all tools, equipment, labor, materials, curing, clean-up, fees, traffic control, testing, forming, and all incidentals necessary to complete this work. Restoration of any existing improvements (where and if needed) including but not limited to: sod, plantings, and irrigation systems, is also included in this Work and at this price.

Payment to be made under: **Install Reverse Pan Curb and Gutter... per Linear Foot**

- 16. Install Landscape Improvements:** This item shall include the installation of new and restoration of all existing landscaping improvements disturbed during the construction of the new

improvements. Cost shall include sod in disturbed places including utility/other disturbance, and sod in new locations of the site. Installing new and reconnecting sprinkling systems is also included in this cost. Contractor is responsible to keeping landscaping alive for one month after installation. Cost shall include all labor, tools, materials, machinery, equipment and appurtenant necessary to complete the work.

Payment to be made under: **Install Landscape Improvements per Lump Sum**

- 17. **Install ADA Access Ramp:** This item shall include the installation of these materials and utilities according to the plan set and documents found herein. The contractor shall verify the location within the plan set. Sidewalk adjacent to ADA ramps is included in a separate line item. Cost of Curb and gutter adjacent to ADA Ramp shall be included in a separate line item. The cost of this item shall include all tools, equipment, labor, materials, grading, saw cutting and appurtenances necessary to complete the work as described in the Plan Set and Technical Specifications contained herein. Restoration of existing improvements (where and if needed) is also included in this WORK, and for this price.

Payment to be made under: **Install ADA Access Ramp..... per Each**

- 18. **Install Handicap Accessible Ramp and Railing:** This item shall include the installation of a handicap accessible ramp, railing (per ADA standards), modifying existing railing, basecourse, steel reinforcement, and any grading/installation/removal of subbase material according to the drawings and technical specifications contained herein. Cost of this item shall include all tools, equipment, labor, materials, excavation, compaction, removal and disposal of unsuitable materials, curing, clean-up, disposal fees, traffic control, testing, forming, and all incidentals necessary to complete this work. Restoration of any existing improvements (where and if needed) including but not limited to: sod, plantings, and irrigation systems, is also included in this Work and at this price.

Payment to be made under: **Handicap Accessible Ramp and Railing per Lump Sum**

- 19. **Electrical Light Poles (Double Head) Per Plan:** This item shall include furnishing and installation of all electrical and pole installation and removal per plan. Shall include cost of removal of poles, installation of poles, conduit, and all other related appurtenances to the electrical/lighting plan. Cost of this item shall include all labor, excavation, removal and disposal of excavated materials, forming and pouring new concrete base with the required reinforcement, new power cable and conduit, equipment, materials, disposal fees and appurtenances necessary to complete the work as described in the Plan Set and Technical Specifications contained herein.

Payment to be made under: **Install New Light Poles..... per Each**

- 20. **Electrical Conduit, Conductor, Connections & Tie-Ins:** This bid item shall include all materials, equipment, operations, and labor necessary to provide and install all electrical conduit and conductor as shown on the Electrical Drawings and required by the Project Specifications. This bid item shall specifically include but is not limited to all site preparations required for electrical improvements, earthwork, trenching, backfill, junction boxes, light controllers, wiring, conduit, conductor, connections to main power, coring, and other necessary improvements as indicated by the Electrical Drawings and Project Specifications. This bid item shall also include

all connections, tie-ins, and circuitry that pertain to a fully functional parking lot lighting system as intended and shown on the Electrical Drawings and required by the Project Specifications.

Payment to be made under: **Electrical Conduit, Conductor, Connections & Tie-Ins
..... per Lump Sum**

21. Install Striping and Roadway Messaging: This item shall include the installation of all parking stall striping (including handicap stalls), direction arrows, lane striping, 1’ wide cross walk striping and 2.5’ tall lettering reading at multiple locations. The cost of these item shall include all tools, materials, paint, equipment, labor, and incidentals necessary to complete this work. Restoration of existing improvements (where and if needed), is also included in this work and at the same price.

Payment to be made under: **Install Striping and Roadway Messaging..... per Lump Sum**

22. Install Signage: This item shall include the installation of all signage contained in the planset. Shall include sign, post, installation. The cost of these item shall include all tools, materials, paint, equipment, labor, and incidentals necessary to complete this work. Restoration of existing improvements (where and if needed), is also included in this work and at the same price.

Payment to be made under: **Install Signage..... per Each**

23. Install 3” HMA: This item shall include all labor, equipment and materials required to furnish and install 3” of hot mix asphalt per specifications grading and all preparatory work in relation to installing 3” asphalt. The cost of this item shall include all tools, materials, equipment, labor, compacting, machinery, testing, clean-up, and all other appurtenant work necessary to complete the work in accordance with the Technical Specifications and Drawings, as contained herein. Restoration of existing improvements, if needed, is also included in this item and for this unit price.

Payment to be made under: **Install 3” HMA..... per Square Foot**

24. Remove Tennis Court Fencing, Bollards, Stairs, Curbs, Walls: This item shall include all labor, equipment required to remove and properly dispose of fencing, bollards, stairs, curbs, walls, and other appurtenances related to the tennis courts. Concrete flatwork removal shall be included in item #4. Material under the flatwork shall be included in item #25. The cost of this item shall include all tools, materials, equipment, labor, compacting, machinery, testing, clean-up, and all other appurtenant work necessary to complete the work in accordance with the Technical Specifications and Drawings, as contained herein. Restoration of existing improvements, if needed, is also included in this item and for this unit price.

Payment to be made under: **Remove Tennis Court Fencing, Bollards, Stairs, Curbs, Walls per Lump Sum**

25. Remove Cut Material: This item shall include all labor, equipment required to remove and properly dispose of material underneath the basecourse for the concrete and pavement sections. The cost of this item shall include all tools, materials, equipment, labor, compacting, machinery, testing, clean-up, and all other appurtenant work necessary to complete the work in accordance with the Technical Specifications and Drawings, as contained herein. Restoration of existing improvements, if needed, is also included in this item and for this unit price.

Payment to be made under: **Remove Cut Material..... per Square Foot**

26. Import Structural Fill: This item shall include all labor, equipment required to import and install structural fill underneath concrete and pavement sections to the depth indicated by the Engineer. The cost of this item shall include all tools, materials, equipment, labor, compacting, machinery, testing, clean-up, and all other appurtenant work necessary to complete the work in accordance with the Technical Specifications and Drawings, as contained herein. Restoration of existing improvements, if needed, is also included in this item and for this unit price.

Payment to be made under: **Import Structural Fill..... per Cubic Yard**

27. Irrigation Improvement Allowance: This item is an allowance item for the contractor to repair existing irrigation systems once, demolition is complete on the site. Given the unknown nature on where the irrigation systems are currently, the contractor shall expect coordination efforts with the school district to determine the best approach on repairing the irrigation system. This line item shall only be used at the discretion of the Engineer and Owner.

Payment to be made under: **Irrigation Improvements Allowance..... per Allowance**

28. Soft Spot Allowance: This item shall be used to cover unforeseen soft spots in the concrete on asphalt subbase. The contractor shall notify the engineer immediately if there is a soft spot encountered. This line item shall only be used at the discretion of the Engineer and Owner.

Payment to be made under: **Soft Spot Allowance..... per Allowance**

29. CONSTRUCTION STAKING: Ensign will provide construction staking at the price shown at the contractor's expense. Staking shall include all locations and elevations for improvements. Contractor shall give Ensign 2 weeks' notice for staking.

Payment to be made under: **CONSTRUCTION STAKING.....per Lump Sum**

END OF SECTION 012000

SECTION 013113 - COORDINATION

PART 1 GENERAL

1.01 GENERAL

- A. The OWNER and/or utility owners may be working within the project area while this contract is in progress. If so, the CONTRACTOR shall schedule his work in conjunction with these other entities to minimize mutual interference.
- B. CONTRACTOR shall notify ENGINEER of the schedule for materials testing required by CONTRACTOR in Section 01440 a minimum of 24 hours in advance in order to provide ENGINEER time for scheduling of desired Quality testing.
- C. CONTRACTOR shall notify Owners of Private right-of-ways 72 hours prior to work being performed across Owners' rights-of-way.
- D. The CONTRACTOR's normal working hours shall be within the hours of 7 AM to 6 PM. Exceptions of normal working hours may be approved by the ENGINEER based on request from the CONTRACTOR.

- END OF SECTION -

SECTION - 013119 PROJECT MEETINGS

PART 1 GENERAL

1.01 PRECONSTRUCTION CONFERENCE

- A. Prior to the commencement of work at the site, a preconstruction conference will be held at a mutually agreed time and place which shall be attended by CONTRACTOR, its superintendent, and its subcontractors as appropriate. Other attendees will be:
1. ENGINEER and the Resident Project Representative (RPR).
 2. Representatives of OWNER.
 3. Governmental representatives as appropriate.
 4. Others as requested by CONTRACTOR, OWNER, or ENGINEER.
- B. Unless previously submitted to ENGINEER, CONTRACTOR shall bring to the conference one copy of each of the following:
1. Progress schedule.
 2. Procurement schedule of major equipment and materials and items requiring long lead time.
 3. Shop Drawings/Sample/Substitute or "Or Accepted equal" submittal schedule.
- C. The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The complete agenda will be furnished to CONTRACTOR prior to the meeting date, which may include the following:
1. CONTRACTOR's tentative schedules.
 2. Transmittal, review, and distribution of CONTRACTOR's submittals.
 3. Processing applications for payment.
 4. Maintaining record documents.
 5. Critical work sequencing.
 6. Field decisions and Change Orders.
 7. Use of project site, office and storage areas, security, housekeeping, and OWNER's needs.
 8. Major equipment deliveries and priorities.
 9. CONTRACTOR's assignments for safety and first aid.
- D. ENGINEER will preside at the preconstruction conference and will arrange for keeping the minutes and distributing the minutes to all persons in attendance.

1.02 PROGRESS MEETINGS

- A. CONTRACTOR shall schedule and hold regular on-site progress meetings at least weekly and at other times as required by ENGINEER or as required by progress of the work. CONTRACTOR, ENGINEER, and all subcontractors active on the site shall be represented at each meeting. CONTRACTOR may at its discretion request attendance by representatives of its suppliers, manufacturers, and other subcontractors.
- B. ENGINEER shall preside at the meetings and provide for keeping and distribution of the minutes. The purpose of the meetings will be to review the progress of the work, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop.
- C. At each construction progress meeting a progress report shall be presented by the CONTRACTOR containing an updated Progress Schedule. Where the delayed completion data of a project phase is noted, the Contractor shall describe the anticipated delays or problems and outline the action plan being taken to counter their effect.

1.03 MEASUREMENT AND PAYMENT

- A. Project Meetings shall not be measured or paid as a separate item but shall be included as part of the various items to which it relates.

- END OF SECTION -

SECTION 013219 - CONTRACTOR SUBMITTALS

PART 1 GENERAL

1.01 SHOP DRAWING SUBMITTAL

- A. CONTRACTOR shall furnish to the ENGINEER for review, 4 copies of each shop drawing submittal. The term "Shop Drawings" as used herein shall be understood to include detail design calculations, shop drawings, fabrication and installation drawings, erection drawings, list, graphs, operating instructions, catalog sheets, data sheets, and similar items. Shop drawings and submittal requirements shall include interpretations of proposed or required configurations not shown on the drawings, so as a document record of such can be approved.
- B. Drawings shall be submitted sufficiently in advance to allow the ENGINEER not less than ten regular working days for examining the drawings. These drawings shall be accurate, distinct, and complete and shall contain all required information, including satisfactory identification of items and unit assemblies in relation to the contract drawings and/or specifications.
- C. When the shop drawings are approved by the ENGINEER, two sets of prints will be returned to CONTRACTOR marked "Approved", "Approved, Except as Noted", or similar notification. If changes or corrections are necessary, one set will be returned to CONTRACTOR with such changes or corrections, indicated by a brief statement, and CONTRACTOR shall correct and resubmit the drawings, in triplicate, when requested by the ENGINEER.
- D. Approval of shop drawing will not be required of reinforcing steel that is detailed by CONTRACTOR in accordance with the plans and specifications. Any change from the plans and specifications that is made by CONTRACTOR in reinforcing steel as well as any other change shall be approved by the ENGINEER in a written change order prior to any work being altered from that already approved for construction.
- E. Fabrication of an item may be commenced only after the ENGINEER has reviewed the pertinent submittals and returned copies to CONTRACTOR marked "No Exception Taken", "Make Corrections Noted", "Rejected" or "Revise and Resubmit". Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis of claims for extra work.
- F. All CONTRACTOR shop drawing submittals shall be carefully reviewed by an authorized representative of CONTRACTOR, prior to submission to the ENGINEER.
- G. The ENGINEER's review of CONTRACTOR shop drawing submittals shall not relieve CONTRACTOR of the entire responsibility for the corrections of details and dimensions. CONTRACTOR shall assume all responsibility and risk for any misfits due

to any errors in CONTRACTOR submittals. CONTRACTOR shall be responsible for dimensions and the design of adequate connections and details.

1.02 SAMPLES SUBMITTAL

- A. Whenever requested of the ENGINEER, CONTRACTOR shall submit at least one sample of each item or material to the ENGINEER for acceptance at no additional cost to OWNER.
- B. Samples, as required herein, shall be submitted for acceptance prior to ordering such material for delivery to the jobsite, and shall be submitted in an orderly sequence so that dependent materials or equipment can be assembled and reviewed without causing delay in the Work.
- C. Unless otherwise specified, all colors and textures of specified items will be selected by the ENGINEER from the manufacturer's standard colors and standard materials, products, or equipment lines.

1.03 OPERATIONS AND MAINTENANCE MANUAL SUBMITTAL

- A. The Contractor shall furnish to the Engineer 4 (four) identical sets of Operations and Maintenance Manuals. Each set shall consist of one or more volumes, each of which shall be bound in a standard size, 3-ring, loose-leaf, vinyl, hard-cover binder suitable for bookshelf storage. Binder ring size shall not exceed 2.5 inches. A Table of Contents shall be provided which indicates all equipment in the Operations and Maintenance Manuals.
- B. The Contractor shall include in the Operations and Maintenance Manuals full details for care and maintenance for all visible surfaces as well as the following for each item of mechanical, electrical, and instrumentation equipment (except for equipment furnished by the Owner):
 - 1. Complete operating instructions, including location of controls, special tools or other equipment required, related instrumentation, and other equipment needed for operation.
 - 2. Preventative maintenance procedures and schedules.
 - 3. Complete parts lists, by generic title, identification number, and catalog number, complete with exploded views of each assembly.
 - 4. Disassembly and reassembly instructions.
 - 5. Name and location of nearest supplier and spare parts warehouse.
 - 6. Name and location of manufacturer.

7. Recommended troubleshooting and start-up procedures.
 8. Prints of the record drawings, including diagrams and schematics, as required under the electrical and instrumentation portions of these specifications.
- C. All Operations and Maintenance Manuals shall be submitted in final form to the Engineer not later than the 75 percent of construction completion date. All discrepancies found by the Engineer in the Operations and Maintenance Manuals shall be corrected by the Contractor prior to final acceptance of the project.

1.04 PROGRESS SCHEDULE SUBMITTAL

- A. The CONTRACTOR shall prepare a project progress schedule using the Critical Path Method, and meeting the following requirements:
1. Minimum Sheet Size: as required to show appropriate level of detail.
 2. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
 3. Provide separate schedule of submittal dates for shop drawings, product data, and samples.
 4. Submit revised Progress Schedule with each Application for Payment.

1.05 MEASUREMENT AND PAYMENT

- A. Contractor submittals shall not be measured or paid as a separate item, but shall be included as part of the various items to which they relate.

- END OF SECTION -

SECTION 014213 - ABBREVIATIONS/DEFINITIONS

PART 1 GENERAL

1.01 DESCRIPTION

- A. Wherever in these Specifications references are made to the standards, specifications, or other published data of the various national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only. As a guide to the user of these specifications, the following acronyms or abbreviations which may appear in these specifications shall have the meanings indicated herein.

1.02 ABBREVIATIONS AND ACRONYMS

AASHTO	American Association of the State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AGC	American General Contractors
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American Nation Standards Institute, Inc.
APWA	American Public Works Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASCE	American Society of Civil Engineers
ASOC	American Society of Quality Control
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
BBC	Basic Building Code, Building Officials and Code Administrators International
CEMA	Conveyors Equipment Manufacturer's Association
CGA	Compressed Gas Association
CLFMI	Chain Link Fence Manufacturer's Institute
CMA	Concrete Masonry Association
CRSI	Concrete Reinforcing Steel Institute
DCS	Cove Special Service District Design and Construction Standards
DEQ	Department of Environmental Quality
DWQ	Department of Water Quality
DWR	Drinking Water Regulations
EIA	Electronic Industries Association
ETC	Electrical Test Laboratories

ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IME	Institute of Makers of Explosives
ISA	Instrument Society of America
ISO	International Organization of Standardization
ITE	Institute of Traffic Engineers
MBMA	Metal Building Manufacturer's Association
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
RWMA	Resistance Welder Manufacturer's Association
SAE	Society of Automotive Engineers
UDOT	Utah Department of Transportation
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
UPRR	Union Pacific Railroad
WCRSI	Western Concrete Reinforcing Steel Institute
WRI	Wire Reinforcements Institute, Inc.
WWPA	Western Wood Products Association

1.03 DEFINITIONS

CONTRACTOR	The person or persons performing the construction work.
CUSTOMER	Individual/institutions requiring utility services such as power, water or sewer.
DEVELOPER	The contractor, property owner or agent as applicable.
ENGINEER	Project Engineer or an authorized representative.
OWNER	Subdivision owners, developers, or others responsible parties for constructing improvements or developments on property within Cove Special Service District.
WATER LATERAL	Domestic service water pipe, including meter box or vault, meter setter, valving and lid.
WATER DISTRIBUTION MAIN	Domestic water line which is 6-inch to 12-inch diameter.

- END OF SECTION -

SECTION 014219 - REFERENCE STANDARDS

PART 1 GENERAL

1.01 GENERAL

- A. TITLES OF SECTIONS AND PARAGRAPHS. Captions accompanying Specifications sections and paragraphs are for convenience of reference only, and do not form a part of the Specification.
- B. APPLICABLE PUBLICATIONS. Whenever in these specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards or requirements of the respective issuing agencies which have been published as of the date that the work is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the drawings shall be waived because of any provision of, or omission from, said standards or requirements.
- C. SPECIALISTS, ASSIGNMENTS. In certain instances, specifications test requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements and shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the work; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with CONTRACTOR.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of other requirements of the specifications, all work specified herein shall conform to or exceed the requirements of all applicable codes and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of these Specifications nor the applicable codes.
- B. Reference herein to "Building Code" or IBC shall mean the International Building Code of the International Conference of Building Officials (ICBO). The latest edition of the code as approved and used by the local agency as of the date of award, as adopted by the agency having jurisdiction, shall apply to the work herein, including all addenda, modifications, amendments, or other lawful changes thereto.
- C. In case of conflict between codes, reference standards, drawings and the other Contract Document, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the ENGINEER for clarification and directions prior to ordering or

providing any materials or labor. CONTRACTOR shall bid the most stringent requirements.

- D. APPLICABLE STANDARD SPECIFICATIONS. CONTRACTOR shall construct the work specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and specifications listed herein; except, that wherever references to "Standard Specifications" are made, the provisions therein for measurement and payment shall not apply.
- E. References in the Contract Documents to "Standard Specifications" shall mean the Tooele City Design and Construction Standards including all current supplements, addenda, and revisions thereof.
- F. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.
- G. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including changes and amendments thereto.
- H. UTAH STATE DIVISION OF DRINKING WATER. New Transmission Pipeline and Distribution Pipeline installations and modifications shall conform to the requirements of the Utah Administrative Code, Rule R309-550. "Facility Design and Operation: Transmission and Distribution Pipelines."
- I. Reference herein to APWA shall mean the latest edition of the "Manual of Standard Specifications" and "Manual of Standard Plans" as prepared by the American Public Works Association and the Associated General Contractors of America.
- J. Rural Development has specific American Iron and Steel Requirements that apply to this project per RUS Bulletin 1780-26.
- K. STATE OF UTAH WATER WELL HANDBOOK. Based on administrative rules for water wells (R655-4 UAC) adopted May 2018.

- END OF SECTION -

DOCUMENT 014326 - TESTING AGENCY SERVICES

PART 1 GENERAL**1.01** SECTION INCLUDES

- A. CONTRACTOR shall be responsible for providing Construction Quality Control Testing of all soils, concrete, etc. as required by the various sections of these specifications. This section includes the following:
 - 1. Use of independent testing agency.
 - 2. Control testing report submittal requirements.
 - 3. Responsibilities of testing agency.

1.02 REFERENCES

- A. ASTM D 3740: Standard Recommended Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- B. ASTM D 4561: Standard Practice for Quality Control Systems for an Inspection and Testing Agency for Bituminous Paving Materials.
- C. ASTM E 329: Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.

1.03 DEFINITIONS

- A. Independent Testing Agency: A testing agency NOT owned by CONTRACTOR, and an agency that does not have any preferential affiliation or association with CONTRACTOR, or any of CONTRACTOR's Subcontractors and Suppliers other than entering into a contract with CONTRACTOR to perform the duties defined in these specifications.
- B. Professional Engineer: An engineer who complies with Utah licensing law and is acceptable to the authority having jurisdiction.

1.04 QUALITY ASSURANCE

- A. CONTRACTOR shall employ and pay for services of an independent testing agency which complies with ASTM D 3740, ASTM D 4561, and ASTM E 329 to test materials for contract compliance.
- B. Concrete Technician: Approved by ENGINEER or ACI certified.

1.05 TESTING AGENCY SUBMITTALS

- A. Field Test Report: Submit report no later than the end of the current day.
- B. Laboratory Test Report: Submit original report within 48 hours after test results are determined.
- C. Final Summary Report: Submit prior to final payment.
- D. On all reports include:
 - 1. Project title, number and date of the report.
 - 2. Date, time and location of test
 - 3. Name and address of material Supplier.
 - 4. Identification of product being tested and type of test performed.
 - 5. Identify whether test is initial test or retest.
 - 6. Results of testing and interpretation of results.
 - 7. Name of technician who performed the testing.

1.06 RESPONSIBILITIES OF TESTING AGENCY

- A. Calibrate testing equipment at least annually with devices of an accuracy traceable to either National Bureau of Standards or acceptable values of natural physical constraints.
- B. Provide sufficient personnel at site and cooperate with CONTRACTOR, ENGINEER and OWNER's Representative in performance of testing service.
- C. Secure samples using procedures specified in the applicable testing code.
- D. Perform testing of products in accordance with applicable sections of the Contract Documents.
- E. Immediately report any compliance or noncompliance of materials and mixes to CONTRACTOR, ENGINEER and OWNER's Representative.
- F. When an out-of-tolerance condition exists, perform additional inspections and testing until the specified tolerance is attained, and identify retesting on test reports.

1.07 LIMITS ON TESTING AGENCY AUTHORITY

- A. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Agency may not suspend Work.
- C. Agency possesses the authority to accept Work for OWNER.

- END OF SECTION -

DOCUMENT 014516 - QUALITY CONTROL & MATERIALS TESTING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Responsibilities for controlling quality of materials, products and workmanship.
- B. Responsibilities for manufacturer's instructions, certificates and field service.

1.02 MATERIALS

- A. All materials incorporated in the project shall be new and shall fully comply with the specifications. Unless otherwise clearly provided in the specifications, all workmanship, equipment, materials, and articles incorporated in the work covered by the contract are to be of the best available grade of their respective kinds. Whenever in the specifications, any material, article, device, product, fixture, form, type of construction, or process indicated or specified by patent or proprietary name, by name of manufacturer, or by catalog number, such specifications shall be deemed to be used for the purpose of establishing a standard of quality and facilitating the description of the material or process desired and shall be deemed to be followed by the words "or accepted equal" and CONTRACTOR may in such case, upon receiving the ENGINEER's approval, purchase and use any item, type, or process which shall be substantially equal in every respect to that indicated or specified.
- B. Materials and equipment may be used in the Work based upon receipt of a Supplier's certificate of compliance. Certificate must be in possession of CONTRACTOR and reviewed by ENGINEER prior to use.
- C. Quality Assurance Testing by the OWNER and/or ENGINEER shall not relieve CONTRACTOR of responsibility to furnish materials and work in full compliance with Contract Documents.

1.03 MANUFACTURER'S INSTRUCTIONS

- A. Should instructions conflict with Contract Documents, request clarification before proceeding.
- B. When required in individual sections, submit manufacturer's instructions in the quantity required for product data, delivery, handling, storage, assembly, installation, start-up, adjusting, balancing, and finishing, as appropriate.

1.04 MANUFACTURER'S CERTIFICATES

- A. When required in individual sections, submit manufacturer's certificate in duplicate executed by responsible officer certifying that product meets or exceeds specified requirements.

1.05 MANUFACTURER'S FIELD SERVICES

- A. When required in individual sections, have manufacturer or Supplier provide qualified representative to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable and to make written report of observations and recommendations to ENGINEER.

1.06 WORKMANSHIP

- A. Maintain performance control and supervision over Subcontractors, Suppliers, manufacturer's, products, services, workmanship, and site conditions, to produce work in accordance with Contract Documents.
- B. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
- C. Provide suitable qualified personnel to produce specified quality.
- D. Ensure finishes match approved samples.

1.07 INSPECTION OF MATERIALS

- A. At the option of the ENGINEER, materials to be supplied under this contract will be tested and/or inspected either at their place of origin or at the site of the work. CONTRACTOR shall give the ENGINEER written notification well in advance of actual readiness of materials to be tested and/or inspected at point of origin. Satisfactory tests and inspections at the point of origin shall not be construed as a final acceptance of the material nor shall it preclude retesting or re-inspection at the site of the work.
- B. CONTRACTOR shall furnish such samples of materials as are requested by the ENGINEER, without charge. No material shall be used until it has been approved by the ENGINEER. See Section 01300, CONTRACTOR's Submittal.

1.08 UNSATISFACTORY CONDITIONS

- A. Examine areas and conditions under which materials and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer.

1.09 QUALITY CONTROL TESTING

- A. ENGINEER's failure to detect any defective Work or materials does not prevent later rejection when such defect is discovered nor does it obligate ENGINEER for acceptance.
- B. CONTRACTOR shall provide 24-hours minimum notice to ENGINEER for all testing required by these specifications.

1.10 TESTING ACCEPTANCE AND FREQUENCY

- A. Minimum Quality Control Testing Frequency: As defined in Table 01440-1. The CONTRACTOR shall be responsible to ensure that testing is performed at the frequencies shown. CONTRACTOR shall uncover any work at no cost to OWNER to allow OWNER to perform required testing at the frequencies shown.
- B. Acceptance of Defective Work: As defined in Article 9.6 of the General Conditions.

1.11 MEASUREMENT AND PAYMENT

- A. Quality Control and Materials Testing required in Table 01440-1, is the responsibility of the CONTRACTOR.

TABLE 01440-1: QUALITY CONTROL TESTING FREQUENCY

SYSTEM or MATERIAL	TESTS	MINIMUM REQUIRED FREQUENCY
SUBGRADE AND BACKFILL MATERIALS		
Section 02221 Excavation and Backfill for Buried Pipelines	Field Density *	1 test per 300 linear feet per 1.5 feet of backfill thickness placed.
	Laboratory	1 test for each material type which includes proctor, classification and gradation.
Section 02222 Excavation and Backfill for Structures	Field Density *	1 test per 300 linear feet per 1.5 feet of backfill thickness placed.
	Laboratory	1 test for each material type which includes proctor, classification and gradation.
ASPHALT		
Section 02500 Removal and Replacement of Surface Improvements	Mix Design	<u>Marshall Test Method</u> : 1 test initially per each type of material and each change in target, and for each day of production thereafter. <u>Specific Gravity</u> : 1 per each Marshall Test <u>Extraction</u> : 1 test per each Marshall Test
	Field Density *	<u>Bituminous surfaces</u> : 1 test per 8,000 square feet placed or part thereof.
	Asphalt Thickness and Core Density	<u>Bituminous surfaces</u> : 1 test sample every 300 linear feet of completed roadway.

TABLE 01440-1: QUALITY CONTROL TESTING FREQUENCY (Continued...)

SYSTEM or MATERIAL	TESTS	MINIMUM REQUIRED FREQUENCY
PORTLAND CEMENT CONCRETE		
Section 03300 Cast-in-Place Concrete	Slump	1 test every day of placement or 1 test for every 50 cubic yards and more frequently if batching appears inconsistent. Conduct with strength tests.
	Entrained air	1 test with slump test.
	Ambient and concrete temperatures	1 test with slump test.
	Water cement ratio.	to be verified and provided with batch tickets.
	Compressive strength	1 set of 4 cylinders every 50 c.y. or part thereof per day.
<p>NOTES:</p> <ol style="list-style-type: none"> 1 Additional tests shall be conducted when variations occur due to the contractor's operations, weather conditions, site conditions, etc. 2 Classification, moisture content, Atterberg limits and specific gravity tests shall be conducted for each compaction test if applicable. 3 Tests can substitute for same tests required under "Aggregates" (from bins or source), although gradations will be required when blending aggregates. 4 Aggregate moisture tests are to be conducted in conjunction with concrete strength tests for water/cement calculations. 5. * All nuclear density meters used for in place field testing shall have been calibrated by ASTM methods within 1 year previous to current testing. 		

SECTION 015719 - TEMPORARY CONSTRUCTION UTILITIES AND ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.01 DESCRIPTION

- A. This section covers temporary utilities, including electricity, lighting, telephone service, water, and sanitary facilities; temporary controls, including barriers, protection of work, and water control; and construction facilities, including parking, progress cleaning, and temporary buildings.

1.02 TEMPORARY UTILITIES

- A. Temporary Electricity: CONTRACTOR shall provide, maintain, and pay for all power required by CONTRACTOR, including electrical service to CONTRACTORS field office.
- B. Temporary Lighting: CONTRACTOR shall provide all temporary lighting required for prosecution of his work and for employee and public safety. As a minimum, lighting levels during working hours shall meet the requirements of U.O.S.H.A. Subsection 1926.56 illumination.
- C. Telephone Service: CONTRACTOR shall provide, maintain and pay for telephone service to the field office.
- D. Temporary Water Service
1. CONTRACTOR shall provide for all his workers on the project, adequate and reasonably convenient uncontaminated drinking water supply. All facilities shall comply with the regulations of the local and State Departments of Health.
 2. CONTRACTOR shall be responsible to arrange for water, both potable and non-potable water.
 3. When water is taken from a city water system or any other potable water supply source for construction purposes, suitable precautions shall be taken to prevent cross connections and contamination of water supply.
- E. Temporary Sanitary Facilities: CONTRACTOR shall provide and maintain sanitary facilities for his employees and his subcontractors' employees that will comply with the regulations of the local and State Departments of Health.

1.03 TEMPORARY CONTROLS

- A. Barriers: Provide barriers as necessary to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Dust Control: Execute Work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into the atmosphere. Give all unpaved streets, roads, detours, or haul roads used in the construction area an approved dust-preventive treatment or periodically water to prevent dust. Applicable environmental regulations for dust prevention shall be strictly enforced. CONTRACTOR shall submit a Fugitive Dust Control Plan to the Division of Air Quality, which meets all state requirements (R307-309-4).
- C. Protection of Work: CONTRACTOR shall protect installed work and provide special protection where specified in individual specifications sections. CONTRACTOR shall provide temporary and removable protection for installed products, and shall control activity in immediate work area to minimize damage.
- D. Open Burning: No open burning of waste materials will be allowed.
- E. Explosives and Blasting: The use of explosives on the work will not be permitted.
- F. Noise Abatement: In inhabited areas, particularly residential, operations shall be performed in a manner to minimize unnecessary noise generation.
- G. Storm & Ground Water
 - 1. CONTRACTOR shall provide and maintain at all times during construction, ample means and devices with which to promptly remove and properly dispose of all water entering the excavation or other parts of the work, whether the water be surface or underground water.
 - 2. In excavation, fill, and grading operations, care shall be taken to disturb the pre-existing drainage pattern as little as possible. Particular care shall be taken not to direct drainage water into private property or into streets or drainageways inadequate for the increased flow.
 - 3. CONTRACTOR shall maintain effective means to minimize the quantity of sediments leaving the work area either by storm water or CONTRACTOR's own dewatering operations.
- H. Traffic Control: shall be the responsibility of the CONTRACTOR along any road where potential exists for traffic disruption. CONTRACTOR shall assume responsibility for materials (including barricades, flagging, signage, personnel safety equipment, etc., including storage and handling of materials), labor, equipment and incidentals required to control traffic flow for the duration of the project in accordance with all applicable local, state and federal regulations. The CONTRACTOR shall be responsible to obtain a traffic control permit from the City, and have such permit in place prior to beginning any work which impacts traffic.

1.04 CONSTRUCTION FACILITIES

- A. Parking: CONTRACTOR shall provide temporary parking areas to accommodate use of construction personnel. Parking shall be located in an area approved by the ENGINEER.
- B. Progress Cleaning
 - 1. CONTRACTOR shall maintain areas free of waste materials, debris, and rubbish. Maintain the site in a clean and orderly condition. Upon completion of work, repair all damage caused by equipment and leave the project free of rubbish or excess materials of any kind.
 - 2. Thoroughly clean all spilled dirt, gravel, or other foreign materials caused by the construction operations from all streets and roads at the conclusion of each day's operation.
 - 3. It shall be the responsibility of CONTRACTOR to promptly clean up and remove any oil and or fuel spills caused by CONTRACTOR or his Sub-contractors during the course of the project. Contaminated soil shall be properly disposed of by CONTRACTOR in accordance with all applicable laws. CONTRACTOR shall be responsible for any damages to OWNER resulting from CONTRACTOR's negligence in promptly cleaning up said spills.

1.05 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Prior to Final Application for Payment, CONTRACTOR shall remove temporary above grade or buried utilities, equipment, facilities, and materials; clean and repair damage caused by installation or use of temporary work; and restore existing facilities used during construction to original condition.

1.06 CHEMICALS

- A. All chemicals used during construction or furnished for project operation whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall show approval of the U.S. Department of Agriculture. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instruction of the manufacturer.

1.07 CULTURAL RESOURCES

- A. The CONTRACTOR's attention is directed to the National Historic Preservation Act of 1966 (16 U.S.C. 470) and 36 CFR 800 which provides for the preservation of potential historical architectural, archeological, or cultural resources (hereinafter called "cultural resources").
- B. The CONTRACTOR shall conform to the applicable requirements of the National Historic Preservation Act of 1966 as it relates to the preservation of cultural resources.

- C. In the event potential cultural resources are discovered during subsurface excavations at the site of construction, the following procedures shall be instituted:
1. The ENGINEER will issue a Field Order directing the CONTRACTOR to cease all construction operations at the location of such potential cultural resources find.
 2. Such Field Order shall be effective until such time as a qualified archeologist can be called to assess the value of these potential cultural resources and make recommendations to the OWNER and ENGINEER.
- D. If the archeologist determines that the potential find is a bona fide cultural resource, at the direction of the ENGINEER, the CONTRACTOR shall suspend work at the location of the find under the provisions for changes contained in Articles 10, 11, and 12 of the General Conditions, Section 00700.

1.08 MEASUREMENT AND PAYMENT

- A. Temporary Utilities and Facilities shall not be measured or paid as a separate item, but shall be included as part of the various items to which it relates.

- END OF SECTION -

SECTION 015719.1 - MITIGATION

1.01 GENERAL

- A. This Section is provided to explain the CONTRACTORS obligations with regards to environmental mitigation on this project. It is expected that all mitigation measures within this section and the final EA prepared by the U.S. Army Corps of Engineers will be adhered to and followed to the strictest standards. Periodical inspection of performance on mitigation measures will have a direct effect on timing of the project and are cause for delay of the project which will result in penalties being assessed to the CONTRACTOR.

1.02 HAZARDOUS, TOXIC, AND RADIOLOGICAL WASTE

- A. A Phase 1 ESA survey was conducted in June 2010 by the U.S. Army Corps of Engineers. There were no documented hazardous, toxic, or radiological waste (HTRW) releases found in the project area (Cole, 2010). (Appendix A). The Phase 1 survey consisted of a database search of all Federal and State records of HTRW registered sites.
- B. All spills of any hazardous or toxic waste will be cleaned up immediately according to best management practices.

1.03 MITIGATION AND BMP'S BEST MANAGEMENT PRACTICES

- A. Sediment transport and soil erosion effects would be eliminated with the implementation of BMP's. With the implementation of BMP's any adverse effects to water resources would be minimized to less than significant. The practices would include:
 - B. Minimizing ground disturbance.
 - C. Installing silt fencing.
 - D. Watering disturbed soil.
 - E. Completing disturbed areas quickly.
 - F. Re-vegetating soils disturbed areas

1.04 MITIGATION AND RE-VEGETATION

- A. The need for re-vegetation is anticipated because removal or disturbance of vegetation, including that of native species, within the project area is expected. However, with the implementation of the BMP's effects to the surrounding vegetation would be less than significant. BMP's include the following:

- B. Prior to entering the construction site for the first time, construction equipment would be washed in an effort to reduce the spread of noxious and invasive weeds
- C. Any disturbed areas would be leveled and graded to the natural slope, no greater than 4H:1V, and re-vegetated with native plants.
- D. Minimization of areas cleared, graded, or excavated.

1.05 MITIGATION AND AIR QUALITY

- A. The BMP's include the following:
- B. Watering of disturbed soils.
- C. Surface disturbance activities would be used only in areas necessary to complete the project.
- D. Proper exhaust systems would be required on all equipment entering the construction area.

1.06 MITIGATION TRAFFIC

- A. A traffic management plan would be required from the contractor to help minimize any effects on traffic. Also, to ensure public safety, precautionary measures such as flags, signs, detours, and barricades would be used, as needed.

1.07 MITIGATION NOISE

- A. Short-term effects of increased noise would be limited to daylight working hours from 7:00 a.m. to 6:00 p.m., Monday through Friday. Compliance of the required construction hours would minimize short-term construction noise effects on sensitive receptors to less than significant.

1.08 MITIGATION CULTURAL RESOURCES

- A. No effects on cultural resources is anticipated. However, in the event of discovering unidentified cultural resources during project activities, all work in that area would cease and a Utah State Historic Preservation Officer, Antiquities Section, would be contacted. Additional consultation as directed by the Code of Federal Regulations (36 CFR 800.13) for Post Review Discoveries would then be conducted.

COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

Clean Air Act, as amended and recodified (42 U.S.C. 7401 et seq.) *Compliance*. The project is not expected to violate any Federal or State air quality standards, or hinder the attainment of air quality objectives in the local air basin. The Corps has determined that the project would have no significant adverse effects on the air quality of the area.

Clean Water Act (33 U.S.C. 1251 et seq.) *Compliance*. Since the project would not involve placing any fill material into waters of the U.S., including wetlands, a Section 404 permit would not be required. The project would require an UPDES permit from the State since it would disturb 1 or more acres of land.

- END OF SECTION -

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Product delivery requirements.
- C. Product storage and handling requirements.
- D. Product options.
- E. Equipment electrical characteristics and components.

1.2 PRODUCTS

- A. At minimum, comply with specified requirements and reference standards.
- B. Specified products define standard of quality, type, function, dimension, appearance, and performance required.
- C. Furnish products of qualified manufacturers that are suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.
- D. Domestic Products: Except where specified otherwise, domestic products are required and interpreted to mean products mined, manufactured, fabricated, or produced in United States or its territories.
- E. Do not use materials and equipment removed from existing premises except as specifically permitted by Contract Documents.
- F. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

- A. Comply with delivery requirements in Section 017419 - Construction Waste Management and Disposal.
- B. Transport and handle products according to manufacturer's instructions.
- C. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

- D. Provide equipment and personnel to handle products; use methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products according to manufacturer's instructions.
- B. Store products with seals and labels intact and legible.
- C. Store sensitive products in weathertight, climate-controlled enclosures in an environment suitable to product.
- D. For exterior storage of fabricated products, place products on sloped supports aboveground.
- E. Provide bonded off-Site storage and protection when Site does not permit on-Site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products; use methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Products complying with specified reference standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and complying with Specifications; no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit Request for Substitution for any manufacturer not named, according to Section 012500 - Substitution Procedures.

PART 2 - PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.

- B. Cord and Plug: Furnish minimum 6-foot long cord and plug including grounding connector for connection to electric wiring system. Cord of longer length may be specified in individual Specification Sections.

PART 3 - EXECUTION - Not Used

END OF SECTION 016000

SECTION 017113 - MOBILIZATION

1.01 GENERAL

- A. This Section is provided to cover CONTRACTOR's cost of general and miscellaneous responsibilities and operations not normally attributed to, or included in, any other single bid item. This shall include, but not necessarily be limited to, work described or enumerated in this section under the following subsections.

1.02 MOVING TO AND FROM THE JOB SITE

- A. This shall include CONTRACTOR's preliminary arrangement for starting and stopping construction operations, work schedules, and transportation of equipment and personnel to and from the project.

1.03 CLEAN-UP

- A. The cost of all clean-up work as specified and not covered under other items shall be included in the lump-sum price for "Mobilization".

1.04 TEMPORARY UTILITIES

- A. The cost of water, power, etc. required by CONTRACTOR in performing the work specified in the contract shall be included in the lump-sum price for "Mobilization".

1.05 PERFORMANCE BOND, PAYMENT BOND, AND INSURANCE

- A. The cost of the performance bond, payment bond, and any required insurance and/or other miscellaneous cost associated with this project that is not found on the Bid Schedule shall be paid for under mobilization.

1.06 TEMPORARY FACILITIES

- A. CONTRACTOR shall provide and maintain a temporary field office on the project or within 20 miles of the project limits.
- B. CONTRACTOR shall provide for all his workers on the project, adequate and reasonably convenient uncontaminated drinking water supply and temporary toilet facilities. All facilities shall comply with the Utah Occupational Safety and Health Act.
- C. CONTRACTOR shall make arrangements for, secure, and pay for any and all utility supplies such as electric power, water, natural gas, or telephone that may be required for prosecution of the work.

- D. CONTRACTOR shall provide all temporary lighting required for prosecution of his work and for employee and public safety. As a minimum, lighting levels during working hours shall meet the requirements of U.O.S.H.A. Subsection 1926.56 illumination.
- E. CONTRACTOR shall provide a temporary project sign as described in Section 1580 Project Sign. Sign shall be placed on the project site and be maintained until completion of the project.

1.07 ENGINEER'S OFFICE

- A. CONTRACTOR is not required to supply an ENGINEER's Office.

1.08 PERMITS

- A. CONTRACTOR shall provide all necessary permits for completion of the work.

1.09 MEASUREMENT AND PAYMENT

- A. Paid in accordance with Section 01025 - Measurement and Payment.

END OF SECTION 017133

SECTION 017123 - FIELD ENGINEERING

PART 1 GENERAL

1.01 GENERAL

- A. CONTRACTOR shall contract with Ensign Engineering to provide all survey construction staking as necessary to complete the facilities and appurtenant work according to the contract documents, including but not limited to:
1. Benchmark network throughout the construction zone.
 2. Two intermediate offset cut stakes for pipeline construction.
 3. TBC offset stakes as needed throughout reconstruction area.
 4. Removal and replacement of survey monuments if required. Any removal of survey monuments, without notification to the Engineer/Surveyor, is illegal and replacement costs will be charged to the CONTRACTOR.
- B. CONTRACTOR shall be responsible for notifying utility owners to request location staking of all utilities in the areas of construction. All utility staking shall be protected during construction activities from removal and disturbance. CONTRACTOR shall be responsible for replacement of all stakes removed as a result of CONTRACTOR and Subcontractor activities.

END OF SECTION 017123

SECTION 017133 - PROTECTION OF EXISTING FACILITIES

PART 1 GENERAL

1.01 GENERAL

- A. Any existing facilities, disturbed which are located in or adjacent to the line of work such as curbs, gutters, drive approaches, sidewalks, driveways, fences, underground pipes, conduits, or utilities, shall be cleaned up and restored in kind by the CONTRACTOR and in accordance with the specifications contained herein governing the various types of services involved.

1.02 RESTORATION OF FENCES

- A. Where it is necessary to remove any fence to facilitate the CONTRACTOR's operation, the CONTRACTOR shall obtain prior agreement with the Owner for removal of the fence, and shall be responsible for any damage due to negligence of the CONTRACTOR. As soon as practical, the fence shall be restored substantially to the same or improved condition as it was prior to the commencement of the work. Where livestock is present the CONTRACTOR shall provide temporary fencing to keep livestock away from the construction area.

1.03 INTERFERING STRUCTURES AND UTILITIES

- A. The CONTRACTOR shall exercise all possible caution to prevent damage to existing structures and utilities, whether above ground or underground. It shall be the responsibility of the CONTRACTOR to locate and expose all existing underground and overhead structures and utilities in such a manner as to prevent damage to same. The CONTRACTOR shall notify all utility offices concerned at least 48 hours in advance of construction operations in which a utility agency's facilities may be involved. This shall include, but not be limited to, irrigation water, culinary water, sanitary sewer, telephone, gas, and electric. The CONTRACTOR shall be responsible for any and all changes to, reconnections to public utility facilities encountered or interrupted during prosecution of the work, and all costs relating hereto shall be at the CONTRACTOR's expense. The CONTRACTOR shall contract with and pay Public Utility Agencies for work required in connection with all utility interferences and handle all necessary notifications, scheduling, coordination, and details. The cost of public utility interferences shall be included in the CONTRACTOR's lump sum or unit price bid covering the major contract facility to which interference or changes are attributable.
- B. Any damages to private property, either inside or outside the limits of the easements provided by the OWNER, shall be the responsibility of the CONTRACTOR. Any roads, structures, or utilities damaged by the work shall be repaired or replaced in a condition equal to or better than the condition prior to the damage. Such repair or replacement shall be accomplished at the CONTRACTOR's expense without additional compensation from the OWNER.

- C. The CONTRACTOR shall remove and replace small miscellaneous structures such as fences and culverts which are damaged by the construction activity at his own expense without additional compensation from the OWNER. The CONTRACTOR shall replace these structures in a condition as good as or better than their original condition.
- D. The CONTRACTOR shall saw cut the edge of existing drive approaches, where necessary, to prevent their damage during removal and replacement of the adjacent asphalt surface. Drive approaches which are damaged by the construction activity shall be repaired by the CONTRACTOR at his own expense without additional compensation from the OWNER. The CONTRACTOR shall replace these structures in a condition as good as or better than their original condition.
- E. At points where the CONTRACTOR's operations are adjacent to or across properties of railway, telegraph, telephone, irrigation canal, power, gas, water, or adjacent to other property (damage to which might result in considerable expense, loss, and inconvenience), no work shall be started until all arrangements necessary for the protection thereof have been made.
- F. The locations of the major existing culinary water lines, gas pipes, underground electric, cable television, and telephone lines that are shown on the plans, were taken from city maps, and maps supplied by the utility owner. Preliminary investigations have indicated they are generally reliable. However, it should be expected that some location discrepancies will occur. Neither the OWNER nor its officers or agents shall be responsible for damages to the CONTRACTOR as a result of the locations of the utilities being other than those shown on the plans or for the existence of utilities not shown on the plans.
- G. The CONTRACTOR shall be solely and directly responsible to the owners and operators of such properties for any damage, injury, expense, loss or inconvenience, delay, suits, actions, or claims of any character brought because of an injury or damage which may result from the carrying out of the work to be done under the contract.
- H. In the event of interruption to either domestic or irrigation water, or to other utility services as a result of accidental breakage, or as a result of being exposed or unsupported, the CONTRACTOR shall promptly notify the proper authority. The CONTRACTOR shall cooperate with the authority in restoration of service as soon as possible, and shall not allow interruption of any water or utility service outside working hours unless prior approval is received.
- I. Existing drainage ditches are owned and operated by a third party; not the OWNER. These drainage ditches must be maintained by the CONTRACTOR during construction. Where these drainage ditches must be crossed for utility installation, they must be restored upon completion to their existing condition (See Section 2500 - Removal and Replacement of Surface Improvements). The CONTRACTOR shall consult with ENGINEER if conflicts or questions arise during construction.

1.04 RIGHTS-OF-WAY

- A. The CONTRACTOR shall be required to confine construction operations within the dedicated rights-of-way for public through fares, or within areas for which construction easements have been obtained, unless they have made special arrangements with the affected property owners in advance. The CONTRACTOR shall be required to protect stored materials, cultivated trees and crops, and other items adjacent to the proposed construction site.
- B. The CONTRACTOR shall submit for approval by the ENGINEER the type and size of equipment used, and the methods for work performed on the rights-of-way across private properties, to avoid or minimize injury to trees, shrubs, gardens, lawns, fences, driveways, retaining walls, or other improvements within the rights-of-way.
- C. Property owners affected by the construction shall be notified by the CONTRACTOR at least 48 hours in advance of the time the construction begins. During all construction operations, the CONTRACTOR shall construct and maintain such facilities as may be required to provide access by all property owners to their property. No person shall be cut off from access to his property for a period exceeding 8 hours unless the CONTRACTOR has made special arrangements with the affected persons. The CONTRACTOR shall, daily or more frequently if necessary, grade all disturbed areas to be smooth for motor vehicle traffic.

1.05 MEASUREMENT AND PAYMENT

- A. Protection of existing facilities shall not be measured or paid as a separate item, but shall be included as part of the various items to which it relates.

END OF SECTION 017133

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Construction waste management plan.
2. Construction waste recycling.
3. Construction waste adaptive reuse.

B. Related Sections:

1. Section 018113 - Sustainable Design Requirements: General LEED requirements.
2. Section 019100 - Commissioning: General commissioning requirements.

1.2 REFERENCES

A. U.S. Green Building Council (USGBC):

1. LEED for New Construction and Major Renovations Rating System.

1.3 PLAN REQUIREMENTS

A. Develop and implement construction waste management plan as approved by Engineer for compliance with the following:

1. USGBC LEED divert 50 percent from landfill.

B. Intent:

1. Divert construction, demolition, and land-clearing debris from landfill disposal.
2. Redirect recyclable material back to manufacturing process.
3. Generate cost savings or increase minimal additional cost to Project for waste disposal.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures contains requirements for submittals.

B. Construction Waste Management Plan: Submit construction waste management plan describing methods and procedures for implementation and monitoring compliance including the following:

1. Transportation company hauling construction waste to waste processing facilities.

2. Recycling and adaptive reuse processing facilities and waste type each facility will accept.
 3. Construction waste materials anticipated for recycling and adaptive reuse.
 4. On-Site sorting and Site storage methods.
- C. Submit documentation with each application for payment substantiating construction waste management plan was maintained and goals are being achieved.
1. Trash: Quantity by weight deposited in landfills. Include associated fees, transportation costs, container rentals, and taxes for total cost of disposal.
 2. Salvaged Material: Quantity by weight with destination for each type of material salvaged for resale, recycling, or adaptive reuse. Include associated fees, transportation costs, container rentals, taxes for total cost of disposal, and reimbursements due to salvage resale.
 3. Total Cost: Indicate total cost or savings for implementation of construction waste management plan.

1.5 CONSTRUCTION WASTE MANAGEMENT PLAN

- A. Construction Waste Landfill Diversion: Minimum [50] [75] percent by weight of construction waste materials for duration of Project through resale, recycling, or adaptive reuse.
- B. Implement construction waste management plan at start of construction.
- C. Review construction waste management plan at preconstruction meeting and progress meetings specified in Section 013000 - Administrative Requirements.
- D. Distribute approved construction waste management plan to Subcontractors and others affected by plan requirements.
- E. Oversee plan implementation, instruct construction personnel for plan compliance, and document plan results.
- F. Purchase products to prevent waste by:
 1. Ensuring correct quantity of each material is delivered to Site.
 2. Choosing products with minimal or no packaging.
 3. Requiring suppliers to use returnable pallets or containers.
 4. Requiring suppliers to take or buy back rejected or unused items.

1.6 CONSTRUCTION WASTE RECYCLING

- A. Use source separation method or comingling method suitable to sorting and processing method of selected recycling center. Dispose nonrecyclable trash separately into landfill.
- B. Source Separation Method: Recyclable materials separated from trash and sorted into separate bins or containers, identified by waste type, prior to transportation to recycling center.

- C. Comingling Method: Recyclable materials separated from trash and placed in unsorted bins or container for sorting at recycling center.
- D. Materials suggested for recycling include:
 - 1. Packing materials including paper, cardboard, foam plastic, and sheeting.
 - 2. Recyclable plastics.
 - 3. Organic plant debris.
 - 4. Earth materials.
 - 5. Native stone and granular fill.
 - 6. Asphalt and concrete paving.
 - 7. Wood with and without embedded nails and staples.
 - 8. Glass, clear and colored types.
 - 9. Metals.
 - 10. Gypsum products.
 - 11. Acoustical ceiling tile.
 - 12. Carpet.
 - 13. Equipment oil.

1.7 CONSTRUCTION WASTE ADAPTIVE REUSE

- A. Arrange with processing facility for salvage of construction material and processing for reuse. Do not reuse construction materials on-Site except as allowed by Engineer.
- B. Materials suggested for adaptive reuse include:
 - 1. Concrete and crushed concrete.
 - 2. Masonry units.
 - 3. Lumber suitable for re-sawing or refinishing.
 - 4. Casework and millwork.
 - 5. Doors and door frames.
 - 6. Windows.
 - 7. Window glass and insulating glass units.
 - 8. Hardware.
 - 9. Acoustical ceiling tile.
 - 10. Equipment and appliances.
 - 11. Fluorescent light fixtures and lamps.
 - 12. Incandescent light fixtures and lamps.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 CONSTRUCTION WASTE COLLECTION

- A. Collect construction waste materials in marked bins or containers and arrange for transportation to recycling centers or adaptive salvage and reuse processing facilities.

- B. Maintain recycling and adaptive reuse storage and collection area in orderly arrangement with materials separated to eliminate co-mingling of materials required to be delivered separately to waste processing facility.
- C. Store construction waste materials to prevent environmental pollution, fire hazards, hazards to persons and property, and contamination of stored materials.
- D. Cover construction waste materials subject to disintegration, evaporation, settling, or runoff to prevent polluting air, water, and soil.

3.2 CONSTRUCTION WASTE DISPOSAL

- A. Deliver construction waste to waste processing facilities. Obtain receipt for deliveries.
- B. Dispose of construction waste not capable of being recycled or adaptively reused by delivery to landfill, incinerator, or other legal disposal facility. Obtain receipt for deliveries.

END OF SECTION 017419

DIVISION 2 – EXISTING CONDITIONS

SECTION 020750 - ASPHALT AND PORTLAND CEMENT CONCRETE PAVEMENT

DEMOLITION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED.

- A. Demolition and disposal of roadway pavements composed of Portland cement concrete, asphalt cement concrete or combination Portland cement concrete and asphalt concrete.
- B. Pulverize of asphalt pavement and re-grade.

1.02 MEASUREMENTS AND PAVEMENT

- A. Measurement shall be per section 012000 Measurement and Payment

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 PREPARATION

- A. Review all the work procedures with ENGINEER.
- B. Coordinate utility location by contracting Blue Stakes.
- C. Preserve all active utilities which are to remain in service.

3.02 PORTLAND CEMENT CONCRETE PAVEMENT DEMOLITION

- 1. Prior to Portland cement concrete pavement removal, saw cut concrete full depth to near vertical straight lines.
- 2. Remove Portland cement concrete pavement

3.03 ASPHALT CONCRETE PAVEMENT DEMOLITION

- A. Saw cut to full depth and remove asphalt concrete pavement.

3.04 PROTECTION OF EXISTING SURFACES OUTSIDE OF THE WORK AREA

- A. Do not damage adjacent concrete surfaces which are not scheduled for removal.
- B. Use rubber cleats or pavement pads when operating backhoes, outriggers, track equipment, or any other equipment on or crossing paved surfaces.
- C. Restore any paving outside the Work which is damaged by removal operations at no additional cost to the OWNER. Match the existing pavement structural section.

3.05 DISPOSAL OF WASTE MATERIALS

- A. Portland cement concrete, asphaltic concrete or combination shall be disposed at a suitable off-site location.
- B. Disposal site shall meet applicable laws and ordinances.

END OF SECTION 020750

SECTION 021000 - SITE PREPARATION

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Preparation
- B. Clear and Grub Site
- C. Asphalt Concrete Removal
- D. Portland Cement Concrete Removal
- E. Removal of fences and miscellaneous obstructions
- F. Disposal of Waste Materials

1.02 RELATED WORK

- A. Section 01500 - Construction Facilities and Temporary Controls
- B. Section 02220 - Excavating, Backfilling and Compaction
- C. Section 02590 - Restoration of Existing Improvements

1.03 MEASUREMENT AND PAYMENT

- A. Site preparation will not be paid for separately, but shall be included in the lump sum bid item. Such price shall constitute full compensation for furnishing and placing of materials required to complete the site preparation, and for all labor, equipment, tools and incidentals needed to complete the work in conformity with the plans and specifications.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 PREPARATION

- A. Establish necessary clearing limits within the construction limits. Mark all trees, shrubs, structures, fences, concrete, and other improvements to be removed.
- B. Within 10 feet of clearing limits, inspect, photograph with videotape, and record conditions of concrete slabs, structures, trees, landscaping, adjoining construction, and site improvements and features that might be affected by the work. Allow Owner to view tape and approve prior to proceeding with the work.
- C. Trees, shrubs and lawn, areas to receive planting, rock outcroppings, fences, sprinklers and other improvements that are not to be removed shall be protected from damage or injury. If damaged or removed, they shall be restored or replaced in as nearly the original condition and location as is reasonably possible. Trees, shrubs, and improvements not to be removed shall be marked in the field by Owner and/or shown on the Drawings.

- D. Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site preparation operations. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
- E. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- F. Notify interested utility companies to be present if disturbing ground in the vicinity of utilities.
- G. Protect active utility systems adjacent to or uncovered by any excavation during site preparation.
- H. Protect and maintain benchmarks, survey control points, monuments and other reference points and construction stakes from disturbance during construction.
- I. Protect all improvements to remain outside of construction from tree removal and/or pruning work.

3.02 ASPHALTIC CONCRETE PAVEMENT REMOVAL

- A. Saw cut full depth along pavement removal limits to create straight removal lines and prevent ragged edges.

3.03 PORTLAND CEMENT CONCRETE REMOVAL

- A. Saw cut 4-inches deep along concrete pavement removal limits to create straight removal lines and prevent ragged edges.
- B. Concrete sidewalk or driveways to be removed shall be neatly sawed in straight lines either parallel to the curb or at right angles to the alignment of the sidewalk. No section to be replaced shall be smaller than 30 inches in either length or width.
- C. Unless otherwise shown on the Drawings, if the saw cut would fall within 30 inches of a construction joint, expansion joint, or edge, the concrete shall be removed to the joint or edge, except that where the saw cut would fall within 12 inches of a score mark, the saw cut shall be made in and along the score mark.
- D. Curb and gutter to be removed shall be removed to an existing joint or sawed to a depth of 1-1/2 inches on a neat line at right angles to the curb face.

3.04 FENCES AND MISCELLANEOUS OBSTRUCTIONS

- A. No demolition or removal of fences or miscellaneous obstructions shall proceed until clearance is obtained from the Owner.

3.05 DISPOSAL OF WASTE MATERIALS

- A. Except for materials indicated to be stockpiled, reused, or to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from the site.

- B. Dispose of removed materials shall be accomplished at a suitable off-site location in accordance with applicable laws and ordinances.
- C. No burning shall be allowed.

END OF SECTION

DIVISION 3 – CONCRETE

SECTION 025130 - CONCRETE SITEWORK

PART1 - GENERAL

1.01 WORK INCLUDED

- A. Contractor shall provide all materials, labor, tools, equipment, fees, permits, transportation and other items required to furnish and install concrete sitework as indicated or as required to accomplish Work of other sections of these specifications. All concrete sitework shall be in accordance with applicable regulations and as specified herein.
- B. Concrete sitework includes, but is not limited to the following:
 - 1. Form Construction
 - 2. Concrete Materials
 - 3. Placing Concrete
 - 4. Sidewalk and Curb and Gutter Joints
 - 5. Hot and Cold Weather Concreting
 - 6. Finishing
 - 7. Curing
 - 8. Testing, Clean-up and Protection
 - 9. Truncated Domes

1.02 RELATED WORK

- A. Section 02220 - Excavating, Backfilling and Compaction
 - 1. Materials and compaction requirements for subgrades beneath paved areas.

1.03 REFERENCES

- A. The applicable provisions of the latest editions of the References listed below shall govern the Work covered under this Section, unless there is a conflict between said References and the requirements of this Section. In the case of such a conflict, the requirements of this Section shall apply.
- B. American National Standards Institute (ANSI)
- C. The American Concrete Institute (ACI)
- D. American Society for Testing and Materials (ASTM)
- E. American Association of State Highway and Transportation Officials (AASHTO)
- F. Provo School District Standard Construction Details
- G. Americans with Disabilities Act (ADA) – Accessibility Guidelines for Buildings and Facilities – Accessible Guidelines for the Blind (ADB)

1.04 SUBMITTALS

- A. Submit evidence of materials conformance with applicable requirements as well as these specifications.
- B. Submittals generally include, but are not limited to the following:
 - 1. A mix design shall be submitted to Engineer at least two weeks prior to commencement of the work.
 - 2. Submit construction, expansion and contraction joint layout plan for review and approval at least 14 days prior to start of concreting.
 - 3. Submit manufacturer's data for all materials used.
 - 4. Provide weight tickets to owner's representative for all ready-mixed concrete at the time of delivery to the site.

1.05 QUALITY ASSURANCE

- A. Qualifications of Workmen:
 - 1. Use workmen thoroughly trained and experienced in placing and finishing the types of concrete specified. Provide a minimum of one ACI certified flatwork finished with each concrete finishing crew.
- B. Comply with federal, state and local codes and regulations.
- C. Comply with hot or cold weather requirements when applicable.
- D. Two (2) Year Written Guarantee.
 - 1. Provide two-year written guarantee to the Owner, in form approved by the Engineer to promptly remove and/or repair defective concrete (cracking, spalling, pitting or honeycombing) as directed by Engineer and at Contractor's expense. New replacement work shall carry a similar two-year written guarantee. Guarantee shall start from Date of Substantial Completion.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Contractor shall be responsible for proper storage of all equipment and materials to be provided as part of this specification in accordance with the manufacturer's recommendations and shall be responsible for security and proper handling of such equipment and materials at the project site.
- B. Any materials lost, stolen, or damaged prior to Owner's final acceptance are to be replaced or repaired to the Owner's satisfaction by the Contractor at no additional cost to the Owner.

- C. Ready-mixed concrete: Concrete shall be mixed only in such quantities as are required for immediate use. The maximum allowable time between charging of the material in the mixing drum and final placing shall be ninety minutes for air temperatures below 80°F and sixty minutes for temperatures above 80°F. Concrete not placed within these time limits, or if an initial set has developed shall not be used. Tempering concrete by adding water or by other means will not be permitted.

1.07 MEASUREMENT AND PAYMENT

- a. Payment for curb and gutter replaced shall be based upon the measured linear footage of the curb and gutter installed and upon the unit price for each in the bid schedule. Payment for sidewalk installed shall be based upon the measured square footage for each thickness of sidewalk installed based upon the unit price in the bid schedule. Payment for driveway or drive apron installed shall be based upon the square footage of the concrete installed and shall be based upon the unit price in the bid schedule. Such prices shall include full compensation for the furnishing and placing of materials required to complete the curb, gutter, sidewalk, and drive aprons and driveway sections, including but not limited to all labor, equipment, tools, and incidentals to complete the Work in conformity with the specifications.

PART 2 - PRODUCTS

2.01 PORTLAND CEMENT CONCRETE MATERIALS

A. Cement:

1. Portland cement shall be Type II, complying with ASTM C 150 - Standard Specification for Portland Cement.

B. Coarse Aggregates:

1. Shall conform to ASTM C33 - Standard Specification for Concrete Aggregates.
2. Coarse aggregate shall be nominal $\frac{3}{4}$ " and shall be graded within the following limits:

Sieve	%Passing
1 - $\frac{1}{2}$ "	100
1"	95-100
$\frac{1}{2}$ "	25-60
No. 4	10-40

3. Coarse aggregate shall consist of gravel, crushed slag, or crushed stone, composed of hard, strong and durable particles, free of injurious coatings.

C. Fine aggregate:

1. Shall conform to ASTM C33.
2. Fine aggregate shall consist of natural sand, composed of hard, strong and durable particles.

3. Fine aggregate shall be uniformly graded from coarse to fine within the following gradation:

Sieve	%Passing
$\frac{3}{4}$ "	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-60
No. 50	10-30
No. 100	2-10

D. Water:

1. Water used in washing aggregate and mixing concrete shall be of a potable quality clean and free from oil, acid, salt, injurious amounts of alkali, organic matter or other deleterious substances.

E. Admixtures:

1. No admixture will be permitted to be used in Portland cement concrete except for an air entraining agent, and a concrete coloring agent.

F. Air entraining agent:

1. Shall be used in all concrete.
2. The agent shall conform to ASTM Designation C260 - Standard Specification for Air Entraining Admixtures for Concrete.
3. Shall be added at the mixer.

G. Concrete curing compound:

1. Liquid membrane curing compound shall comply with ASTM Designation C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete, Type II Class A. Moisture loss not more than 0.055 gr./sq. cm when applied at 200 sq. ft./gal.

2.02 PORTLAND CEMENT CONCRETE MIX

- A. Portland Cement Concrete shall consist of a mixture of water, Portland Cement, fine and coarse aggregates, and an air entraining agent.
- B. The proportions of the concrete materials shall produce a mixture that will work readily into corners and angles of forms and around reinforcing steel.
- C. The methods of measuring concrete materials shall permit proportions to be accurately controlled and easily checked. Measurement of materials for ready-mixed concrete shall conform to ASTM C94 - Standard Specification for Ready-Mixed Concrete.

D. Concrete mix design:

Intended Use:	Storm drainage, curbs, walks and driveways.
Coarse Aggregate Size:	1”
Minimum Cement Content	6.5 sacks / CY
Minimum 28 Day Compressive Strength:	4000 psi
Minimum 28 Day Flexural Strength	550 psi
Required Slump	2.5 – 4 inches
Air Entrainment	5 – 6.5 percent

E. The contractor shall be responsible for the mix design.

2.03 JOINT MATERIALS (In conjunction with 2012 APWA Specification 32 16 13)

- A. Filler material shall be pre-formed, non-extruding resilient type complying with ASTM D-544 of thickness to fill joint.
- B. Joint sealant shall be polyurethane based, self leveling, one part elastomeric sealant complying with FS-TT-SO0230 Class A Type 1. (unless Type 11 is recommended by manufacturer for application). Select marketing materials of sufficient strength and hardness to withstand stiletto heel traffic without damage or deterioration.

2.04 CONCRETE REINFORCEMENT

(In conjunction with 2012 APWA Specification 32 16 13)

A. Reinforcing steel:

1. All reinforcing bare material used for reinforcement of concrete shall be intermediate Grade 60 steel conforming to the requirements of ASTM A-615.
2. All rods shall be deformed and round.
3. All reinforcement shall be uncoated, free from rust, scale, form oil, etc.
4. Welded wire fabric for concrete reinforcement shall conform to ASTM A-1 85.

B. Accessories:

1. All accessories, including such items as chairs, spacers, saddles, etc., shall be of steel formed in such a manner and with sufficient strength to perform the intended functions. Chairs, spacers, saddles, etc., which are set in contact with forms, are to be galvanized or provided with plastic tips or coating to prevent rust spots on finish concrete surface.

C. Wire:

1. All tying steel shall not be less than 18 gage annealed iron lacing wire. All wire tie ends shall point away from forms.

D. Fibermesh:

1. All flatwork to have fibermesh.

2.05 FORM MATERIALS (In conjunction with 2012 APWA Specification 32 16 13)

- A. Forms shall be of suitable material and of a type, size, shape, quality, and strength to insure construction as designed.
- B. Metal forms for exposed surfaces may be used when all bolt and rivet holes are countersunk so that a plane, smooth surface of the desired contour is obtained.
- C. Rough lumber may be used for forming surfaces that will be covered by earth in the finished structure.
- D. Forms for all surfaces that will not be completely enclosed or hidden below the permanent surface of the ground shall be made of surfaced lumber, or material which will provide a surface at least equal to surfaced lumber or plywood.
- E. All lumber shall be free from knotholes, loose knots, cracks, splits, warps, or other defects affecting the strength or appearance of the finished work. Any lumber or material which becomes badly checked or warped, prior to placing concrete, shall not be used.
- F. All forms shall be free of bulge and warp, and shall be cleaned thoroughly before being used.

2.06 TRUNCATED DOMES

- A. All truncated domes shall comply with the ADB and ADA requirements for such applications, and shall be constructed using a 2 foot by 4 foot CASTinTACT panels, red in color, or approved equal.

2.07 EQUIPMENT (In conjunction with 2012 APWA Specification 32 16 13)

- A. The use of Power Screed equipment will be required for all concrete pavement work.
- B. Slip-Form Paver:
 - 1. At the option of the Contractor, and with the approval of the Engineer, concrete pavement may be constructed by the use of slip-form paving equipment. The slip-form paver shall consist of a self-propelled, self-powered machine capable of spreading, vibrating, tamping, striking-off, and shaping the concrete to the desired line, grade, and thickness in one continuous passage.
 - 2. The slip-form paver shall be equipped with internal-type vibrators meeting the following requirements:

Eccentric Diameter	1-7/8 inch
Frequency	9,500 vibrations per minute (min)
Spacing	24 inches maximum when mounted transversely; 18 inches when mounted longitudinally

3. The vibrators shall be operated horizontally at the height of the midpoint of the concrete slab and shall be mounted so they will maintain this position. The vibrators may be mounted in a traverse or longitudinal position.
4. Each vibrator shall be equipped with an indicator light or other electrical device that will indicate whether or not the vibrator is operating. The lights or other devices shall be mounted on the paving machine so they can be easily seen by the operator and the inspector. If the lights or other devices show that a vibrator or vibrators are not operating properly, the paving operations shall be stopped immediately. Paving operations shall not be resumed until the faulty vibrator or vibrators have been repaired or replaced.
5. The paver shall be capable of providing a continuous deposit of concrete with a minimum of starting and stopping. Trailing forms shall be of a sufficient length to leave a smooth, straight, vertical edge or a keyed longitudinal construction joint of the shape shown on the Drawings. The trailing forms shall be held in position by suitable devices sufficiently rigid to prevent spreading of the forms under the weight of the concrete and finishing operations.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Coordinate layout and installation of concrete sitework with other construction elements to ensure adequate headroom, working clearance, and access.
- B. Examine surfaces to receive concrete sitework for compliance with installation tolerances and other conditions affecting performance of the paving system. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 METHODS OR PROCEDURES

- A. Preparation
 1. Remove all wood scraps, ice, snow, frost and debris from the areas in which concrete will be placed.
 2. Thoroughly clean the areas to ensure proper placement and bonding of concrete.
 3. All reinforcement shall be free from loose mill scale, loose or thick rust, dirt, paint, oil, or grease, and shall present a clean surface.
 4. Thoroughly wet the forms (except in freezing weather), or oil them and remove all standing water.
 5. Thoroughly clean all transporting and handling equipment.
 6. Notify the City at least 24 hours before placing concrete.
 7. Obtain the Engineer's approval of location of all construction joints and control joints in the Work prior to start of concrete placement.
 8. Erect and maintain suitable barriers to protect the finished surface. Any section damaged from traffic or other causes occurring prior to its official acceptance shall be repaired or replaced by the Contractor at his own expense in a manner satisfactory to the Architect/Engineer.
- B. Hot Weather Concreting

1. Hot weather is defined as any combination of high air temperature, low relative humidity, and wind velocity tending to impair the quality of fresh or hardened concrete or otherwise resulting in abnormal properties. Hot weather concreting shall follow the guidelines of ACI 305R, latest edition.
2. Undesirable hot weather effects on concrete in the plastic state may include:
 - a. Increased water demand.
 - b. Increased rate of slump loss and corresponding tendency to add water at job site.
 - c. Increased rate of setting resulting in greater difficulty with handling, finishing, and curing, and increasing the possibility of cold joints.
 - d. Increased tendency for plastic cracking.
 - e. Increased difficulty in controlling entrained air content.
3. Undesirable hot weather effects on concrete in the hardened state may include:
 - a. Decreased strength resulting from higher water demand and increased temperature level.
 - b. Increased tendency for drying shrinkage and differential thermal cracking.
 - c. Decreased durability.
 - d. Decreased uniformity of surface appearance.
4. Placing and curing:
 - a. Concrete shall be handled and transported with a minimum of segregation and slump loss. Concrete temperature at time of placement shall be such that the rate of evaporation for the weather conditions shall not cause cracking.
 - b. The aggregate shall be cooled by frequent spraying in such a manner as to utilize the cooling effect of evaporation. The placement schedule shall be arranged, as approved, in such a manner as to provide time for the temperature of the previously placed course to begin to recede. The mixing water shall be the coolest available at the site insofar as is practicable.
 - c. Concrete shall be placed where it is to remain.
 - d. Concrete shall be placed in layers shallow enough to assure vibration well into the layer below.
 - e. Surfaces exposed to the drying wind shall be covered up immediately after finishing with polyethylene sheets and be water cured continuously as soon as the concrete has set up. Curing compounds, in lieu of water, may be used.
 - f. Joints be made on sound, clean concrete.
 - g. Finishing operations and their timing be shall be guided only by the readiness of the concrete for them, and nothing else.

- h. Curing shall be conducted in such a manner that at no time during the prescribed period will the concrete lack ample moisture and temperature control. Facilities must be ready to protect promptly all exposed surfaces from drying. All work determined by Engineer to be damaged from hot weather shall be removed and replaced at no cost to Owner.
- i. All materials and workmanship required to meet the hot weather requirements shall be supplied at the Contractor's own expense.

C. Cold Weather Concreting

1. Cold weather is generally defined as a period when for more than 3 successive days the mean daily temperature drops below 40°F. When temperatures above 50°F occur during more than half of any 24-hour period, the weather should no longer be regarded as "cold". The times and temperatures given for various conditions and situations are not exact values and should not be used as such. Weather conditions are variable and common sense must be used to protect the concrete. Cold weather concreting shall follow the guidelines of ACI 306R, latest edition.
2. All materials and workmanship required to meet the cold weather requirements shall be supplied at the Contractor's own expense.
 - a. Preparation:
 - i. When specific written authorization is given to permit concreting operations at temperatures below those specified herein, arrangements for covering, insulating, housing, or heating materials and/or newly-placed concrete should be made in advance of placement and should be adequate to achieve the temperature and moisture conditions recommended herein in all parts of the concrete. All equipment and materials necessary should be at the work site before the first frosts are likely to occur, not after concrete has been placed and its temperature begins to approach the freezing point.
 - b. Concrete Temperature:
 - i. The temperature of the concrete as mixed shall be maintained as shown in the following table:

Air Temperature	Minimum Concrete Temperature as mixed
Above 30°F	60°F
0°F to 30°F	65°F
Below 0°F	70°F
 - ii. The minimum concrete temperature as placed and maintained shall be 55°F.
 - c. Placement and protection:

- i. During placement of concrete, tarpaulins, or other readily movable coverings supported on horses or framework should follow closely the placing of the concrete so that only a few feet of concrete are exposed to outside air at any time.
- ii. The housing, covering, or other protection used in curing shall remain intact at least 24 hours after artificial heating is discontinued.
- iii. All concrete placed in forms shall have a temperature between 55°F and 70°F after placement. Adequate means shall be provided for maintaining the surrounding air at 60°F for at least seventy-two (72) hours after placing and at no less than 40°F for an additional four days. All methods and equipment for heating shall be subject to approval. Insulating blankets shall be used when required to maintain a satisfactory temperature during the curing period.
- iv. No dependence shall be placed on salt or other chemicals for the prevention of freezing.
- v. If heating or other protective measures need to be taken to prevent concrete from freezing, the concrete may require special curing methods to prevent rapid drying, as described in ACI 306R-78.
- vi. Salt or other chemicals shall not be used for prevention of freezing.

3.03 INSTALLATION (In conjunction with 2012 APWA Specification 32 16 13)

A. Form Construction

1. Forms shall be constructed so that the finished concrete shall be of the form and dimensions shown on the plans and true to line and grade, and sufficiently rigid to resist deflection. Design of form work and removal of forms and shores are to conform to ACI 381. The responsibility for their adequacy shall rest with the contractor.
2. All forms shall be mortar tight and designed and constructed so that they may be removed without injuring the concrete.
3. If, at any stage of the work, during or after placing the concrete, the forms sag or bulge to such an extent as to allow concrete to fall below the elevation shown on the plans, or outside the true line of the form, the concrete affected shall be removed.
4. No concrete may be deposited against the earth as a side form.

B. Placing Steel Reinforcement

1. Reinforcing bars shall be accurately placed as shown on the plans and shall be firmly and securely held in position in accordance with the "Manual of Standard Practice" of the Concrete Reinforcing Steel Institute, using concrete or metal chairs, spacers, metal hangers, supporting wires and other appropriate devices of sufficient strength to resist crushing under full load. Metal chairs which extend to the surface of the concrete (except where shown on the plans) and wooden supports, shall not be used.
2. Placing bars on layers of fresh concrete as the work progresses and adjusting bars during the placing of concrete will not be permitted.
3. Tack welding of reinforcing bars in place shall not be allowed.

4. Splicing:
 - a. Splices of bars shall be made only where shown on the Drawings or as approved by the Owner.
 - b. Where bars are spliced, they shall be lapped at least 30 diameters, unless otherwise shown on the plans.
 - c. Splicing shall be accomplished by placing the bars in contact with each other and wiring them together.

5. Bending reinforcement:
 - a. Bends and hooks in bars shall be made in the manner prescribed in the "Manual of Standard Practice" of the Concrete Reinforcing Steel Institute.
 - b. Bars shall not be bent or straightened in a manner which will injure the material.
 - c. Bars with kinks or unspecified bends shall not be used.

C. Placing Concrete

1. Convey concrete from mixer to place of final deposit by methods that will prevent separation and loss of materials.
 - a. The free fall of concrete from the end of the spout or chute, or from a transporting vehicle, shall not exceed 10 feet for thin walls (10 inches or less in thickness) nor more than 5 feet for other types of construction.
 - b. When the distance through which concrete must be dropped vertically exceeds the maximums specified above, a tremie or flexible metal spout shall be used. Flexible metal spouts having sufficient strength to hold the weight of the concrete shall be composed of conical sections not more than 3 feet long, with the diameter of the outlet and taper of the various sections such that the concrete will fill the outlet and be retarded in its flow.
 - c. Chutes, troughs, or pipes used as aids in placing concrete shall be arranged and used so that the ingredients of the concrete will not be separated. Chutes and troughs shall be of metal or metal-lined. When steep slopes are necessary, the chutes shall be equipped with baffle boards or a reversed section at the outlet. Open troughs and chutes shall extend, if necessary, down inside the forms or through holes left in the forms; or the ends of such chutes shall terminate in vertical downspouts.

2. Place concrete as dry as possible consistent with good workmanship, never exceeding the maximum specified slump.
3. On arrival at the job site, adding water to the mix shall not be allowed.
4. Place concrete at such a rate that concrete is at all times plastic and flows readily between bare bars.
5. When placing is once started, carry it on as a continuous operation until placement of the section is complete.
6. Do not pour a greater area at one time than can be properly finished without checking; this is particularly important during hot or dry weather.

7. Thoroughly consolidate by suitable means during placement, working it around all embedded fixtures and into corners of forms.
8. No water shall be added to the concrete surface behind the screed. Addition of water to the concrete surface shall be cause for shutting down the placement operations and rejection of any suspect work.
9. Do not use re-tempered concrete that has been contaminated by foreign materials.
10. Struts, stays, and braces serving temporarily to hold the forms in correct shape and alignment, pending the placing of concrete at their locations, shall be removed when the concrete placing has reached the elevation rendering their service unnecessary. These temporary members shall be entirely removed from the forms.
11. Unless necessary materials and equipment are readily available to adequately protect the concrete in place, placing operations may be postponed by the Engineer when, in his opinion, impending conditions may result in rainfall or low temperatures which will impair the quality of the finished work. The Contractor shall pay for all delay related costs resulting from such postponements including costs for removing and replacing damaged concrete. In case rainfall should occur after placing operations are started, provide ample covering to protect the work.
12. Whenever it is necessary to continue the mixing, placing, and finishing of concrete after daylight hours, the site of the work shall be adequately lighted so that all operations are plainly visible. Every effort shall be made to enable finishing to be done in daylight.
13. Except by specific written authorization from the Architect/Engineer, concreting operations shall not be continued when a descending air temperature, in the shade and away from artificial heat, falls below 40°F, nor shall operations be resumed until ascending air temperature reaches 35°F. However, such authorization shall in no way relieve the Contractor of responsibility for proper results. Any concrete injured by frost action shall be removed and replaced at the Contractor's expense. All materials and workmanship required to meet the cold weather requirements shall be supplied at the Contractor's own expense.
14. The concrete shall be distributed to such depth and width that the plan thickness and grade will be obtained for the entire width of the pass. The spread concrete shall be vibrated, screened, and tamped by mechanical means. No manual screening or tamping will be allowed, except in those cases where the use of a mechanical tamper and screener would be obviously impracticable. Any delay in excess of fifteen minutes in vibrating, screening and tamping shall constitute cause for shutting down the operation until the difficulties are corrected.
15. Discharge of mixed concrete from hauling equipment and processing by the initial power lay down machine or power screed shall be accomplished within sixty minutes after introduction of the mixing water to the cement and aggregates.
16. The concrete shall be deposited in such a manner as to require as little rehandling as possible. It shall be thoroughly vibrated against and along the faces of the forms. Necessary hand spreading shall be done with shovels, not with rakes. Workmen shall not be allowed to walk in the newly placed concrete with boots coated with earth.

D. Sidewalk and Curb and Gutter Joints

1. Locate joints as specified herein or as required on the plans.
 2. Make all joints perpendicular and straight.
 3. Joints for concrete structures that were removed or damaged as a result of construction under this contract shall match joints in the remaining original structure.
 4. Expansion Joints
 - a. Sidewalk: Expansion joints one-half inch in thickness shall be constructed every 40-50 feet by using premolded expansion joint material. Also, expansion joints shall be placed where the new sidewalk meets existing sidewalks, fixed objects and where it meets the curb at all handicap ramps. No dowel bars shall be required at the joints.
 - b. Curb & gutter: Expansion joints, one-half inch in thickness, shall be constructed every 40-50 feet and at changes in direction by using premolded expansion joint filler. For both formed and slipformed curb and gutter, joint filler shall also be placed between the curb and/or gutter and storm drainage structures.
 - c. Joint sealant will be installed over all expansion joints. Provide bond breaker and install per manufacturer specifications.
 5. Contraction Joints
 - a. Sidewalk: Contraction joints shall be constructed at intervals equal to the width of the walk by cutting into the fresh concrete to a minimum depth of 1/4 of the thickness of the concrete to create a plane of weakness. The edges of tooled joints shall be rounded to provide a neat, workmanlike appearance.
 - b. Curb: Contraction joints shall be constructed every ten feet as shown on the plans by using steel templates not less than one-eighth inch nor more than three-sixteenth inch in thickness. The templates shall be removed as soon as the concrete has set sufficiently to hold its shape. Where curbs and curb and gutter are placed by slipform methods, the contraction joints every ten feet may be provided by cutting into the fresh concrete to a minimum depth of 1-1/2 inches to create a plane of weakness. The edges of such joints shall be rounded to provide a neat workmanlike appearance.
 6. Immediately after the forms are removed, the expansion joints shall be inspected carefully. Any concrete or mortar that has sealed across the joint shall be cut neatly and removed.
- E. Finishing
1. The surface of the concrete shall be finished smooth and true to grade by float. The finishing shall commence immediately after the concrete is placed and shall progress at a rate equal to the progress of the paving operation. Any delay in excess of thirty minutes in performing the preliminary finishing shall constitute cause for shutting down the mixing operations until the finishing is resumed.

2. Hand methods of strike-off and consolidation will only be permitted when the width of pavement to be constructed is less than 10 feet or at rounded intersections where the use of machine finishing is impracticable.
3. While the concrete is still plastic, the entire slab surface will be tested by the Contractor for trueness with an accurate 10 foot straightedge. Any depressions that are found shall be immediately filled with freshly mixed concrete, struck-off, consolidated and refinished. High spots shall also be struck-off and refinished.
4. In advance of the curing operations the pavement shall be textured by brooming. Initial brooming operation shall permit Owner to review texture and recommend modifications, if any.
5. Finished Surface:
 - a. The finished surface shall be true to grade and cross section, free from ruts, humps, depression or other irregularities. The surface shall not deviate from line and grade by more than 1/8 inch, plus or minus, in 10 feet. The determination of compliance with smoothness may be made with a straightedge or string line at the option of the Engineer. Any irregularities that may be found shall be corrected at the expense of the Contractor by means of a suitable grinding and grooving tool.
 - b. The grinding tool shall consist of a machine equipped with cutting wheels mounted on a horizontal shaft. The grinding action shall be conducted parallel to the centerline. Grinding operations shall be deferred, as directed by the Engineer, whenever tearing of aggregate with the surface occurs and shall not be resumed until the concrete has hardened sufficiently to avoid tearing.
 - c. The finished surface across contact joints shall not deviate from a straight line by more than 1/8 inch (vertically) in 12 inches when tested with a straightedge. The Contractor shall take the necessary precautions to prevent slumping of the edge of the concrete at contact joints.
 - d. Line and grade control: The Contractor shall establish references at reasonable intervals, usually at subgrade elevation, for line and grade control of the placing operations. The Contractor shall furnish, place, and maintain such supports, wire devices, and materials as may be required to provide continuous line and grade reference controls to the placing machine, trimmers or paver.
 - e. At least one ACI certified concrete finisher to be on crew at all times.

3.04 PROTECTION

- A. The Contractor shall protect the concrete against all damage and markings. Barricades shall be placed at the proper locations to prevent traffic from using the pavement.
- B. When it is necessary to provide for traffic crossing the concrete, the Contractor shall, at his expense, construct suitable substantial crossings to bridge over the concrete satisfactory to the Engineer.

- C. Newly placed concrete shall be protected from damage by rain, snow and hail. Placing operations shall be stopped when rain is threatening, as determined by the Owner. The Contractor shall have available on the project enough material to cover the plastic concrete to prevent damage by rain, snow or hail. Any concrete damage due to rain, snow or hail shall be removed, by the Contractor at his expense.
- D. No traffic or Contractor's hauling equipment will be permitted on the concrete until the concrete has developed a modulus of rupture of 450 psi, when tested in accordance with AASHTO Designations T-97 but, in no case before ten calendar days have elapsed after the concrete has been placed. The concrete shall be cleaned and all joints shall be sealed and trimmed as previously specified before traffic is allowed to use the pavement.
- H. Curing
 - 1. Protect the concrete from the effects of weather in accordance with HOT WEATHER CONCRETING AND COLD WEATHER CONCRETING in this section.
 - 2. Water for curing shall be as specified in PART 2 - PRODUCTS.
 - 3. Other curing requirements may be required in individual Specifications Sections.
 - 4. Membrane curing compound method:
 - a. Surface of newly placed or exposed concrete shall be kept moist or wet until the curing compound is applied. The curing compound shall be applied immediately after all patching or surface finishing has been completed.
 - b. The curing compound shall be delivered to the work in ready-mixed form. At the time of use, the compound shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. The compound shall not be diluted or altered in any manner.
 - c. Curing compound that has become chilled to such an extent that it is too viscous for satisfactory application shall be warmed to a temperature not exceeding 100°F, unless otherwise specified by manufacturer's recommendations.
 - d. The curing compound shall be applied to the exposed surface at a uniform rate of 1 gallon per 100 square feet of area, unless otherwise required by manufacturer's recommendations.
 - e. In the event that the application of curing compound is delayed, the application of water as provided in this section shall be started immediately and shall be continued until application of the compound is resumed or started.

3.05 TESTING

- A. Testing will be provided by an independent testing laboratory employed by the Owner. Refer to individual Specifications Sections for other Field Quality Control requirements.
- B. Concrete sampled from a concrete pump shall be sampled from the hose after all of the priming grout has been wasted. The end of the hose shall be placed in a horizontal position before the concrete is discharged into the sampling pan. The concrete shall not be allowed to fall into the sampling pan.

- C. The Contractor, at his expense, shall furnish the concrete required for testing.
- D. Strength, slump and air tests shall be taken in accordance with the following unless otherwise specified in individual Specifications Sections:

- 1. Strength, slump and air tests may be taken in accordance with the placement rate per day as shown below:

Rate/day (C.Y.)	Air	Slump	Compressive Strength
0-8	1	1	Optional
8-20	1	1	1
For each 20 C.Y. or fraction thereof	1	1	1

- 2. Compressive strength test specimens shall be made and cured in accordance with ASTM C31 -Standard Practice for Making and Curing Concrete Test Specimens in the Field; Specimens shall be tested in accordance with ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - a. Three specimens shall be prepared for each test, and these shall be broken at 7 and at 28 days, with one held in reserve.
 - b. At least one test (3 specimens) shall be made for each class of concrete or each poured during one day.
- 3. If an air test does not meet the specification, a second air test shall be made immediately upon the same load. The concrete shall be accepted if the second air test meets the specification or rejected and removed from the project if the second air test does not meet the specification.
- 4. Slump and air tests shall be made in accordance with ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete and C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method, respectively.
- 5. The maximum allowable time between charging of the material in the mixing drum and final placing shall be ninety minutes for air temperatures below 80°F and sixty minutes for temperatures above 80°F. Concrete not placed within these time limits, or if an initial set has developed shall not be used. Tempering concrete by adding water or by other means will not be permitted.
- 6. If a compressive strength test is below the required specified strength, the Engineer shall immediately notify the Contractor or his authorized representative.
- 7. All costs incurred in resampling and retesting shall be paid by the Contractor if the retested strength is below the specified strength, and shall be assumed by the Owner if the retested strength is above the specified strength.

3.06 CLEANING

- A. Contractor shall remove all forms, excess materials, debris and other items upon completion of concrete sitework.
- B. All damage to concrete sitework prior to Owner's acceptance shall be repaired or replaced to Owner's satisfaction at the expense of the Contractor.

* * * END OF SECTION* * *

SECTION 031000 - CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Anchor bolts.
2. Expansion, contraction and construction joints.
3. Waterstops.
4. Bearing and filler pads.
5. Joint sealers.
6. Floor Sealer.

B. Related Requirements:

1. Section 032000 - Concrete Reinforcing: Reinforcing steel and required supports for cast-in-place concrete.
2. Section 033000 - Cast-in-Place Concrete: Cast-in-place or in-situ concrete for structural building frame, slabs-on-grade, and other concrete components associated with building.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Section 012000 - Price and Payment Procedures: Contract Sum/Price modification procedures.

1.3 REFERENCE STANDARDS

A. ASTM International:

1. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
2. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

1.4 COORDINATION

- A. Section 013000 - Administrative Requirements: Requirements for coordination.
- B. Coordinate Work of this Section with other Sections of Work in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

1.5 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.

- B. Product Data: Submit manufacturer's information (catalog data) for the following:
1. Anchor Bolts and Sealant
 2. Joint sealer.
 3. Floor Sealer
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.6 QUALITY ASSURANCE

- A. Qualifications of Workmen:
1. Use workmen thoroughly trained and experienced in placing and finishing the types of materials specified.
- B. Comply with federal, state and local codes and regulations.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Materials shall be delivered, stored, and handled so as to prevent damage by water or inclusion of foreign materials. Packaged materials shall be delivered and stored in original package, marked with brand and maker's name, until ready for use. Packages of materials showing evidence of water or other damage shall be rejected. Bulk cement shall be identified by shipping and delivery statements.

PART 2 - PRODUCTS

2.1 CONCRETE ACCESSORIES

- A. Plastic Waterstops:
1. Shall be of an approved type, supplied by an approved manufacturer and shall be plastic made of virgin polyvinyl chloride compound, shall be ribbed, uniform in dimensions, dense, homogeneous and free from porosity. The material shall meet the following minimum requirements:

Tensile strength	2000psi
Ultimate elongation	350%
Shore hardness	70 - 80
Specific gravity	1.3
Stiffness in flexure	1300 psi
Cold brittleness	35 F
Water absorption in 48 hours	0.320%
Tear resistance	290 #/inch
Water head	150 feet

2. Permissible tolerances:

Width (6" and less) -- plus or minus 1/8"
 Width (over 6") -- plus or minus 1/4"
 Thickness -- plus 1/16", minus 1/32"

B. Rubber Waterstops: In lieu of plastic, rubber waterstops will be considered provided the proposed section will develop the same ultimate force as the plastic waterstop section specified, and provided splices can be made which will be fully watertight and will be able to develop a strength of 75 percent of the pulling strength of the waterstop.

C. Neoprene Bearing Pads:

1. Shall be of the dimensions and hardness shown on the Drawings and shall conform to ASTM D2000, including the following:

Durometer	ASTM Designation	Design	Test Temperature 'C	Design	Maximum Swell Volume	Minimum Tensile Strength MPa	Psi	Ultimate Elongation (%)
40	MBC 414	B	100	C	120	14	2031	400
30	MBC 310	B	1010	C	120	10	1450	400

2. The Contractor shall provide reports of tests made in accordance with the applicable ASTM standards by an independent testing laboratory approved by the Engineer for the following properties:escription:

- a. Test Temperature
- b. Maximum Swell Volume
- c. Minimum Tensile Strength.
- d. Ultimate Elongation

3. Additional tests may be performed at the expense of the Owner by a testing laboratory of Owner's choice to further demonstrate the conformance of the bearing pads with this specification.

D. Neoprene Filler Pads:

- 1. Shall be closed cell type, soft grade, conforming to SCE-41 of ASTM D 1056-67 and 68 and RE-4IEI of ASTM DI056-73.
- 2. Shall be at least 1/4" wider than theoretically required to facilitate placing and to reduce development of voids between filler pads, bearing pads and waterstops.

3. Quality Standard: Rubatex R411N
- E. Joint Sealant:
1. Shall be polyurethane based, multi-component elastomeric sealant complying with Federal Specification TT -00227E Class A Type II and with ASTM C-920.
 2. Quality Standard: Sikaflex-2c, Permapol RC-270.
 3. Slump: Joint sealer shall not sag when installed in 1/2" wide, 1" deep and at least 6" long groove in concrete and maintained in a vertical position at a temperature of 180 F for 24 hours.
 4. Extensibility: Joint sealer shall not pull away from sides or rupture within itself when installed between two concrete blocks and a temperature of 50 F extended 50 times at the rate of 0.1" to 0.15" per hour.
 5. Plasticity: Joint sealers shall be of a soft enough consistency that the material may be placed in the grooves with the aid of putty knives without having to heat the material when installed under 70 F ambient temperature conditions.
- F. Backer Rod:
1. Shall be installed prior to applying sealant following Sealant manufacturer's recommendations. Backer Rod must be polyethylene or other closed cell material.
- G. Floor Sealant
1. Shall be XYPEX or an approved equal.

2.2 ANCHOR BOLTS

- A. Anchor bolts shall conform to ASTM A-276 for Type 302 Stainless Steel

PART 3 - EXECUTION

3.1 ANCHOR BOLTS

- A. Locate in accordance with the Drawings.

3.2 EXPANSION, CONTRACTION AND CONSTRUCTION JOINTS

- A. Locate joints in accordance with the Drawings or these Specifications, or as otherwise approved by the Engineer. The method and materials used shall be subject to the approval of the Engineer.
- B. Remove all obstructions including concrete and nails from surfaces of floor, footing and roof joints before installing waterstops, bearing pads, filler pads and joint sealers.
- C. Make all joints perpendicular and straight. In no case shall fixed metal, embedded in or otherwise bonded to the concrete, be continuous through an expansion joint.

- D. Expansion joints shall be formed as shown on the Drawings or as required by local jurisdiction having authority.
 - 1. Walks, curb, gutter and drive apron: Expansion joints shall be constructed at intervals multiple of the contraction joint interval nearest to 50'. No dowel bars shall be required at the joints.
- E. Immediately after the forms are removed, the expansion joints shall be inspected carefully. Any concrete or mortar that has sealed across the joint shall be cut neatly and removed.
- F. Construction joints shall be located as shown or noted on the Drawings or as required by these Specifications, and shall be as detailed or otherwise approved by the Engineer
- G. No horizontal construction joints in reservoir walls will be permitted. Vertical construction joints in reservoir walls shall be no farther apart than 60 feet.
- H. Before depositing new concrete on or against concrete, which has hardened, or when horizontal cold joints are encountered, the forms shall be retightened. The surface of the hardened concrete shall be roughened in a manner that will not leave loosened particles of aggregate or damaged concrete at the surface. It shall be thoroughly cleaned of foreign matter and latency and covered with a 2" mortar bed immediately before the new concrete is placed.

3.3 WATERSTOPS

- A. Shall be correctly positioned in the forms so that the center of the waterstop is centered on the joint.
- B. Where preformed expansion joint material is used in conjunction with the waterstop, allowance shall be made for equal waterstop embedment on each side in the concrete.
- C. Waterstop shall be held in place in the forms by use of a split form or other approved method that will positively hold the waterstop in the correct position and to the correct alignment.
- D. Horizontal waterstops shall be bent up during placing of concrete until the concrete has been brought to the level of the waterstop; additional concrete shall then be placed over the waterstop, after which the concrete shall be thoroughly vibrated.
- E. All horizontal and vertical waterstops, which are not accessible during pouring, shall be tied off in two directions every 12 inches in such a manner that bending over one way or another is prevented. A hog-ring or nail may be driven through both ends of the waterstop to facilitate placing and tying of waterstops to reinforcing steel forms or form ties.
- F. All waterstops shall be properly spliced and joints shall be checked for strength and pinholes after splicing. Splices shall be strong enough to develop a pulling force of 75 % of the strength of the waterstop, and shall be watertight.
- G. The ends of the radial waterstop in wall footings shall be joined to the circumferential waterstop in the wall to wall-footing joint and to the circumferential waterstops in the floor to wall-footing joints.

3.4 BEARING AND FILLER PADS

- A. Shall be glued to the concrete with an approved rubber cement material to prevent uplift of the pads during concrete pouring.
In addition, for poured in place walls, all pads shall be held down with approved plastic chairs or shim plates placed under the reinforcing steel.
- B. Nailing down pads will not be permitted.
- C. Voids and cavities between bearing and filler pads, waterstop and seismic cable sleeves, irrespective of whether these voids are large or small, shall be filled with a soft mastic of a consistency that will not adversely affect the quality of plastic and neoprene materials.
- D. Workmanship shall be such that no cement grout or concrete seepage will occur through the bearing and filler pad area resulting in a restraint of radial wall movements.
- E. A continuous neoprene pad and one or more sponge filler pads shall be provided between the top of the wall and the underside of the roof. Any void areas shall be caulked and sealed to prevent any mortar from the roof pour to come in contact with the wall top.

3.5 JOINT SEALANTS

- A. Joint sealed areas shall be sandblasted and blown clean of dust and sand with compressed air before the material may be applied.
- B. Joints shall be primed and sealant shall be applied in accordance with the manufacturer's recommendations.

3.6 FLOOR SEALANTS

- A. Surface Preparation - Concrete surfaces to be treated must be clean and free of laitance, dirt, films, paint, coatings or other foreign matter. The surfaces must also have an open capillary system so as to provide tooth and suction for the treatment. If surfaces are too smooth, the concrete should be acid etched, lightly sandblasted or waterblasted. Structural defects such as cracks, faulty construction joints and honeycombing should be routed out to sound concrete and repaired. Horizontal surfaces should have a rough wood float or broom finish.
- B. Floors shall be primed and sealant shall be applied in accordance with the manufacturer's recommendations.

END OF SECTION 031000

SECTION 032000 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Reinforcing bars.
2. Welded wire fabric.
3. Reinforcement accessories.

B. Related Requirements:

1. Section 031000 - Concrete Forming and Accessories: Form materials, waterstops, and accessories required to form cast-in-place concrete.
2. Section 033000 - Cast-in-Place Concrete: Cast-in-place or in-situ concrete for structural building frame, slabs on grade, and other concrete components associated with building.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Measurement and Payment shall be per section 012000 Measurement and Payment.

1.3 REFERENCE STANDARDS

A. American Concrete Institute:

1. ACI 301 - Specifications for Structural Concrete.
2. ACI 318 - Building Code Requirements for Structural Concrete.
3. ACI 530/530.1 - Building Code Requirements and Specification for Masonry Structures.
4. ACI SP-66 - ACI Detailing Manual.

B. ASTM International:

1. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

C. Concrete Reinforcing Steel Institute:

1. CRSI 10-MSP - Manual of Standard Practice.
2. CRSI 10PLACE - Placing Reinforcing Bars.

1.4 COORDINATION

- A. Section 013000 - Administrative Requirements: Requirements for coordination.

- B. Coordinate Work of this Section with placement of formwork, formed openings, and other Work.

1.5 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings:
 - 1. Indicate bar sizes, spacings, locations, splice locations, and quantities of reinforcing steel and welded wire fabric.
 - 2. Indicate bending and cutting schedules.
 - 3. Indicate supporting and spacing devices.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified ASTM A-615, grade 60 requirements.
- D. Submit certified copies of mill test report of reinforcement materials analysis.

1.6 QUALITY ASSURANCE

- A. Perform Work according to CRSI 10-MSP
- B. Prepare Shop Drawings according to ACI SP-66.
- C. Maintain **copies** of each standard affecting Work of this Section on Site.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. During shipment, steel shall be adequately packaged against intrusion of chemical contaminants (from the atmosphere or otherwise) for the protection of the steel against physical damage and corrosion during shipping and storage.
- C. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage. Steel that has sustained physical damage through rust or otherwise will be rejected.
- D. Store materials according to manufacturer instructions.
- E. During construction, steel shall be stored off the ground on planks, supported by 4" x 4" timber, which shall be covered with polyethylene or sizalkraft paper to prevent any moisture from coming up from the bottom.
- F. Protection:
 - 1. Protect materials from moisture by storing in clean, dry location remote from construction operations areas.

2. Provide additional protection according to manufacturer instructions.
3. Steel and accessories shall be covered with waterproof tarpaulins to protect them from rain, moisture and dust.

1.8 EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel:

1. Comply with ASTM A-615.
2. Yield Strength: 60 ksi (grade 60).
3. Billet Bars: shall be deformed and round, unless otherwise shown.
4. Finish: shall be galvanized where shown on the Drawings.
5. All reinforcement shall be uncoated, free from rust, scale, form oil, etc.

B. Plain Bar Mats:

1. Material: Steel bars.
2. Comply with ASTM A704.
3. Fabrication: ASTM A615.
4. Yield Strength: 60 ksi (60 grade)
5. Finish: Galvanized or Epoxy coated.

C. Deformed Wire:

1. Comply with ASTM A1064
2. Finish: Uncoated or Epoxy coated.

2.2 FABRICATION

- A. Fabricate concrete reinforcement according to **ACI 318**.
- B. Form standard hooks for 180-degree bends, 90-degree bends, stirrups and tie hooks, and seismic hooks as indicated on Drawings.
- C. Form reinforcement bends with minimum diameters according to **ACI 318**.
- D. Fabricate column reinforcement with offset bends at reinforcement splices.

E. Splicing:

1. If not indicated on Drawings, locate reinforcement splices at point of minimum stress.
2. Obtain approval of splice locations from Architect/Engineer.

2.3 SHOP FINISHING

A. Galvanized Finish for Steel Bars:

1. Comply with ASTM A767, Class [I] [II].
2. Hot-dip galvanized after fabrication.

B. Epoxy-Coated Finish for Steel Bars: Comply with ASTM A775

C. Epoxy-Coated Finish for Steel Wire: Comply with ASTM A884, Class A.

2.4 ACCESSORY MATERIALS

A. Tie Wire:

1. Minimum 18 gage, annealed type.
2. All wire tie ends shall point away from forms

B. Chairs, Bolsters, Bar Supports, and Spacers:

1. Size and Shape: To strengthen and support reinforcement during concrete placement conditions.
2. Furnish load-bearing pad on bottom to prevent vapor retarder puncture.
3. Spacing clips: Shall be stainless steel unless otherwise specified.
4. Chairs, spacers, saddles, etc., which are set in contact with forms, are to be galvanized or provided with plastic tips or coating to prevent rust spots on finish concrete surface
5. The pattern of the units and their spacing shall be such as to maintain prescribed distances between the reinforcement and the surfaces of the forms and between adjacent reinforcing steel members. Chairs which support top bars for slabs on grade shall be provided with metal plates
6. Spacing clips: Shall be stainless steel.
7. Shims: Shall be Preco SH 203
8. Concrete blocks: Shall have a minimum compressive strength of 5000 psi. Wire for securing concrete spacer blocks in place shall be Type 304 stainless steel. Concrete blocks may be used in the locations specified in this section or as shown.

C. Reinforcing Splicing Devices:

1. Splicing shall be accomplished by placing the bars in contact with each other and wiring them together.
2. Tack welding of reinforcing bars in place shall not be allowed

2.5 SOURCE QUALITY CONTROL

- A. Provide shop inspection and testing of completed assembly.
- B. Section 014000 - Quality Requirements: Requirements for testing, inspection, and analysis.
- C. Comply with federal, state, and/or local codes and regulations.
- D. All work shall be performed by experienced and qualified workmen. Qualifications of prestressing specialty contractor shall be examined and approved prior to award of Contract.
- E. Information shall be supplied with the Bid as required by Owner.
- F. Certificate of Compliance:
 - 1. If fabricator is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
 - 2. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All reinforcement shall be free from loose mill scale, loose or thick rust, dirt, paint, oil, or grease, and shall present a clean surface.
- B. Place, support, and secure reinforcement against displacement.
- C. Do not deviate from required position beyond specified tolerance.
- D. Tack welding of reinforcing bars in place shall not be allowed.
- E. Do not displace or damage vapor retarder.
- F. Placing bars on layers of fresh concrete as the work progresses and adjusting bars during the placing of concrete will not be permitted.
- G. Accommodate placement of formed openings.
- H. Spacing:
 - 1. Space reinforcement bars with minimum clear spacing equal to one bar diameter but not less than 1 inch.
 - 2. If bars are indicated in multiple layers, place upper bars directly above lower bars.
 - 3. Structural Slabs: Reinforcement shall be supported at 30" O.C. on metal chairs or slab bolsters designed to support steel at the height from the form shown on the Drawings
- I. Provide following minimum concrete cover over reinforcement:

1. Slabs: 2 inches.
2. Beams, Girders, and Trusses: 2 inches.
3. Joists: 2 inches.
4. Columns: 2 inches.
5. Cast against and permanently exposed to earth: 3 inches
6. Exposed to earth or weather: 1.5 inches.
7. Not exposed to weather or in contact with ground: $\frac{3}{4}$ "

J. Splice reinforcing where indicated on Drawings according to manufacturer's instructions.

1. Splices of bars shall be made only where shown on the plans or as approved by the Engineer
2. Where bars are spliced, they shall be lapped at least 36 bar diameters, or 24" minimum, unless otherwise shown on the plans.

K. Hooks:

1. All continuous reinforcement shall terminate with a 90 degree hook or corner bar unless noted otherwise on the Drawings.

L. Concrete blocks may be used for support of reinforcing steel in the following locations:

1. Floor slabs on grade: Concrete blocks size 4" x 4" x 2-2/3" may be used for the support of reinforcing 2-3/8" above grade.
2. Columns: Concrete chair blocks with cast-in wire ties may be used in lieu of spacing clips to hold column vertical reinforcing steel in proper alignment. Three sets of 4 concrete chair blocks shall be provided at 8', 16' and 24' above the top of the footing.

M. Bending reinforcement:

1. Bends and hooks in bars shall be made in the manner prescribed in the "Manual of Standard Practice" of the Concrete Reinforcing Steel Institute, and in accordance with the Drawings or as specifically directed by the Engineer.
2. Bars shall not be bent or straightened in a manner which will injure the material.
3. Bars with kinks or unspecified bends shall not be used.
4. No re-bent steel shall be used.
5. All bending shall be done cold

3.2 TOLERANCES

A. Section 014000 - Quality Requirements: Requirements for tolerances.

B. Install reinforcement within following tolerances for flexural members, walls, and compression members:

1. Reinforcement Depth Greater Than 8 Inches:
 - a. Depth Tolerance: Plus or Minus 3/8 inch .
 - b. Concrete Cover Tolerance: Minus 3/8 inch.

2. Reinforcement Depth Less Than or Equal to 8 Inches:

- a. Depth Tolerance: Plus or Minus 1/2 inch.
- b. Concrete Cover Tolerance: Minus 1/2 inch.

C. Foundation Walls: Install reinforcement within tolerances according to ACI 530/530.1.

3.3 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Perform field inspection and testing according to ACI 318 code.

C. Reinforcement Inspection:

1. Placement Acceptance: Inspect specified and ACI 318 material requirements and specified placement tolerances.
2. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.

3.4 ATTACHMENTS

A. Reinforcement for Superstructure Framing Members: Deformed bars, unfinished.

B. Reinforcement for Foundation Wall Framing Members and Slabs on Grade: Deformed bars and wire fabric, galvanized finish.

C. Reinforcement for Parking Structure Framing Members: Deformed bars, epoxy-coated finish.

END OF SECTION 032000

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Inspection
- B. Preparation
- C. Placing Concrete
- D. Hot Weather Concreting
- E. Cold Weather Concreting
- F. Expansion, Contraction and Construction Joints
- G. Finishing
- H. Curing
- I. Field Quality Control
- J. Protection

1.02 RELATED WORK

- A. Section 03100 - Concrete Formwork
- B. Section 03200 - Concrete Reinforcement

1.03 QUALITY ASSURANCE

- A. Qualifications of Workmen:
 - 1. Use workmen thoroughly trained and experienced in placing and finishing the types of concrete specified.
- B. Comply with federal, state and local codes and regulations.
- C. Comply with hot or cold weather requirements as applicable.

1.04 REFERENCES

- A. The American Concrete Institute (ACT):
 - 1. 306R, "Cold Weather Concreting"
 - 2. 305R, "Hot Weather Concreting"
 - 3. 3 18-83, "Building Code Requirements"
- B. American Society for Testing and Materials (ASTM):
 - 1. C-I 50, "Portland Cement"
 - 2. C-33, "Concrete Aggregates"
 - 3. C-94, "Ready-Mixed Concrete"

1.05 SUBMITTALS

- A. A mix design and information based on trial batch test results shall be submitted to Owner at least two weeks prior to commencement of the work.
- B. Results from a reputable independent testing laboratory showing concrete aggregates comply with applicable sections of ASTM C-33. Contractor shall pay for necessary tests as directed by Engineer. A minimum of one test shall be made on the aggregate used for the first 5 cubic yards

of concrete and for each 50 cubic yards thereafter. Should the Engineer deem that additional testing of aggregate is necessary, he may select samples from any of the aggregate to be used and have these samples tested by a recognized laboratory of his choice. Such material shall not be used in the work until the test reports are available. Should the material fail to meet the specified requirements, the aggregate will be rejected and the expense of testing shall be borne by the Contractor. Should the tests show the aggregate to be satisfactory, the cost of additional testing will be borne by the Owner.

- C. Submit manufacturer’s information (catalog data) for all products.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Ready-mixed concrete: Concrete shall be mixed only in such quantities as are required for immediate use. The maximum allowable time between charging of the material in the mixing drum and final placing shall be ninety minutes for air temperatures below 80° F and sixty minutes for temperatures above 80°F. Concrete not placed within these time limits, or if an initial set has developed shall not be used. Tempering concrete by adding water or by other means will not be permitted.
- B. Materials shall be delivered, stored, and handled so as to prevent damage by water or inclusion of foreign materials. Packaged materials shall be delivered and stored in original package, marked with brand and maker’s name, until ready for use. Packages of materials showing evidence of water or other damage shall be rejected. Bulk cement shall be identified by shipping and delivery statements.
- C. Cement shall not be stored longer than 4 months before usage.

1.07 MEASUREMENT AND PAYMENT

- A. Payment for Cast-In-Place concrete will be included in the Lump Sum Bid Price(s) for the item requiring Cast-In-Place concrete. Such price shall include full compensation for the furnishing and placing of materials required to complete the Cast-In-Place concrete, and for all labor, equipment, tools and incidentals needed to complete the work in conformity with the plans and specifications.
- B. If any individual compressive strength test is below the specified required strength, the concrete may be accepted at a reduced price, Owner option. If Owner elects to accept at a reduced price, the price reduction shall apply to the amount of concrete represented by the strength test in accordance with the following schedule:

<u>PSI BELOW SPECIFIED STRENGTH SPECIFICATION</u>	<u>PAY FACTOR</u>
1-100	98
101-200	94
201-300	88
301-400	80

Concrete with a compressive strength of more than 400 psi below the required specified strength shall be evaluated by the Engineer for capabilities necessary to the integrity of the structure. The

Engineer may accept this concrete at a pay factor of 0.80, or require that it be replaced with acceptable material. The Engineer shall make the final decision.

1.09 WARRANTY

- A. Shall be for two (2) years in accordance with applicable laws and regulation. See General Conditions.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

- A. Cement:
 - 1. Portland cement shall be Type II, low alkali, complying with ASTM C-150, unless otherwise specified.
 - 2. No air-entraining type of cement will be allowed.
- B. Coarse Aggregates:
 - 1. Coarse aggregate shall consist of gravel, crushed gravel, crushed stone, air-cooled blast furnace slag, or crushed hydraulic-cement concrete, or a combination thereof, conforming to the requirements of ASTM C-33.
 - 2. The amount of deleterious substances included in the aggregate shall not exceed the amount specified in ASTM C33
 - 3. Coarse aggregate size shall be graded within the following limits.

Coarse Aggregate Size (Nominal)	Percent Passing (by weight)					
	1 – 1/2"	1"	3/4"	1/2"	3/8"	No. 4
3/4"	100	95-100	-	25-60	-	0-10

- C. Fine aggregate
 - 1. Fine aggregate shall consist of natural sand, manufactured sand, or a combination thereof, conforming to the requirements of ASTM C-33
 - 2. Shall not be used in the work until approval by the Engineer of the tests performed by the independent testing laboratory.
 - 3. The amount of deleterious substances included in the aggregate shall not exceed the amount specified in ASTM C33.
 - 4. Fine aggregate shall be uniformly graded from coarse to fine within the following gradation

Percent Passing

Sieve Size	(by weight)
3/8"	100
No.4	95-100
No. 16	45-80
No. 50	10-30
No. 100	2-10

D. Water:

1. Water used in washing aggregate and mixing concrete shall be of a potable quality clean and free from oil, acid, salt, injurious amounts of alkali, organic matter or other deleterious substances

E. Admixtures

1. The air-entraining admixture shall conform to ASTM Designation C-260 and be added at the mixer, not the job site.
2. No other admixtures will be allowed unless approved by the Engineer.

F. Concrete curing compound:

1. Liquid membrane curing compound shall conform to all applicable sections of ASTM C-309.

G. Concrete Sealer:

1. Concrete sealing compound shall comply with the NCHRP 244 standard specifications for chloride protection using Penta-Sil (244+) or approved equal. Penta-Sil (244+) is available from Convergent Concrete Technologies, 115 North 1380 West, Orem, Utah 84057. Phone: (866) 375-2280 toll free or (801) 375-2280 locally. See www.convergentconcrete.com.

2.02 CONCRETE MIX

- A. Concrete shall consist of a mixture of Portland Cement, water, fine and coarse aggregates, and an air entraining agent.
- B. The proportions of the concrete materials shall produce a mixture that will work readily into corners and angles of forms and around reinforcing steel. The mixture shall have a water content which does not exceed the maximum specified amount, and which shall have the required compressive strength.
- C. The methods of measuring concrete materials shall permit proportions to be accurately controlled and easily checked. Measurement of materials for ready-mixed concrete shall conform to ASTM C-94. Engineer shall have free access to the mixing plant at all times.
- D. Concrete mix shall be as follows (unless otherwise shown or specified). The proportions given below are intended to give the required strength and shall be carefully followed as to minimum quantity of cement per cubic yard of concrete and as to water/cement ratios and more cement per

cubic yare of concrete will be required if tests indicate necessity for such increased quantity to achieve the design strength:

2.04 EQUIPMENT

- A. Mixing equipment shall be subject to approval. Mixers may be of the stationary plant, paver, or truck mixer type.
- B. Each mixer shall be equipped with a device for accurately measuring and indicating the quantity of water entering the concrete, and the operating mechanism shall be such that leakage will not occur when the valves are closed.
- C. Adequate equipment and facilities shall be provided for accurate measurement and control of all materials, and for readily changing the proportions of the material. The batch plant shall be capable of controlling the delivery of all material to within 1% by weight of the individual material. If bulk cement is used, it shall be weighed on a separate visible scale which will accurately register the scale load at any stage of the weighing operation from zero to full capacity.
- D. Mixers shall be equipped with a device for automatically measuring and indicating the time required for mixing, which device shall be interlocked to prevent the discharge of concrete from the mixer before the expiration of the mixing period. Neither speed nor volume capacity of the mixers shall exceed manufacturer recommendations. Excessive over-mixing, requiring additions of water to preserve the required consistency, will not be permitted.

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspect subgrade surface and verify grade and adequacy of compaction.
- B. Correct grade and compaction deficiencies.
- C. Notify the Engineer in writing of readiness to place concrete in any portion of the work, This notification shall be given as far in advance of the placing of concrete as the Engineer deems necessary for him to make final inspection of the preparations at the location of the proposed concrete placing. All forms, steel, screeds, anchors, ties, and inserts shall be in place before the Contractor notification of readiness is given to the Engineer
- D. No concrete shall be placed until forms, reinforcement, etc. has been inspected by the Engineer.

3.02 PREPARATION

- A. Remove all water, wood scraps, ice, snow, frost and debris from the areas in which concrete will be placed.
- B. Thoroughly clean the areas to ensure proper placement and bonding of concrete.
- C. Thoroughly dampen the surfaces which will come into contact with the concrete (except in freezing weather), forms may be oiled instead; remove all standing water. Reinforcement shall be thoroughly cleaned of all ice and other coatings.

- D. Thoroughly clean all transporting and handling equipment.
- E. Erect and maintain suitable barriers to protect the finished surface. Any section damaged from traffic or other causes occurring prior to its official acceptance, shall be repaired or replaced by the Contractor at his own expense in a manner satisfactory to the Owner.
- F. The concrete surface must not be damaged or pitted by rain, hail or snow.
- G. Concrete shall not be placed until all reinforcement is securely and properly fastened in its correct position, and until the form ties at construction joints have been retightened, all sleeves, hangers, pipe, bolts and any other items required to be embedded in the concrete have been placed and anchored and the forms cleaned and coated as specified.

3.03 PLACING CONCRETE

- A. Except by specific written authorization, concreting operations shall not be continued when a descending air temperature, in the shade and away from artificial heat, falls below 40° F, nor shall operations be resumed until ascending air temperature, in the shade and away from artificial heat, reaches 40°F.
- B. Convey concrete from mixer to place of final deposit by methods that will prevent separation and loss of materials.
 - 1. The free fall of concrete from the end of the spout or chute, or from a transporting vehicle, shall not exceed 6 feet, except when beginning a wall pour, in which case the free fall shall not exceed 2 feet.
 - 2. When the distance through which concrete must be dropped vertically exceeds the maximums specified above, a tremie or flexible metal spout shall be used. Flexible metal spouts having sufficient strength to hold the weight of the concrete shall be composed of conical sections not more than 3 feet long, with the diameter of the outlet and taper of the various sections such that the concrete will fill the outlet and be retarded in its flow.
 - 3. Chutes, troughs, or pipes used as aids in placing concrete shall be arranged and used so that the ingredients of the concrete will not be separated. Chutes and troughs shall be of metal or metal-lined. When steep slopes are necessary, the chutes shall be equipped with baffle boards or a reversed section at the outlet. Open troughs and chutes shall extend, if necessary, down inside the forms or through holes left in the forms; or the ends of such chutes shall terminate in vertical downspouts,
 - 4. Pumping: The equipment shall be so arranged that no vibrations result which might damage freshly placed concrete. Where concrete is conveyed and placed by mechanically applied pressure, the equipment shall be suitable in kind and adequate in capacity for the work. The operation of the pump shall be such that a continuous stream of concrete without air pockets is produced. When pumping is completed, the concrete remaining in the pipe line, if it is to be used, shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients. Before and after this operation, the entire equipment shall be thoroughly cleaned. Water shall not be added to the concrete in the pump hopper.

- C. Place concrete as dry as possible consistent with good workmanship, never exceeding the maximum specified slump
- D. Place concrete at such a rate that concrete is at all times plastic and flows readily between bare bars. No segregation of coarse aggregate shall occur when placing or dropping between bars.
- E. When placing is once started, carry it on as a continuous operation until placement of the section is complete.
- F. Do not pour a greater area at one time than can be properly finished without checking; this is particularly important during hot or dry weather.
- G. Do not use retempered concrete that has been contaminated by foreign materials.
- H. Struts, stays, and braces serving temporarily to hold the forms in correct shape and alignment, pending the placing of concrete at their locations, shall be removed when the concrete placing has reached the elevation and strength rendering their service unnecessary. These temporary members shall be entirely removed from the forms.
- I. Build into concrete any nosings, inserts, anchors, structural members, ties and hangers required to secure abutting or adjacent materials. Waterstops shall be prevented from bending over or being moved out of position.
- J. Unless necessary materials and equipment are readily available to adequately protect the concrete in place, placing operations may be postponed by the Engineer when, in the opinion of the Engineer, impending conditions may result in rainfall or low temperatures which will impair the quality of the finished work. The Contractor shall pay for all delay related costs resulting from such postponements including costs for removing and replacing damaged concrete. In case rainfall should occur after placing operations are started, provide ample covering to protect the work.
- K. Whenever it is necessary to continue the mixing, placing, and finishing of concrete after daylight hours, the site of the work shall be adequately lighted so that all operations are plainly visible. Every effort shall be made to enable finishing to be done in daylight.
- L. Clean up all spilled concrete and washings thoroughly. Concrete trucks shall not be washed- out on job site. Wash trucks at off-site location in accordance with all applicable laws and ordinances.

3.04 HOT WEATHER CONCRETING

- A. Hot weather is defined as any combination of high air temperature, low relative humidity, and wind velocity tending to impair the quality of fresh or hardened concrete or otherwise resulting in abnormal properties. Hot weather concreting shall follow the guidelines of ACT 305R, latest edition.
- B. Placing and curing:
 - 1. Concrete shall be handled and transported with a minimum of segregation and slump loss. Concrete temperature at time of placement shall be such that the rate of evaporation for the weather conditions shall not cause cracking.
 - 2. The aggregate shall be cooled by frequent spraying in such a manner as to utilize the cooling effect of evaporation. The placement schedule shall be arranged, as approved, in such a manner as to provide time for the temperature of the previously placed course to

- begin to recede. The mixing water shall be the coolest available at the site insofar as is practicable.
3. Concrete shall be placed where it is to remain.
 4. Concrete shall be placed in layers shallow enough to assure vibration well into the layer below.
 5. Surfaces exposed to the drying wind shall be covered up immediately after finishing with polyethylene sheets and be water cured continuously as soon as the concrete has set up. Curing compounds, in lieu of water, may not be used.
 6. Joints shall be made on sound, clean concrete
 7. Finishing operations and their timing shall be guided only by the readiness of the concrete for them, and nothing else.
 8. Curing shall be conducted in such a manner that at no time during the prescribed period will the concrete lack ample moisture and temperature control. Facilities must be ready to protect promptly all exposed surfaces from drying. All work determined by Engineer to be damaged from hot weather shall be removed and replaced at no cost to Owner.
 9. All materials and workmanship required to meet the hot weather requirements shall be supplied at the Contractors own expense.

3.05 COLD WEATHER CONCRETING

- A. Cold weather is generally defined as a period when for more than 3 successive days the mean daily temperature drops below 40° F. When temperatures above 50° F occur during more than half of any 24-hour period, the weather should no longer be regarded as “cold”. The times and temperatures given for various conditions and situations are not exact values and should not be used as such. Weather conditions are variable and common sense must be used to protect the concrete. Cold weather concreting shall follow the guidelines of ACT 306R, latest edition.
- B. All materials and workmanship required to meet the cold weather requirements shall be supplied at the Contractor’s own expense.
 1. Preparation:
 - a. When specific written authorization is given to permit concreting operations at temperatures below those specified in 3.03 PLACING CONCRETE, arrangements for covering, insulating, housing, or heating materials and/or newly placed concrete should be made in advance of placement and should be adequate to achieve the temperature and moisture conditions recommended herein in all parts of the concrete. All equipment and materials necessary should be at the work site before the first frosts are likely to occur, not after concrete has been placed and its temperature begins to approach the freezing point.
 2. Placement and protection:
 - a. During placement of concrete, tarpaulins, or other readily movable coverings supported on horses or framework should follow closely the placing of the concrete so that only a few feet of concrete are exposed to outside air at any time.

- b. The housing, covering, or other protection used in curing shall remain intact at least 24 hours after artificial heating is discontinued.
- c. All concrete placed in forms shall have a temperature between 55° F and 90° F after placement. Adequate means shall be provided for maintaining the surrounding air at 60° F for at least seventy-two hours after placing and at no less than 40° F for an additional four days. All methods and equipment for heating shall be subject to approval. Insulating blankets shall be used when required to maintain a satisfactory temperature during the curing period.
- d. No dependence shall be placed on salt or other chemicals for the prevention of freezing.
- e. If heating or other protective measures need to be taken to prevent concrete from freezing, the concrete may require special curing methods to prevent rapid drying, as described in ACT 306R-78.

3.06 EXPANSION, CONTRACTION AND CONSTRUCTION JOINTS

- A. Shall be formed and sealed as shown on the drawings or as required in individual Specifications Sections.

3.07 FINISHING

- A. Surface preparation: Immediately after the removal of forms, all fins and irregular projections shall be removed from surfaces, whether or not they are to be covered with high tensile wire and shotcrete covercoats.
- B. The finishing shall commence immediately after the concrete is placed. Any delay in excess of thirty minutes in performing the preliminary finishing shall constitute cause for shutting down the placing operation.
- C. The finished surface shall be true to grade and cross section, free from ruts, humps, depression or other irregularities.
- D. Finish Types: Finish shall be as shown on the Drawings or as specified in individual specification sections in accordance with the following:
 - 1. Patched: Remove all fins and irregular projections. Clean form4ie holes thoroughly, coat with suitable epoxy and fill with mortar of dry consistency (see PART 2 - PRODUCTS).
 - 2. Rubbed: Use proper grout mix (see PART 2- PRODUCTS) and point up voids with cement mortar. Thereafter, rub the entire surface with said grout mix and a carbomndum stone to produce a relatively smooth, plane surface without defects and imperfections. Surface shall be properly cured. Use of plaster shall not be permitted. Upon completion of the rubbing, the surface shall be washed thoroughly with clean water.
 - 3. Float: This type of finish shall be an integral finish by float after screeding, to compact the surface evenly. Any excess surface water shall be removed before floating and no mortar shall be used for leveling.

4. Steel Trowel: After striking off the wearing course to the established grade, it shall be compacted by rolling or tamping, and then floated with a wood or magnesium float or power floating machine. The surface shall be tested with a straightedge to detect high and low spots, which shall be eliminated. Floating shall be followed by steel troweling after the concrete has hardened sufficiently to prevent excess fine material from working to the surface. The finish shall be brought to a smooth surface, free from defects and blemishes. No dry cement nor mixture of dry cement and sand shall be sprinkled directly on the surface of the wearing course to absorb moisture or to stiffen the mix. After the concrete has further hardened, additional troweling may be required. This shall be done as may be directed by the Engineer. Troweling shall produce a dense, smooth, impervious surface, free from defects and blemishes.
 5. Sandblasting: Sandblasting shall be done using a sharp silica sand. Exterior surfaces of concrete walls shall be sandblasted with #16 silica sand, preferably by the dry sandblasting process before wire wrapping may be started. The concrete surface shall be heavily pitted, leaving no traces of laitance, form-oil and original surface smoothness and surface color. The minimum sand consumption per 100 square feet of surface shall be 150 pounds of silica sand. Sandblasting shall not be started before the completion date of the curing period or before all tieholes have been die-packed.
 6. Formed: Immediately after the removal of forms, all fins and irregular projections shall be removed from surfaces, whether or not they are to be covered with high tensile wire and shotcrete covercoats.
- E. Final finishing:
1. When the concrete has hardened sufficiently, the surface shall be given a broom finish. The broom shall be of an approved type.
 2. The strokes shall be in a transverse direction with adjacent strokes slightly overlapped and shall be made by drawing the broom without tearing the concrete, but so as to produce regular corrugations not over 1/8 inch in depth.
 3. The surface, as thus finished, shall be free from porous spots, irregularities, depressions, and small pockets or rough spots such as may be caused by accidental disturbing during the final brooming of particles of coarse aggregate embedded near the surface.

3.09 CURING

- A. Protect the concrete from the effects of weather in accordance with HOT WEATHER CONCRETING AND COLD WEATHER CONCRETING in this section.
- B. Water for curing shall be as specified in PART 2 - PRODUCTS.
- C. Other curing requirements may be required in individual Specifications Sections.
- D. Membrane curing compound method:
 1. Surface of newly placed or exposed concrete shall be kept moist or wet until the curing compound is applied. The curing compound shall be applied immediately after all patching or surface finishing has been completed.

2. The curing compound shall be delivered to the work in ready-mixed form. At the time of use, the compound shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. The compound shall not be diluted or altered in any manner.
3. Curing compound that has become chilled to such an extent that it is too viscous for satisfactory application shall be warmed to a temperature not exceeding 100°F, unless otherwise specified by manufacturer’s recommendations.
4. The curing compound shall be applied to the exposed surface at a uniform rate of 1 gallon per 150 square feet of area, unless otherwise required by manufacturer’s recommendations.
5. In the event that the application of curing compound is delayed, the application of water as provided in this section shall be started immediately and shall be continued until application of the compound is resumed or started.

3.10 FIELD QUALITY CONTROL

- A. Testing will be provided by a testing laboratory employed by the Owner. The Engineer shall select the testing agency from Owner’s list of approved labs. Refer to individual Specifications Sections for other Field Quality Control requirements.
- B. All testing will be paid for by Owner, except for retesting of material which fails to meet these specifications. Such retesting shall be paid for by Contractor at no expense to Owner. Contractor shall pay for curing cylinders. Testing agency shall transport cylinders.
- C. Concrete sampled from a concrete pump shall be sampled from the hose after all of the priming grout has been wasted. The end of the hose shall be placed in a horizontal position before the concrete is discharged into the sampling pan. The concrete shall not be allowed to fall into the sampling pan.
- D. The Contractor, at his expense, shall furnish the concrete required for testing.
- E. Strength, slump and air tests shall be taken in accordance with the following unless otherwise specified in individual Specifications Sections:
 1. Strength, slump and air tests may be taken in accordance with the placement rate per day as shown below:

Rate/Day (C.Y.)	Air	Slump	Compressive Strength	Flexural Strength
0-8	1	1	Optional	Optional
8-50	1	1	Optional	Optional
For each 50 C.Y. or fraction thereof	1	1	1	1

Additional tests may be made at the discretion of the Owner.

2. Compressive strength test specimens shall be made and cured in accordance with ASTM C-3 I Specimens shall be tested in accordance with ASTM C-39.
 - a. Three specimens shall be made by the Engineer for each test, and these shall be broken at 7 and at 28 days, with one held in reserve.
 - b. At least one test (3 specimens) shall be made for each class of concrete poured during one day.
3. Flexural strength test specimens shall be prepared in accordance with AASHTO Designation T-23 and tested for flexural strength in accordance with AASHTO Designation T-97.
 - a. Four specimens shall be made by the Engineer for each test, and one shall be broken at 7 and two at 14 days, with one held in reserve.
 - b. At least one test (4 specimens) shall be made for each class of concrete placed during one day.
4. If a slump test does not meet the specification, a second slump test shall be made immediately on the same load. The concrete shall be accepted if the second slump test meets the specification or rejected and removed from the project if the second slump test does not meet the specification.
5. If an air test does not meet the specification, a second air test shall be made immediately upon the same load. The concrete shall be accepted if the second air test meets the specification or rejected and removed from the project if the second air test does not meet the specification.
6. Slump and air tests shall be made in accordance with ASTM C-143 and C-23 1, respectively.
7. The maximum allowable time between charging of the material in the mixing drum and final placing shall be ninety minutes for air temperatures below 80 F and sixty minutes for temperatures above 80E F. Concrete not placed within these time limits, or if an initial set has developed shall not be used. Tempering concrete by adding water or by other means will not be permitted.
8. If a compressive strength test is below the required specified strength, the Engineer shall immediately notify the Contractor or his authorized representative.
9. All costs incurred in resampling and retesting shall be paid by the Contractor if the retested strength is below the specified strength, and shall be assumed by the Owner if the retested strength is above the specified strength.

3.11 PROTECTION AND CURING

A. General

Freshly deposited concrete shall be protected from premature drying and excessively hot or cold temperatures, and shall be maintained without drying at a relatively constant temperature for the period of time necessary for the hydration of the cement and proper hardening of the concrete.

B. Initial Curing

Initial curing shall immediately follow the finishing operation. Concrete shall be kept continuously moist at least overnight. One of the following materials or methods shall be used.

1. Ponding or continuous sprinkling.
2. Absorptive mat or fabric kept continuously wet.
3. Sand or other covering kept continuously wet.
4. Curing compounds shall be applied in accordance with the recommendations of the manufacturer and shall not be used on any surfaces against which additional concrete or other cementitious finishing materials are to be bonded, or on surfaces to be coated, waterproofed, moistureproofed, tiled, roofed, or on surfaces on which such curing is prohibited by these specifications.

C. Final Curing

Immediately following the initial curing and before the concrete has dried, additional curing shall be accomplished by one of the following materials or methods.

1. Continuing the method used in initial curing.
2. Waterproof paper covering.
3. Other moisture-retaining coverings as approved.

D. Duration of Curing

The final curing shall continue until the cumulative number of days or fractions thereof, not necessarily consecutive, during which temperature of the air in contact with the concrete is below 50°F has totaled 7 days. If high early strength of concrete has been used, the final curing shall continue for a total of 3 days. Rapid drying at the end of the curing period shall be prevented.

E. Formed Surfaces

Steel forms heated by the sun and all wood forms in contact with the concrete during the final curing period shall be kept wet. If forms are to be removed during the curing period, one of the above curing materials or methods shall be employed immediately. Such curing shall be continued for the remainder of the curing period.

F. Protection from Mechanical Injury

During the curing period, the concrete shall be protected from damaging mechanical disturbances, particularly load stresses, heavy shock, and excessive vibration. All finished concrete surfaces shall be protected from damage caused by construction equipment, materials, or methods, and by rain or running water. Self-supporting structures shall not have form supports removed until the concrete strength has met the requirements of Section 03100, CONCRETE FORMWORK.

END SECTION

SECTION 034100 - PRECAST STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Utility Vaults
 - 2. Manhole Sections

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Section 012000 - Price and Payment Procedures: There shall be no separate measurement and payment for items contained in this section. Full compensation for items contained in this section shall be considered as included in the contract unit or lump sum bid prices for the various items of the contract to which they relate.
- B. Precast Utility Vault:
 - 1. Basis of Measurement: By each unit.
 - 2. Basis of Payment: Includes, each unit furnished, placed, backfilled as well as appropriately marked covers.
- C. Precast Manhole:
 - 1. Basis of Measurement: By each unit.
 - 2. Basis of Payment: Includes, each unit furnished, placed, backfilled as well as appropriately marked covers.

1.3 REFERENCE STANDARDS

- A. American Concrete Institute:
 - 1. ACI 301 - Specifications for Structural Concrete.
 - 2. ACI 318 - Building Code Requirements for Structural Concrete.
- B. American Water Works Association:
 - 1. AWWA C-502 Standard for Fire Hydrants
- C. American Welding Society:
 - 1. AWS B2.1 - Specification for Welding Procedure and Performance Qualification.
 - 2. AWS D1.1 - Structural Welding Code - Steel.
 - 3. AWS D1.4 - Structural Welding Code - Reinforcing Steel.

D. ASTM International:

1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM C478 – Standard Specification for Precast Reinforced Concrete Manhole Sections.
3. ASTM C858 - Standard Specification for Underground Precast Concrete Utility Structures.

E. Precast/Prestressed Concrete Institute:

1. Design Handbook.
2. PCI MNL-116 - Manual for Quality Control for Plants and Production of Structural Precast Concrete Products.
3. PCI MNL-117 - Quality Control and Assurance for Plant Production of Architectural Precast Concrete.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit standard component configurations, design loads and bearing requirements.
- C. Shop Drawings: Indicate layout, unit locations, fabrication details, reinforcement, connection details, openings, and relationship to adjacent materials.
- D. Fabricator's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacture and transportation only by company experienced in providing precast products and services normally associated with precast and prestressed concrete construction.
- F. Welder Certificates: Certify welders and welding procedures employed on Work, verifying AWS qualification within previous 12 months.
- G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- H. Qualifications Statements:
 1. Submit qualifications for fabricator, erector, and licensed professional.
 2. Welders: Qualify procedures and personnel according to AWS D1.1, AWS B2.1, and AWS D1.4.

1.5 QUALIFICATIONS

- A. Fabricator: Company specializing in fabricating products specified in this Section with minimum three years' documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Store materials according to manufacturer instructions.
- D. Protection:
 - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 - 2. Provide additional protection according to manufacturer instructions.
 - 3. Protect members to prevent staining, chipping, or spalling of concrete.
 - 4. Unless otherwise approved in writing, do not deliver units to job site until required for installation.
- E. Handling:
 - 1. Handle precast members in position consistent with their shape and design.
 - 2. Lift and support only from designated support points.
 - 3. Lifting or Handling Devices: Capable of supporting member in positions anticipated during manufacture, storage, transportation, and erection.
 - 4. Mark each member with date of production and final position in structure.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Above Ground Concrete Structures:
 - 1. Comply with ACI 318, Class 5000 minimum.
 - 2. Type: Portland
 - 3. Reinforcement: Grade 60 reinforcing for all precast units unless approved in writing by ENGINEER
- A. Below Ground Concrete Structures:
 - 1. Comply with ASTM C478 or ASTM C858, Class 4000 minimum.
 - 2. Type: Portland
 - 3. Reinforcement: Grade 60 reinforcing for all precast units unless approved in writing by ENGINEER
- B. Accessories
 - 1. Connecting and Supporting Devices: Steel, in accordance with ASTM A 36

2.2 FABRICATION

- A. Comply with PCI MNL-116 and [ACI 318] [applicable code] [<_____> code].
- B. Maintain plant records and quality-control program during production of precast members, and make records available upon request of Architect/Engineer.
- C. Use molds which are rigid and constructed of material that will result in uniform finished products.
- D. Deposit and vibrate concrete to ensure proper consolidation, elimination of unintentional cold joints, and minimize entrapped air on surface.
- E. Fabricate required connecting devices, plates, angles, items fit to steel framing members, bolts and accessories.
- F. Ensure reinforcing steel, anchors, inserts, plates, angles and other cast-in items are sufficiently embedded, anchored and properly located.
- G. Ensure finished surfaces of precast structural units are uniform.
- H. Cure units under identical conditions to develop specified concrete quality, and minimize appearance blemished such as non-uniformity, staining or surface cracking.
- I. Tension Reinforcement Tendons: As required to achieve design load criteria.
- J. Fabricate required openings larger than 8 inches.
- K. Embed accessories provided by other Sections at indicated locations.
- L. Exposed Ends at Stressing Tendons: Fill recess with nonshrink grout and trowel flush.
- M. Welding:
 - 1. Steel Fabrications: Comply with AWS D1.1/D1.1M.
 - 2. Reinforcing Steel: Comply with AWS D1.4/D1.4M.
 - 3. Do not tack-weld reinforcing.
- N. Tolerances:
 - 1. Deviation: Provide installation equivalent to basic intent. Deviations from exact required cross-section will be permitted only with approval from ENGINEER.
 - 2. Manufacturer's Proposed Design: Supported by complete design calculations and drawings. When requested, submit design calculations for review, bearing seal and signature of Professional Engineer.
 - 3. End Squareness: ½ inch maximum.
 - 4. Length: Plus or minus ¾ inch, or plus or minus 1/8 inch per 10 feet of length, whichever is greater, or as indicated.
 - 5. Blockouts: 1 inch of centerline location indicated.

2.3 FINISHES

- A. GENERAL: The required finish will be described in one of the following paragraphs. If no finish is indicated or selected by ENGINEER; standard.
- B. Exposed-to-View Finished Surfaces of Precast Concrete Members: Uniform in color and appearance.
- C. Curing:
 - 1. Cure members under identical conditions to develop required concrete quality.
 - 2. Minimize appearance blemishes including nonuniformity, staining, and surface cracking.
- D. Standard Finish:
 - 1. Produced in forms such as plastic or metal lined that impart a smooth finish to the concrete.
 - 2. Small surface holes, normal form joint marks, minor chips and spall are acceptable if approved. Major or unsightly imperfections, honeycomb or structural defects are not acceptable.
- E. Commercial Finish:
 - 1. Produced in forms, such as plywood or lumber, that impart texture to concrete.
 - 2. Remove fins and large projections and fill large holes. Faces: true and well defined. Correct exposed ragged edges by rubbing or grinding.
- F. Architectural Grade A Finish:
 - 1. Produced in forms such as plastic or metal lined that impart smooth finish to concrete.
 - 2. Fill holes over 1/4 inch in diameter with sand-cement paste. Grind smooth form offsets or fins over 1/8 inch. Coat with neat cement paste using float. After paste coat has dried, rub with burlap to remove loose particles.
- G. Architectural Grade B Finish:
 - 1. Produced in forms such as plastic or metal lined that impart smooth finish to concrete.
 - 2. Fill holes over 1/4 inch in diameter with sand-cement paste. Grind smooth form offsets or fins over 1/8 inch.
- H. Special Finishes:
 - 1. Sandblasting, acid washing, retarders or form liners as approved by ENGINEER.
 - 2. Special finishes require submittal of two 12 x 12 inch samples showing a representative color and texture to be used.
- I. Painted Finish:
 - 1. Use only paint compatible form release agents on concrete that is to be painted.

2.4 REPAIR

- A. Repair of damaged units is acceptable if structural integrity or appearance is not impaired.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that Site conditions are ready to receive Work.
- C. Verify that field measurements are as indicated on Drawings.

3.2 PREPARATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Prepare support equipment for erection procedure, temporary bracing, and induced loads during erection.
- C. Do not install precast units until concrete has attained its design compressive strength.

3.3 INSTALLATION

- A. Erect members without damage to structural capacity, shape, or finish; replace or repair damaged members.
- B. Install members plumb, level and in accordance with PCI MNL-116 or PCI MNL-117 and indicated limits of erection tolerances.
- C. Align and maintain uniform horizontal and vertical joints as erection progresses.
- D. Clean weld marks or other marks, debris or dirt from exposed surfaces of units.

3.4 FIELD QUALITY CONTROL

- A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.
- B. Inspect welds according to AWS D1.1/D1.1M.
- C. A. Conduct inspections, perform testing, and make repairs or replace unsatisfactory precast units as required.

- D. REJECTION: Units may be rejected for any one of the following:
1. Exceeding specified installation tolerances.
 2. Damaged during construction operations.
 3. Exposed-to-view surfaces which develops surface deficiencies
 4. Other defects as listed in PCI MNL-116 or PCI MNL-117

END OF SECTION 034100

SECTION 036000 - GROUTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Portland cement grout.
2. Rapid-curing epoxy grout.
3. Nonshrink cementitious grout.

B. Related Requirements:

1. Section 031000 - Concrete Forming and Accessories
2. Section 033000 - Cast-in-Place Concrete.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Section 012000 - Price and Payment Procedures: Contract Sum/Price modification procedures.

B. Grout:

1. Basis of Measurement: By cubic yard.
2. Basis of Payment: Includes preparation of substrate and grout, placement, consolidation, troweling, and curing.

1.3 REFERENCE STANDARDS

A. American Concrete Institute:

1. ACI 301 - Specifications for Structural Concrete for Buildings.
2. ACI 318 - Building Code Requirements for Structural Concrete.

B. ASTM International:

1. ASTM C33 - Standard Specification for Concrete Aggregates.
2. ASTM C150 - Standard Specification for Portland Cement.
3. ASTM C191 - Standard Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle.
4. ASTM C307 - Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing.
5. ASTM C531 - Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
6. ASTM C579 - Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.

7. ASTM C827 - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.

C. U. S. Army Corps of Engineers Concrete Research Division (CRD):

1. CRD-C621 - Non-Shrink Grout.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit manufacturer information regarding grout.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Manufacturer Instructions: Submit instructions for mixing, handling, surface preparation, and placing epoxy-type and non-shrink grouts.

E. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

F. Qualifications Statement:

1. Submit qualifications for manufacturer.

1.5 QUALITY ASSURANCE

A. Perform Work according to Manufactures recommendations.

B. Maintain **copy** of Manufactures recommendation affecting Work of this Section on Site.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum **three** years' **documented** experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

1.8 AMBIENT CONDITIONS

- A. Section 015000 - Temporary Facilities and Controls: Requirements for ambient condition control facilities for product storage and installation.
- B. Maximum Conditions: Do not perform grouting if temperatures exceed 120 degrees F.
- C. Minimum Conditions: Maintain minimum temperature of 70 degrees F before, during, and after grouting, until grout has set. Operations shall not be continued when a descending air temperature, in the shade and away from artificial heat, falls below 50 F.

PART 2 - PRODUCTS

2.1 PORTLAND CEMENT GROUT

- A. Portland Cement: Comply with ASTM C150/C150M, Type I and II.
- B. Water:
 1. Potable.
 2. No impurities, suspended particles, algae, or dissolved natural salts in quantities capable of causing:
 - a. Corrosion of steel.
 - b. Volume change increasing shrinkage cracking.
 - c. Efflorescence.
 - d. Excess air entraining.
- C. Fine Aggregate:
 1. Washed natural sand.
 2. Gradation:
 - a. Comply with ASTM C33/C33M.
 - b. Represented by smooth granulometric curve within required limits.
 3. Free from injurious amounts of organic impurities according to ASTM C40/C40M.
- D. Mix:
 1. Portland cement, sand, and water.
 2. Do not use ferrous aggregate or staining ingredients in grout mixes.

2.2 RAPID-CURING EPOXY GROUT

- A. Furnish materials according to Manufactures recommendations
- B. Description:
 - 1. High-strength, three-component epoxy grout formulated with thermosetting resins and inert fillers.
 - 2. Rapid-curing, high adhesion, and resistant to ordinary chemicals, acids, and alkalis.
- C. Performance and Design Criteria:
 - 1. Compressive Strength:
 - a. 12,000 psi at seven days.
 - b. Comply with ASTM C579.
 - 2. Minimum Tensile Strength:
 - a. 4,000 psi.
 - b. Comply with ASTM C307.
 - 3. Coefficient of Expansion:
 - a. 30×10^{-6} inch per degree F.
 - b. Comply with ASTM C531.
 - 4. Shrinkage:
 - a. None.
 - b. Comply with ASTM C827/C827M.

2.3 NONSHRINK CEMENTITIOUS GROUT

- A. Furnish materials according to Manufactures recommendations
- B. Description:
 - 1. Pre-mixed and ready-for-use formulation requiring only addition of water.
 - 2. Nonshrink, non-corrosive, nonmetallic, non-gas forming, and no chlorides.
- C. Performance and Design Criteria:
 - 1. Certified to maintain initial placement volume or expand after set, and to meet following minimum properties when tested according to CRD-C621 for Type D nonshrink grout:
 - a. Setting Time:
 - 1) Initial: Approximately two hours.
 - 2) Final: Approximately three hours.
 - 3) Comply with ASTM C191.

- b. Maximum Expansion: 0.10 to 0.40 percent.
- c. Compressive Strength:
 - 1) One-Day: 4,000 psi.
 - 2) Seven-Day: 7,000 psi.
 - 3) 28-Day: 10,000 to 10,800 psi.
 - 4) Comply with CRD-C621.

2.4 FORMWORK

- A. As specified in Section 031000 - Concrete Forming and Accessories.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify areas to receive grout.

3.2 PREPARATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Remove defective concrete, laitance, dirt, oil, grease, and other foreign material from concrete surfaces by brushing, hammering, chipping, or other similar means until sound and clean concrete surface is achieved.
- C. Roughen concrete lightly, but not to interfere with placement of grout.
- D. Remove foreign materials from metal surfaces in contact with grout.
- E. Align, level, and maintain final positioning of components to be grouted.
- F. Saturate concrete surfaces with clean water, and then remove excess water.

3.3 INSTALLATION

- A. Formwork:
 - 1. Construct leakproof forms anchored and shored to withstand grout pressures.
 - 2. Install formwork with clearances to permit proper placement of grout.
 - 3. As specified in Section 031000 - Concrete Forming and Accessories.
- B. Mixing:

1. Portland Cement Grout:
 - a. Use proportions of two parts sand and one-part cement, measured by volume.
 - b. Prepare grout with water to obtain consistency to permit placing and packing.
 - c. Mix water and grout in two steps:
 - 1) Premix using approximately 2/3 of water.
 - 2) After partial mixing, add remaining water to bring mix to desired placement consistency and continue mixing two to three minutes.
 - d. Mix only quantities of grout capable of being placed within 30 minutes after mixing.
 - e. Do not add additional water after grout has been mixed.
 - f. Minimum Compressive Strength: 2,400 in 48 hours and 7,000 psi in 28 days.
2. Rapid-Curing Epoxy Grout:
 - a. Mix and prepare according to manufacturer instructions.
 - b. Minimum Compressive Strength: 2,400psi in 48 hours and 7,000 psi in 28 days.
3. Nonshrink Cementitious Grout:
 - a. Mix and prepare according to manufacturer instructions.
 - b. Minimum Compressive Strength: 2,400 psi in 48 hours and 7,000 psi in 28 days.
4. Mix grout components in proximity to Work area and transport mixture quickly and in manner not permitting segregation of materials.

C. Placing of Grout:

1. Place grout material quickly and continuously.
2. Do not use pneumatic-pressure or dry-packing methods.
3. Apply grout from one side only to avoid entrapping air.
4. Do not vibrate placed grout mixture or permit placement if area is being vibrated by nearby equipment.
5. Thoroughly compact final installation and eliminate air pockets.
6. Do not remove leveling shims for at least 48 hours after grout has been placed.

D. Curing:

1. Prevent rapid loss of water from grout during first 48 hours by use of approved membrane curing compound or by using wet burlap method.
2. Immediately after placement, protect grout from premature drying, excessively hot or cold temperatures, and mechanical injury.
3. After grout has attained its initial set, keep damp for minimum three days.

3.4 FIELD QUALITY CONTROL

- A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

B. Inspection and Testing:

1. Comply with ACI 301 and as specified in Section 014000 - Quality Requirements.
2. Submit proposed mix design of each class of grout to Engineer of Record for review prior to commencement of Work.
3. Tests of grout components may be performed to ensure compliance with specified requirements.

END OF SECTION 036000

SECTION 26 0500 - ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Architectural, Structural, Mechanical and other applicable documents are considered a part of the electrical documents insofar as they apply as if referred to in full.

1.2 DESCRIPTION OF WORK:

- A. The extent of electrical work is indicated on drawings and/or specified in Division 26 sections of the specification. Provide all labor, materials, equipment, supervision and service necessary for a complete electrical system. Work includes, but is not necessarily limited to, the following items.

<u>ITEM</u>	<u>SECTION</u>
1. Electrical General Provisions	26 0500
2. Electrical Connections for Equipment	26 0507
3. Conduit Raceways	26 0532
4. Conductors and Cables	26 0519
5. Electrical Boxes and Fittings	26 0533
6. Supporting Devices	26 0526
7. Grounding	26 0526
8. Demolition	26 4119
9. Exterior Area Lighting	26 5600

- B. Use of standard industry symbols together with the special symbols, notes, and instructions indicated on the drawings describe the work, materials, apparatus and systems required as a portion of this work.
- C. Visit the site during the bidding period to determine existing conditions affecting electrical and other work. All costs arising from site conditions and/or preparation shall be included in the base bid. No additional charges will be allowed due to inadequate site inspection.

1.3 DEFINITION OF TERMS

- A. The following terms used in Division 26 documents are defined as follows:
 - 1. "Provide": Means furnish, install and connect, unless otherwise indicated.
 - 2. "Furnish": Means purchase and deliver to project site.
 - 3. "Install": Means to physically install the items in-place.
 - 4. "Connect": Means make final electrical connections for a complete operating piece of equipment.

1.4 RELATED SECTIONS:

- A. Consult all other sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.

- B. General and Supplementary Conditions: Drawings and general provisions of contract and Division 1 of the Specifications, apply to all Division 26 sections.
- C. Earthwork: Provide trenching, backfilling, boring and soil compaction as required for the installation of underground conduit, buried cable, in-grade pull boxes, manholes, lighting pole foundations, etc. See Division 2, Sitework, and other portions of Division 26, for material and installation requirements.
- D. Concrete Work: Provide forming, steel bar reinforcing, cast-in-place concrete, finishing and grouting as required for under ground conduit encasement, light pole foundations, pull box slabs, vaults, equipment pads, etc. See Division 3, Concrete for material and installation requirements.
- E. Miscellaneous Metal Work: Provide fittings, brackets, backing, supports, rods, welding and pipe as required for support and bracing of raceways, lighting fixtures, panelboards, distribution boards, switchboards, motor controls centers, etc. See Division 5, Metals for material and installation requirements.
- F. Miscellaneous Lumber and Framing Work: Provide wood grounds, nailers, blocking, fasteners, and anchorage for support of electrical materials and equipment. See Division 6, Rough Carpentry for material and installation requirements.
- G. Painting: Provide surface preparation, priming and finish coating as required for electrical cabinets, exposed conduit, pull and junction boxes, poles, surface metal raceways, etc. See Division 9, Finishes for material and installation requirements.

1.5 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS:

- A. Before bidding, Contractor shall familiarize himself with the drawings, specifications and project site. Submit requests for clarification to Architect/Engineer in writing prior to issuance of final addendum. After signing the contract, the Contractor shall meet the intent, purpose, and function of the Contract Documents. Any costs of materials, labor and equipment arising therefrom, to make each system complete and operable, is the responsibility of the Contractor.

1.6 QUALITY ASSURANCE:

- A. Reference to codes, standards, specifications and recommendations of technical societies, trade organizations and governmental agencies refers to the latest edition of such publications adopted and published prior to submittal of the bid proposed, unless noted otherwise herein. Such codes or standards are considered a part of this specification as though fully repeated herein.
- B. When codes, standards, regulations, etc. allow work of lesser quality or extent than is specified under this Division, nothing in said codes shall be construed or inferred as reducing the quality, requirements or extent of the Drawings and Specifications. Perform work in accordance with applicable requirements of all governing codes, rules and regulations including the following minimum standards, whether statutory or not:
 - 1. National Electric Code (NEC).
 - 2. International Building Code (IBC).
 - 3. International Fire Code (IFC).
 - 4. International Mechanical Code (IMC).
- C. Standards: Comply with the following standards where applicable for equipment and materials specified under this Division.

1.	UL	Underwriters' Laboratories
2.	ASTM	American Society for Testing Materials
3.	CBN	Certified Ballast Manufacturers
4.	IPCEA	Insulated Power Cable Engineers Association
5.	NEMA	National Electrical Manufacturer's Association
6.	ANSI	American National Standards Institute
7.	ETL	Electrical Testing Laboratories

- D. All electrical apparatus furnished under this Section shall conform to (NEMA) standards and the NEC and bear the Underwriters' Laboratories (UL) label where such label is applicable.
- E. Comply with requirements of State and Local Ordinances. If a conflict occurs between these requirements and the Contract Documents, the most stringent requirements shall govern. The Contractor accepts this responsibility upon submitting his bid, and no extra charge will be allowed after the contract is awarded. This shall not be construed as relieving the Contractor from complying with any requirements of the Contract Documents which may be in excess of the aforementioned requirements, and not contrary to same.
- F. Obtain all permits, inspections, etc. required by authority having jurisdiction. Include all fees in bid. Furnish a certificate of approval to the Owner's Representative from the Inspection Authority at completion of the work.
- G. Employ only qualified craftsmen with at least three years of experience. Workmanship shall be neat, have a good mechanical appearance and conform to best electrical construction practices. Provide a competent superintendent to direct the work at all times. Any person found incompetent shall be discharged from the project and replaced by satisfactory personnel.
- H. Contractor shall have a current state contracting license applicable to type of work to be performed under this contract.

1.7 SUBMITTALS:

- A. **SHOP DRAWINGS AND PRODUCT DATA:** After the Contract is awarded but prior to manufacture or installation of any equipment, prepare complete Shop Drawings and Brochures for materials and equipment as required by each section of the specification. Submit 8 complete sets for review. All sets of shop drawing material shall be bound. Prior to submission of the Shop Drawings and Project Data, review and certify that they are in compliance with the Contract Documents. Verify all dimensional information to insure proper clearance for installation of equipment. Check all materials and equipment after arrival on the job site and verify compliance with the Contract Documents. A minimum period of two weeks, exclusive of transmittal time, will be required each time Shop Drawing and/or Brochure is submitted or resubmitted for review. This time period shall be considered by the Contractor when scheduling submittal data. If the shop drawings are rejected twice, the contractor shall reimburse the engineer the sum of \$200.00 for the third review and any additional reviews required.
- B. Review of Shop Drawings and Brochures shall not relieve the Contractor of responsibility for dimensions and/or errors that may be contained therein, or deviations from the Contract Document's requirements. It shall be clearly understood that the noting of some errors but overlooking others does not grant the Contractor permission to proceed in error. Regardless of any information contained in the Shop Drawings and Brochures, the requirements of the Contract Document's shall govern and are not waived, or

superseded in any way by the review of the Shop Drawings and Brochures.

C. Certifications shall be written or in the form of rubber stamp impressions as follows:

1. I hereby certify that this Shop Drawing and/or Brochure has been checked prior to submittal and that it complies in all respects with the requirements of the Contract Drawings and Specifications for this Project.

(Name of Electrical Subcontractor)

Signed _____

Position _____ Date _____

D. Observe the following rules when submitting the Shop Drawings and Brochures.

1. Each Shop Drawing shall indicate in the lower right hand corner, and each Brochure shall indicate on the front cover the following: Title of the sheet or brochure, name and location of the building; names of the Architect and Electrical Engineer, Contractor, Subcontractors, Manufacturer, Supplier/Vendor, etc., date of submittal, and the date of correction and revision. Unless the above information is included the submittal will be returned for resubmittal.
2. Shop Drawings shall be done in an easily legible scale and shall contain sufficient plans, elevations, sections, and isometrics to clearly describe the equipment or apparatus, and its location. Drawings shall be prepared by an Engineer/Draftsmen skilled in this type of work. Shop Drawings shall be drawn to at least 1/4" = 1'0" scale.
3. Brochures to be submitted shall be published by the Manufacturers and shall contain complete and detailed engineering and dimensional information. Brochures submitted shall contain only information relevant to the particular equipment or materials to be furnished. The Contractor shall not submit catalogs which describe several different items in addition to those items to be used, unless all irrelevant information is marked out, or unless relevant information is clearly marked. Brochures from each manufacturer shall be identified and submitted separately.

E. ELECTRONIC SUBMITTAL REQUIREMENTS:

1. Provide submittals in Portable Document Format (PDF).
2. Documents must be electronically bookmarked and keyword searchable using Adobe Acrobat (<http://www.adobe.com/acrobat>) or Bluebeam Revu (<http://www.bluebeam.com>) for each relevant section. For example, include electronic bookmarks separating "Light Fixtures" from "Panelboards".
3. Electronically highlight all options for light fixtures, electrical equipment, etc. Manual highlighting and scanning of the documents is NOT acceptable and will NOT be reviewed.
4. Provide only completed cutsheets for all fixture and equipment types. Blank cutsheets submitted with a schedule are NOT acceptable and will NOT be reviewed.

5. A maximum of one submittal per specification section is allowed. It is NOT acceptable to provide a product by product submittal. Single product by product submittals will NOT be reviewed.
- F. OPERATION AND MAINTENANCE MANUALS: Provide operating instruction and maintenance data books for all equipment and materials furnished under this Division.
- G. Submit four copies of operating and maintenance data books for review at least four weeks before final review of the project. Assemble all data in a completely indexed volume or volumes and identify the size, model, and features indicated for each item. The binder (sized to the material) shall be a 2" slide lock unit (Wilson-Jones B3-367-44). The cover shall be engraved with the job title in 1/2" high letters and the name and address of the Contractor in 1/4" high letters. Provide the same information in 1/8" letters on the spine.
- H. Include complete cleaning and servicing data compiled in clearly and easily understandable form. Show serial numbers of each piece of equipment, complete lists of replacement parts, motor ratings, etc. Each unit shall have its own individual sheet. (Example: If two items of equipment A and D appear on the same sheet, an individual sheet shall be provided for each unit specified).
- I. Include the following information where applicable.
 1. Identifying name and mark number.
 2. Certified outline Drawings and Shop Drawings.
 3. Parts lists.
 4. Performance curves and data.
 5. Wiring diagrams.
 6. Light fixture schedule with the lamps and ballast data used on the project for all fixtures
 7. Manufacturer's recommended operating and maintenance instructions.
 8. Vendor's name and address for each item.
- J. The engineer will review the manuals and forward the manuals on to the architect. If the manuals are rejected twice, the contractor shall reimburse the engineer the sum of \$200.00 for each review afterwards.

1.8 RECORD DRAWINGS:

- A. Maintain, on a daily basis, a complete set of "Record Drawings", reflecting an accurate record of work in accordance with the following:
 1. Show the complete routing and location of all feeders rated 100 amps and larger. Locate work buried below grade or under slab, work concealed above ceilings, and work in concealed spaces, dimensionally from fixed structural elements (not partition walls, etc.)
 2. Show the complete routing and location of all telecommunications conduits, systems raceways, and empty raceways, 1-1/4" and larger. Locate work buried below grade or under slab, work concealed above ceilings, and work in concealed spaces, dimensionally from fixed structural elements (not partition walls, etc.).
 3. Show all changes, deviations, addendum items, change orders, job instructions, etc., which change the work from that shown on the contract documents, including wall relocations, fixtures and device changes, branch circuiting changes, etc. Where locations of boxes, raceways, equipment, etc. are adjusted in the field to fit conditions, but such new locations may not be obvious by

referring to the contract document, show new locations on the record drawings.

- B. At the discretion of the Architect/Engineer, the drawings will be reviewed on a periodic basis and used as a pre-requisite for progress payments. This requirement shall not be construed as authorization for the Contractor to make changes in the layout, or work without written authorization for such changes. The "Record Drawings" for daily recording shall consist of a set of blue line prints of the Contract Drawings.
- C. Upon completion of the work, purchase a complete set of electronic drawings. Transfer all "Record" information from the blue line prints to the drawings via the current CAD program in which it was written. The Architect/Engineer shall review the drawings and the contractor shall incorporate the resulting comments into the final record drawings. Make two complete copies of the drawings electronically and forward this to the engineer.

1.9 **Certify the "Record Drawings" for correctness by placing and signing the following certifications of the first sheet:**

"CERTIFIED CORRECT (3/8" high letters)

(Name of General Contractor)

By _____ Date

(Name of Electrical Contractor)

By _____ Date

- A. **GUARANTEE:** Ensure that electrical system installed under this contract is in proper working order and in compliance with drawings, specifications, and/or authorized changes. Without additional charge, replace any work or materials which develop defect, except from ordinary wear and tear, within one year from the date of substantial completion. Exception: Incandescent and fluorescent lamps shall be guaranteed for a period of two months from the date of substantial completion.

PART 2 - PRODUCTS

2.1 GENERAL:

- A. Products are specified by manufacturer name, description, and/or catalog number. Discrepancies between equipment specified and the intended function of equipment shall be brought to the attention of the Architect/Engineer in writing prior to bidding. Failure to report any conflict, including catalog numbers, discontinued products, etc., does not relieve the Contractor from meeting the intent of the contract documents nor shall it change the contract cost. If the Contractor is unable to interpret any part of the plans and/or specifications, or should he find discrepancies therein, he shall bring this to the attention of the Architect/Engineer who will issue interpretation and/or additional instructions to Bidders before the project is bid.
- B. **MANUFACTURERS:** Provide products of manufacturers specified. Manufacturers catalog numbers and descriptions establish the quality of product required. Substitutions will be considered if a duplicate written application (2-copies) is at the office of the Architect/Engineer eight (8) working days prior to the day of the bidding. The application shall include the following: 1) A statement certifying that the equipment proposed is equal to that specified; that it has the same electrical and physical characteristics, compatible dimensions, and meets the functional intent of the contract documents; 2) The specified and submittal catalog numbers of the equipment under consideration; 3) A pictorial and specification brochure.

- C. Any conflict arising from the use of substituted equipment shall be the responsibility of the Contractor, who shall bear all costs required to make the equipment comply with the intent of the contract documents.
- D. Samples may be required for non-standard or substituted items before installation during construction. Provide all samples as required.
- E. No materials or apparatus may be substituted after the bid opening except where the equipment specified has been discontinued.
- F. Provide only equipment specified in the Contract Documents or approved by addendum.

2.2 SPARE PARTS:

- A. Provide spare parts (fuses, diffusers, lamps, etc.) as specified. Transmit all spare parts to Owner's Representative prior to substantial completion.

PART 3 - EXECUTION

- A. **INSTALLATION:** Layout electrical work in advance of construction to eliminate unnecessary cutting, drilling, channeling, etc. Where such cutting, drilling, or channeling becomes necessary for proper installation; perform with care. Use skilled mechanics of the trades involved. Repair damage to roadway, concrete, buried systems and/or equipment at no additional cost to the contract. Cutting work of other Contractors shall be done only with the consent of that Contractor. Cutting structural members shall not be permitted.
- B. Since the drawings of site installations are made at small scale; devices, equipment, etc., are indicated only in their approximate location unless dimensioned. Locate lighting standards, and coordinate such locations with work of other trades to prevent interferences. Verify all dimensions on the job. Do not scale the electrical drawings, but refer to the architectural and mechanical shop drawings and project drawings for dimensions as applicable.
- C. Perform for other trades, the electrical wiring and connection for all devices, equipment or apparatus. Relocate buried electrical devices and/or connections as directed at no additional cost.
- D. Where conduit, outlets or apparatus are to be encased in concrete, it must be located and secured by a journeyman or foreman present at the point of installation. Check locations of the electrical items before and after concrete and/or masonry installation and relocate displaced items.
- E. Provide block-outs, sleeves, demolition work, etc., required for installation of work specified in this division.

3.2 CLEAN:

- A. Clean up all equipment, conduit, fittings, packing cartons and other debris that is a direct result of the installation of the work of this Division.
- B. Clean fixtures, interiors and exteriors of all equipment, and raceways. Replace all filters in electrical equipment upon request for Substantial Completion.

3.3 STORAGE AND PROTECTION OF MATERIALS:

- A. Provide storage space for storage of materials and apparatus and assume complete responsibility for all losses due to any cause whatsoever. In no case shall storage interfere with traffic conditions in any public thoroughfare or constitute a hazard to persons in the vicinity. Protect completed work, work underway, and apparatus against loss or damage.

3.4 EXCAVATING FOR ELECTRICAL WORK:

- A. General: Locate and protect existing utilities and other underground work in manner which will ensure that no damage or service interruption will result from excavating and backfilling. Perform excavation in a manner which protects walls, footings, and other structural members from being disturbed or damaged in any way. Burial depths must comply with NEC Section 300-5 (or State of Utah requirement, whichever is more stringent), unless noted otherwise on drawings.
- B. Protect persons from injury at excavations, by barricades, warnings and illumination.
- C. Coordinate excavations with weather conditions, to minimize possibility of washouts, settlements and other damages and hazards.
- D. Provide temporary covering or enclosure and temporary heat as necessary to protect bottoms of excavations from freezing and frost action. Do not install electrical work on frozen excavation bases or sub-bases.
- E. Do not excavate for electrical work until the work is ready to proceed without delay, so that total time lapse from excavation to completion of backfilling will be minimum. See other sections of specification for additional requirements for excavating.
- F. Store excavated material (temporarily) near excavation, in manner which will not interfere with or damage excavation or other work. Do not store under trees (within drip line).
- G. Retain excavated material which complies with requirements for backfill material. Dispose of excavated material which is either in excess of quantity needed for backfilling or does not comply with requirements for backfill material. Remove unused material from project site, and dispose of in lawful manner.

3.5 BACKFILL MATERIALS:

- A. For buried conduit or cable (other than below slab-on-grade, or concrete encased) - 2" thickness of well graded sand on all side of conduit or cable.
- B. For trench backfill to within 6" of final grade - soil material suitable for compacting to required densities.
- C. For top 6" of excavation - Top soil.
- D. Backfill excavations in 8" high courses of backfill material, uniformly compacted to the following densities (percent of maximum density, ASTM D 1557), using power-driven hand-operated compaction equipment.
 - 1. Lawn/Landscaped Areas: 85 percent for cohesive soils, 95 percent for cohesionless soils.
 - 2. Paved Areas, Other than Roadways (90 percent for cohesive soils, 95 percent for cohesionless soils).
- E. Subsidence: Where subsidence is measurable or observable at electrical work

excavations during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality and condition of the surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.6 CONCRETE BASES:

- A. Refer to Section 26 5600 Exterior Area Lighting for concrete base specification.

3.7 FINAL REVIEW:

- A. At the time of final review, the project foreman shall accompany the reviewing party, and remove coverplates, panel covers and other access panels as requested, to allow review of the entire electrical system.

END OF SECTION 26 0500

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SECTION 26 0507 - ELECTRICAL CONNECTIONS FOR EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. This section is a Division-26 Basic Materials and Methods section, and is part of each Division-26 section making reference to electrical connections.

1.2 DESCRIPTION OF WORK:

- A. Extent of electrical connection for equipment includes final electrical connection of all equipment having electrical requirements. Make final connections for all owner furnished equipment. See other applicable portions of specification for building temperature control wiring requirements.
- B. Refer to sections of other Divisions for specific individual equipment power requirements.

1.3 QUALITY ASSURANCE:

- A. **NEC COMPLIANCE:** Comply with applicable portions of NEC as to type products used and installation of electrical power connections.
- B. **UL LABELS:** Provide electrical connection products and materials which have been UL-listed and labeled.

PART 2 - PRODUCTS

- A. **GENERAL:** For each electrical connection indicated, provide complete assembly of materials, including but not necessarily limited to, raceways, conductors, cords, cord caps, wiring devices, pressure connectors, terminals (lugs), electrical insulating tape, heat-shrinkable insulating tubing, cable ties, solderless wire nuts, and other items and accessories as needed to complete splices, terminations, and connections as required. Crimp on or slip-on type splicing materials (insulation displacement type) designed to be used without wire stripping are not acceptable. See Section 26 0532, Conduit Raceways; Section 26 2726 Wiring Devices; and Section 26 0519 Wire and Cable for additional requirements. Provide final connections for equipment consistent with the following:
 - 1. Permanently installed fixed equipment - flexible seal-tite conduit from branch circuit terminal equipment, or raceway; to equipment, control cabinet, terminal junction box or wiring terminals. Totally enclose all wiring in raceway.
 - 2. Movable and/or portable equipment - wiring device, cord cap, and multi-conductor cord suitable for the equipment and in accordance with NEC requirements (Article 400).
 - 3. Other methods as required by the National Electrical Code and/or as required by special equipment or field conditions.

PART 3 - EXECUTION

3.1 INSTALLATION OF ELECTRICAL CONNECTIONS:

- A. Make electrical connections in accordance with connector manufacturer's written instructions and with recognized industry practices, and complying with requirements of

- NEC and NECA's "Standard of Installation" to ensure that products fulfill requirements.
- B. Connect electrical power supply conductors to equipment conductors in accordance with equipment manufacturer's written instructions and wiring diagrams.
 - C. Coordinate installation of electrical connections for equipment with equipment installation work.
 - D. Verify all electrical loads (voltage, phase, full load amperes, number and point of connections, minimum circuit ampacity, etc.) for equipment furnished under other Divisions of this specification, by reviewing respective shop drawings furnished under each division. Meet with each subcontractor furnishing equipment requiring electrical service and review equipment electrical characteristics. Report any variances from electrical characteristics noted on the electrical drawings to Architect before proceeding with rough-work.
 - E. Obtain and review the equipment shop drawings to determine particular final connection requirements before rough-in begins for each equipment item.
 - F. Refer to basic materials and methods Section 26 0519, Conductors, for identification of electrical power supply conductor terminations.

END OF SECTION 26 0507

SECTION 26 0519 - CONDUCTORS AND CABLES (600V AND BELOW)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. This section is a Division-26 Basic Materials and Methods section, and is part of each Division-26 section making reference to conductors and cables specified herein.

1.2 DESCRIPTION OF WORK:

- A. Types of conductors and cables in this section include the following:
 - 1. Copper Conductors (600V)
- B. Applications for conductors and cables required for project include:
 - 1. Branch Circuits

1.3 QUALITY ASSURANCE:

- A. Comply with NEC as applicable to construction and installation of electrical conductors and cable. Comply with UL standards and provide electrical conductors and cables which have been UL-listed and labeled.
- B. Comply with applicable portions of NEMA/Insulated Cable Engineers Association standards pertaining to materials, construction and testing of conductors and cable.
- C. Comply with applicable portions of ANSI/ASTM and IEEE standards pertaining to construction of conductors and cable.

1.4 SUBMITTALS:

- A. FIELD TEST DATA: Submit megohmmeter test data for circuits under 600 volts.

PART 2 - PRODUCTS

2.1 COPPER AND ALUMINUM CONDUCTORS (600V):

- A. Provide factory-fabricated conductors of sizes, ratings, materials, and types indicated for each service. Where not indicated provide proper selection to comply with project's installation requirements and NEC standards. Provide conductors in accordance with the following:
 - 1. Branch Circuit Conductors and All Conductors #3 AWG and Smaller - Copper conductor, with THHN/THWN insulation. Size all conductors in accordance with NEC; minimum size to be #12 AWG. Provide solid conductors for #10 AWG and smaller. Provide stranded conductors for #8 AWG and larger.
 - 2. Provide color and coding of conductors as follows (match existing):

120/208V

A-Phase - Black
B-Phase - Red

277/480V

A-Phase - Brown
B-Phase - Purple

C-Phase - Blue
Neutral - White
Ground - Green

C-Phase - Yellow
Neutral - Gray
Ground - Green

3. Provide colors for switch legs, travelers and other wiring for branch circuits different than listed above.
4. Provide connectors and terminations for aluminum-alloy conductors of hydraulic compression type only, listed under UL 486-B, and marked "AL 7CU" for 75o rated circuits, and "AL9CU" for 90o rated circuits.
5. Provide a maximum of three phase conductors in any one conduit or as approved by electrical engineer.
6. Provide a separate neutral conductor for every single phase circuit installed. Match the size of the phase conductor.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. General: Install electric conductors and cables as indicated, in compliance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standards of Installation", and in accordance with recognized industry practices.
- B. Coordinate installation work with electrical raceway and equipment installation work, as necessary for proper interface.
- C. Cables may be pulled by direct attachment to conductors or by use of basket weave pulling grip applied over cables. Attachment to pulling device shall be made through approved swivel connection. Nonmetallic jacketed cables of small size may be pulled directly by conductors by forming them into a loop to which pull wire can be attached; remove insulation from conductors before forming the loop. Larger sizes of cable may be pulled by using basket weave pulling grip, provided the pulling force does not exceed limits recommended by manufacturer; if pulling more than one cable, bind them together with friction tape before applying the grip. For long pulls requiring heavy pulling force, use pulling eyes attached to conductors.
- D. Do not exceed manufacturer's recommendations for maximum allowable pulling tension, side wall pressure, and minimum allowable bending radius. In all cases, pulling tension applied to the conductors shall be limited to 0.008 lbs. per circular mil of conductor cross-section area.
- E. Pull in cable from the end having the sharpest bend; i.e. bend shall be closest to reel. Keep pulling tension to minimum by liberal use of lubricant, and turning of reel, and slack feeding of cable into duct entrance. Employ not less than one man at reel and one in pullhole during this operation.
- F. For training of cables, minimum bend radius to inner surface of cable shall be 12 times cable diameter.
- G. Where cable is pulled under tension over sheaves, conduit bends, or other curved surfaces, make minimum bend radius 50% greater than specified above for training.
- H. Use only wire and cable pulling compound recommended by the specific cable manufacturer, and which is listed by UL.
- I. Seal all cable ends unless splicing is to be done immediately. Conduit bodies shall not

contain splices.

- J. Follow manufacturer's instructions for splicing and cable terminations.
- K. Provide Scotch Cast 400 Resin for water-tight connections on all exterior connections subject to moisture.

3.2 AFTER INSTALLATION TEST FOR CABLE 600 VOLTS AND BELOW:

- A. Prior to energization, test cable and wire for continuity of circuitry, and for short circuits, Megger all circuits of 100 amp and greater rating. Correct malfunctions. Submit record in triplicate of megohmmeter readings to Architect/Engineer.
- B. Subsequent to wire and cable connections, energize circuitry and demonstrate functioning in accordance with requirements.

END OF SECTION 26 0159

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SECTION 16452 - GROUNDING

PART 1 - RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Division-16 Basic Materials and Methods sections apply to work specified in this section.

1.2 DESCRIPTION OF WORK:

- A. Provide grounding and bonding of all electrical and communication apparatus, machinery, appliances, building components, and items required by the NEC to provide a permanent, continuous, low impedance, grounding system.
- B. Unless otherwise indicated, ground the complete electrical installation including the system neutral, metallic conduits and raceways, boxes, fittings, devices, cabinets, and equipment in accordance with all code requirements.
- C. Ground each separately derived system, as described in NEC Section 250-30, unless otherwise indicated.
- D. Types of grounding in this section include the following:
 - 1. Grounding Electrodes
 - 2. Grounding Rods
 - 3. Enclosures
 - 4. Systems
 - 5. Equipment
 - 6. Other items indicated on drawings
- E. Requirements of this section apply to electrical grounding work specified elsewhere in these specifications.

1.3 QUALITY ASSURANCE:

- A. Comply with NEC as applicable to electrical grounding and ground fault protection systems. Comply with applicable ANSI and IEEE requirements. Provide products which have been UL listed and labeled.
- B. Resistance from the service entrance ground bus, through the grounding electrode to earth, shall not exceed 5 ohms.

1.4 SUBMITTALS:

- A. Submit the name of test agency to be used for testing specified in this section. Submit results of tests specified in this section. Also include test results in Operation and Maintenance Manuals as specified.

PART 2 - PRODUCTS

2.1 MATERIALS AND COMPONENTS:

- A. **GENERAL:** Except as otherwise indicated, provide each electrical grounding system as specified herein, including but not necessarily limited to, cables/wires, connectors, terminals (solderless lugs), grounding rods/electrodes and plate electrodes, bonding jumper braid, and other items and accessories needed for complete installation. Where materials or components are not otherwise indicated, comply with NEC, NEMA and

established industry standards for applications indicated.

- B. ELECTRICAL GROUNDING CONDUCTORS: Unless otherwise indicated, provide electrical grounding conductors for grounding connections matching power supply wiring materials and sized according to NEC. Provide with green insulation.
- C. GROUND RODS: Steel with copper welded exterior, 3/4" dia. x 10' long. Weaver or Cadweld.
- D. GROUND WELL BOXES FOR GROUND RODS: Precast concrete box 9-1/2" W. x 16" L. X 18" D. with light duty concrete cover for non-traffic areas or rated steel plate for traffic areas. Provide covers with lifting holes. Engrave cover with "GROUND ROD".
- E. INSULATED GROUNDING BUSHINGS: Plated malleable iron body with 150 degree Centigrade molded plastic insulating throat, lay-in grounding lug with hardened stainless steel fasteners, OZ/Gedney BLG, or Thomas & Betts #TIGB series.
- F. CONNECTIONS TO PIPE: For cable to pipe, OZ/Gedney G-100B series or Thomas & Betts #390X series, or Burndy type GAR.
- G. CONNECTIONS TO GROUND RODS: For splicing and/or connecting conductors, use exothermic welds or high pressure compression type connectors. Provide exothermic weld kits manufactured by Cadweld or Thermoweld. If high compression type connectors are used for cable-to-cable, or cable-to-steel, or cable-to-ground rod connections, provide Thomas & Betts #53000 series, or Burndy Hyground series.

PART 3 - EXECUTION

3.1 INSTALLATION OF GROUNDING SYSTEMS:

- A. Install electrical grounding systems in accordance with manufacturer's written instructions and with recognized industry practices to ensure grounding devices comply with requirements.
- B. Install clamp-on connectors only on thoroughly cleaned and metal contact surfaces, to ensure electrical conductivity and circuit integrity.
- C. Provide grounding for the entire raceway, raceway system, enclosure, equipment and device system in accordance with NEC. All raceways shall include copper grounding conductor sized in accordance with NEC.

3.2 GROUNDING ELECTRODES:

- A. SUPPLEMENTARY GROUNDING ELECTRODE (Driven Rods): Provide driven ground rod(s). Locate ground rod a minimum of 10 feet from any electrode of another electrical system or from adjacent ground rod(s).
- B. GROUNDING ELECTRODE CONDUCTOR: Provide grounding electrode conductor sized per NEC table 250-94 or as indicated.
- C. EQUIPMENT BONDING/GROUNDING: Provide a NEC sized conductor, whether indicated or not on the drawings, in raceways as follows:
 - 1. Non-metallic conduits and ducts.
 - 2. Device and lighting branch circuits.

END OF SECTION 26 0226

SECTION 26 0529 - SUPPORTING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-26 Specification section, apply to work of this section.
- B. This section is a Division-26 Basic Materials and Methods section, and is a part of each Division-26 section making reference to supports, anchors, sleeves, and seals, specified herein.

1.2 DESCRIPTION OF WORK:

- A. Work of this section includes supports, anchors, sleeves and seals required for a complete raceway support system, including but not limited to: riser clamps, C-clamps, one and two hole conduit straps, offset conduit clamps, expansion anchors, toggle bolts, threaded rods, U-channel strut systems, threaded rods and all associated accessories.

1.3 QUALITY ASSURANCE:

- A. Comply with NEC as applicable to construction and installation of electrical supporting devices. Comply with applicable requirements of ANSI/NEMA Std. Pub No. FB 1, "Fittings and Supports for Conduit and Cable Assemblies". Provide electrical components which are UL-listed and labeled.

PART 2 - PRODUCTS

2.1 MANUFACTURED SUPPORTING DEVICES:

- A. **GENERAL:** Provide supporting devices; complying with manufacturer's standard materials, design and construction in accordance with published product information, and as required for a complete installation; and as herein specified.

PART 3 - EXECUTION

3.1 INSTALLATION OF SUPPORTING DEVICES:

- A. Install hangers, anchors, sleeves, and seals as required, in accordance with manufacturer's written instructions and with recognized industry practices to insure supporting devices comply with requirements. Comply with requirements of NECA, NEC and ANSI/NEMA for installation of supporting devices.
- B. Coordinate with other electrical work, including raceway and wiring work, as necessary to interface installation of supporting devices with other work. Attach all supporting devices from the top chord of the trusses and joists. Do not support from the bottom chord. Coordinate additional requirements with drawings.
- C. Install hangers, supports, clamps and attachments to support piping properly.
- D. **RACEWAYS:** Support raceways rigidly

END OF SECTION 26 0529

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SECTION 26 0532 - CONDUIT RACEWAYS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.
- B. This section is a Division-16 Basic Materials and Methods section, and is part of each Division-26 section making reference to electrical raceways and specified herein.

1.2 DESCRIPTION OF WORK:

- A. Types of raceways in this section include the following:
 - 1. Electrical Metallic Tubing
 - 2. Flexible Metal Conduit
 - 3. Intermediate Metal Conduit
 - 4. Liquid-tight Flexible Metal Conduit
 - 5. Rigid Metal Conduit
 - 6. Rigid Non-metallic Conduit

1.3 QUALITY ASSURANCE:

- A. **MANUFACTURERS:** Firms regularly engaged in manufacture of raceway systems of types and sizes required, whose products have been in satisfactory use in similar service for not less than three (3) years.
- B. **STANDARDS:** Comply with applicable portions of NEMA standards pertaining to raceways. Comply with applicable portions of UL safety standards pertaining to electrical raceway systems; and provide products and components which have been UL-listed and labeled. Comply with NEC requirements as applicable to construction and installation of raceway systems.
- C. **SUBMITTALS:** Not required.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING:

- A. **GENERAL:** Provide metal conduit, tubing and fittings of types, grades, sizes and weights (wall thicknesses) as indicated; with minimum trade size of 3/4".
- B. **RIGID METAL CONDUIT (RMC):** FS WW-C-0581 and ANSI C80.1.
- C. **INTERMEDIATE STEEL CONDUIT (IMC):** FS WW-C-581.
- D. **PVC EXTERNALLY COATED RIGID STEEL CONDUIT:** ANSI C80.1 and NEMA Std. Pub. No. RN 1.
- E. **ALUMINUM CONDUIT:** Not acceptable.
- F. **RIGID AND INTERMEDIATE STEEL CONDUIT FITTINGS:** Provide fully threaded malleable steel couplings; raintight and concrete tight where required by application. Provide double locknuts and metal bushings at all conduit terminations. Install OZ Type

B bushings on conduits 1-1/4" and larger.

- G. ELECTRICAL METALLIC TUBING (EMT): FS WW-C-563 and ANSI C80.3.
- H. EMT FITTINGS: Provide insulated throat nylon bushings with non-indenter type malleable steel fittings at all conduit terminations. Install OZ Type B bushings on conduits 1" larger. Cast or indenter type fittings are not acceptable.
- I. FLEXIBLE METAL CONDUIT: FS WW-C-566, of the following type;
 - 1. Zinc-coated steel.
- J. FLEXIBLE METAL CONDUIT FITTINGS: FS W-F-406, Type 1, Class 1, and Style A.
- K. LIQUID TIGHT FLEXIBLE METAL CONDUIT: Provide liquid-tight, flexible metal conduit; constructed of single strip, flexible continuous, interlocked, and double-wrapped steel; galvanized inside and outside; coated with liquid-tight jacket of flexible polyvinyl chloride (PVC).
- L. LIQUID-TIGHT FLEXIBLE METAL CONDUIT FITTINGS: FS W-F-406, Type 1, Class 3, Style G.
- M. EXPANSION FITTINGS: OZ Type AX, or equivalent to suit application.

2.2 NON-METALLIC CONDUIT AND DUCTS:

- A. GENERAL: Provide non-metallic conduit, ducts and fittings of types, sizes and weights as indicated; with minimum trade size of 3/4".
- B. UNDERGROUND PVC PLASTIC UTILITIES DUCT: Minimum requirements shall be schedule 40 for encased burial in concrete and for Type II for direct burial.
- C. PVC AND ABS PLASTIC UTILITIES DUCT FITTINGS: ANSI/NEMA TC 9, match to duct type and material.
- D. HDPE Conduit: Not acceptable

2.3 CONDUIT; TUBING; AND DUCT ACCESSORIES:

- A. Provide conduit, tubing and duct accessories of types and sizes, and materials, complying with manufacturer's published product information, which mate and match conduit and tubing. Provide manufactured spacers in all duct bank runs.

2.4 SEALING BUSHINGS:

- A. Provide OZ Type FSK, WSK, or CSMI as required by application. Provide OZ type CSB internal sealing bushings.

2.5 CABLE SUPPORTS:

- A. Provide OZ cable supports for vertical risers, type as required by application.

PART 3 - EXECUTION

3.1 INSTALLATION OF ELECTRICAL RACEWAYS:

- A. Install electrical raceways where indicated; in accordance with manufacturer's written

instructions, applicable requirements of NEC and NECA "Standard of Installation", and in accordance with the following.

1. BRANCH CIRCUITS, SIGNAL AND CONTROL CIRCUITS, AND INDIVIDUAL EQUIPMENT CIRCUITS RATED LESS THAN 100 AMPS: Install in electric metallic tubing (EMT); except in poured walls, with one side in contact with grade, below concrete slab-on-grade or in earth fill, install in non-metallic plastic duct. In areas exposed to weather, moisture, or physical damage, install in GRC or IMC. In suspended slabs and block walls, install in EMT. Encase non-metallic duct 1-1/4" and larger in concrete. See duct banks.
- B. Coordinate with other work as necessary to interface installation of electrical raceways and components.
- C. Install raceway in accordance with the following:
1. Provide a minimum of 12" clearance measured from outside of insulation from flues, steam and hot water piping, etc. Avoid installing raceways in immediate vicinity of boilers and similar heat emitting equipment.
 2. Install all raceway concealed.
 3. Where cutting raceway is necessary, remove all inside and outside burrs; make cuts smooth and square with raceway. Paint all field threads (or portions of raceway where corrosion protection has been damaged) with primer and enamel finish coat to match adjacent raceway surface.
 4. Comply with NEC for requirements for installation of pull boxes in long runs.
 5. Cap open ends of conduits and protect other raceways as required against accumulation of dirt and debris. Pull a mandril and swab through all conduit before installing conductors. Install a 200 lb. nylon pull cord in each empty conduit run.
 6. Replace all crushed, wrinkled or deformed raceway before installing conductors.
 7. Do not use flame type devices as a heat application to bend PVC conduit. Use a heating device which supplies uniform heat over the entire area without scorching the conduit.
 8. Provide rigid metal conduit (RMC) for all bends greater than 22 degrees in buried conduit. Provide protective coating for RMC bend as specified herein.
 9. Complete installation of electrical raceways before starting installation of cables/conductors within raceways.
- D. Raceway installation below slab-on-grade, or below grade:
1. Apply protective coating to metallic raceways in direct contact with earth or fill of any type; consisting of spirally wrapped PVC tape (1/2" minimum overlap of scotch wrap tape or equal); or factory applied vinyl cladding (minimum thickness .020 inches). Completely wrap and tape all field joints.
 2. Mark all buried conduits which do not require concrete encasement by placing yellow plastic marker tape (minimum 6" wide) along entire length of run 12" below final grade. Where multiple small lines are buried in a common trench and do not exceed an overall width of 16", install a single line marker.

3. Burial depths must comply with NEC Section 300-5 but in no case be less than 24".
4. Protect conduit installed in trenches under slab from large excavated material. Backfill to 8" of cover, with suitable soil material for 95% compaction.

END OF SECTION 26 0532

SECTION 26 0533 - ELECTRICAL BOXES AND FITTINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to work of this section.
- B. This section is a Division- 26 Basic Materials and Methods section, and is a part of each Division-26 section making reference to electrical wiring boxes and fittings specified herein. See Section 26 0536 Raceways, for additional requirements.

1.2 DESCRIPTION OF WORK:

- A. Types of electrical boxes and fittings in this section include the following:
 - 1. Outlet Boxes
 - 2. Junction Boxes
 - 3. Pull Boxes
 - 4. Conduit Bodies
 - 5. Bushings
 - 6. Locknuts
 - 7. Knockout Closures
 - 8. Miscellaneous Boxes and Fittings

1.3 QUALITY ASSURANCE:

- A. Comply with NEC as applicable to construction and installation of electrical boxes and fittings. Comply with ANSI C 134,1 (NEMA Standards Pub No. OS 1) as applicable to sheet-steel outlet boxes, device boxes, covers and box supports. Provide electrical boxes and fittings which have been UL-listed and labeled.

1.4 SUBMITTALS: None required

PART 2 - PRODUCTS

2.1 FABRICATED MATERIALS:

- A. Provide an 'FS' box with no knockouts when surface mounted in a finished, non-utility space. Surface mounting is only acceptable when approved by the Architect.
- B. WEATHERPROOF OUTLET BOXES: Provide corrosion-resistant cast-metal weatherproof outlet wiring boxes, of types, shapes and sizes (including depth) required, with threaded conduit ends, cast-metal face plates with spring-hinged waterproof caps suitably configured for each application, with face plate gaskets and corrosion-resistant fasteners.
- C. JUNCTION AND PULL BOXES: Provide code-gage sheet steel junction and pull boxes, with screw-on covers; of types, shapes and sizes to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers.
- D. CONDUIT BODIES: Provide galvanized cast-metal conduit bodies, of types, shapes and sizes to suit respective locations and installation, construct with threaded-conduit-entrance ends, removable covers, and corrosion-resistant screws.
- E. BUSHINGS, KNOCKOUT CLOSURES AND LOCKNUTS: Provide corrosion-resistant

punched-steel box knockout closures, conduit locknuts and malleable steel conduit bushings and offset connectors, of types and sizes to suit respective uses and installation.

PART 3 - EXECUTION

3.1 INSTALLATION OF ELECTRICAL BOXES AND FITTINGS:

- A. GENERAL: Install electrical boxes and fittings where indicated, complying with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in compliance with recognized industry practices to ensure that products fulfill requirements.
- B. Coordinate installation of electrical boxes and fittings with wire/cable and raceway installation work.
- C. Provide coverplates for all boxes. See Section 26 2726, Wiring Devices.
- D. Provide weatherproof outlets for interior and exterior locations exposed to weather or moisture.
- E. Provide knockout closures to cap unused knockout holes where blanks have been removed.
- F. Install boxes and conduit bodies to ensure ready accessibility of electrical wiring. Do not install boxes above ducts or behind equipment. Install recessed boxes with face of box or ring flush with adjacent surface. Seal between switch, receptacle and other outlet box openings and adjacent surfaces with plaster, grout, or similar suitable material.
- G. Fasten boxes rigidly to substrates or structural surfaces to which attached, or solidly embed electrical boxes in concrete or masonry. Use bar hangers for stud construction. Use of nails for securing boxes is prohibited. Set boxes on opposite sides of common wall with minimum 10" of conduit between them. Set boxes on opposite sides of fire resistant walls with minimum of 24" separation.
- H. Provide electrical connections for installed boxes.
- I. Provide an approved fitting on each end of each conduit (regardless of voltage) whether in panel, box, etc. or in free air.

END OF SECTION 26 0533

SECTION 26 4119 - DEMOLITION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Special Provisions, Division 1 and Division-2 Specification sections, apply to work of this section.
- B. This section is a Division-26 Basic Materials and Methods section, and is part of each Division-26 section making reference to demolition.

1.2 DESCRIPTION OF WORK:

- A. Extent of major items of demolition work is indicated by drawings. Other demolition work shall be performed as required to maintain system operation.
- B. The intent of the drawings is to indicate major items affected and not to show every device, outlet, fixture, etc. affected by demolition work.
- C. The drawings do not necessarily reflect as-built conditions. The contractor shall visit the jobsite prior to bidding to determine the overall scope of demolition work.
- D. Refer to sections of other Divisions for applicable requirements affecting demolition work.
- E. Refer to Section 260500 for requirements with regard to power outages affecting the operation of existing electrical systems.

1.3 QUALITY ASSURANCE:

A. NEC COMPLIANCE:

- 1. Comply with applicable portions of NEC as to methods used for demolition work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL:

- A. Demolition work shall be laid out in advance to eliminate unnecessary cutting, drilling, channeling, etc. Where such cutting, drilling, or channeling becomes necessary, perform with care, use skilled mechanics of the trades involved. Repair damage to building and equipment. Cutting work of other Contractors shall be done only with the consent of that Contractor. Cutting of structural members shall not be permitted.

3.2 PATCHING AND REPAIR

- A. The Contractor is responsible for all demolition, patching and repair of all finished interior surfaces pertaining to the installation of this particular phase of work. All surfaces shall be finished (painted, etc.) to match the adjacent materials, finishes and colors.
- B. Hard surfaces: Whenever demolition or excavation is required for the installation of the electrical system, it shall be the responsibility of this contractor to make repairs and/or replacements of hard finish surfaces such as concrete, asphalt, roofing, etc.
- C. The method of patching and repair shall follow good construction practices and all

finished surfaces shall match materials and finish wherein the demolition occurred.

3.3 EXISTING EQUIPMENT

- A. The following is a part of this project and all costs pertaining thereto shall be included in the base bid.
- B. The new electrical equipment and apparatus shall be coordinated and connected into the existing system as required. Auxiliary systems shall comply, unless otherwise specified.
- C. The existing electrical devices, conduit and/or equipment that for any reason obstructs construction shall be relocated. Provide conduit, wiring, junction boxes, etc. as required to extend existing circuits and systems to relocated devices or equipment.
- D. The new fixtures indicated for existing outlets shall be installed in accordance with the fixture specifications.
- E. When installing equipment in the existing building, it shall be concealed.
- F. All existing electrical equipment and systems in portions of the building not being remodeled shall be kept operational, in service and in working condition throughout the entire construction period. Restore any circuits and systems interrupted. Provide temporary panels, temporary wiring and conduit, etc. as required.
- G. Maintain circuit integrity and continuity of all existing circuits and systems that interfere with or are interrupted by remodel work unless those circuits are to be abandoned completely. Maintain all circuits and systems in operation during construction. Provide temporary panels, temporary wiring and conduit, etc. as required.
- H. Existing raceways may be used where possible in place, except as noted. All circuits, conduit and wire that are not used in the remodeled area shall be removed back to the panelboard, where it shall be labeled a spare with circuit number indicated. Re-used raceway shall meet all requirements for new installations.
- I. Obtain permission from the Architect and Owner's representative before penetrating any ceiling, floor, and wall surfaces.
- J. Any and all equipment having electrical connections that require disconnecting and reconnection at the same or another location throughout the course of construction shall be included as part of this contract.

END OF SECTION 26 4119

SECTION 26 5600 - EXTERIOR AREA LIGHTING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Division-26 Basic Materials and Methods sections apply to work specified in this section.

1.2 DESCRIPTION OF WORK:

- A. Types of lighting fixtures in this section are indicated by schedule and include the following:
 - 1. LED (Light Emitting Diode)
- B. Excavation and backfilling for exterior area lighting poles, standards and foundations are specified in applicable Division-26 general provision sections.
- C. Concrete for embedding poles, and for pole foundations and footings is specified in other sections of specification. Provide pole bases under this section of the specification.
- D. Refer to other Division-26 sections for cable, wire and connectors required in connection with exterior area lighting poles and standards.

1.3 QUALITY ASSURANCE:

- A. Comply with NEC, NEMA and ANSI/IES requirements as applicable to location and installation of lighting poles and standards. Provide lighting components and fittings which are UL-listed and labeled.
- B. Comply with other portions of specification as applicable for forming, splicing, and curing of concrete bases provided under this section.

1.4 SUBMITTALS:

- A. **PRODUCT DATA:** Submit manufacturer's data on lighting units, including certified dimension drawings of components including, but not necessarily limited to, poles and standards, mast arms, brackets, hardware and fixtures.

PART 2 - PRODUCTS

- 2.1 **MANUFACTURER:** Subject to compliance with requirements, provide products as scheduled on drawings.
 - 2.2 **FUSES:** Provide (3) spare fuses for each type and size used.
 - 2.3 **CONCRETE:** 3000 psi Class.
 - 2.4 **LIGHT FIXTURE POLES:** Provide light fixture poles that comply with the following minimum
- EXTERIOR AREA LIGHTING

requirements.

- A. The pole shaft constructed of seamless aluminum alloy per requirements of ASTM B221. Include a flush covered hand hole in each pole with finish hardware. Provide a permanent marking with the manufacturer name inside the hand hole for easy recognition.
- B. Provide aluminum alloy anchor base welded to the pole shaft. Welding must comply with AWS Specification D1.2, Structural Welding Code – Aluminum. The complete assembly must be heat-treated to a T6 temper.
- C. Provide super durable thermosetting polyester power coat paint, a minimum of 1.5 mils thick along the entire length of the pole.
- D. Provide dampening in the pole as required to counter oscillation vortex shedding of the pole.
- E. Include aluminum nut covers for a “Shoe Base” Trim.
- F. Provide a 10 year minimum guarantee, which covers the pole structure and paint.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install area lighting units as indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC, NESC and NEMA standards and with recognized industry practices to ensure that lighting units fulfill requirements.
- B. Coordinate with other work as necessary to properly interface installation of roadway and parking area lighting with other work.
- C. Comply with NEC 300-5 (or State of Utah requirement, whichever is most stringent), for raceway burial depth.
- D. Mount lighting units on concrete bases as indicated, complete with anchor bolts and reinforcing bars. Coordinate proper size and location of all bases as required to ensure proper installation. Provide 3000 psi class concrete; hand rub all exposed concrete to uniform, smooth finish.
- E. Deliver poles to job site with factory finish paint.
- F. Set poles and standards plumb. Support adequately during backfilling, or anchoring to foundations.
- G. Provide sufficient space encompassing hand access and cable entrance holes for installation of underground cabling.
- H. Provide Bussman HEB fuseholder (or Littelfuse LEB-XX-S) with "breakaway" receptacles in all conductors running to the top of each pole. Locate fuseholder at hand hole or in base junction box as applicable. Provide KTK fuses in each phase conductor, sized 1.5

times maximum full load current of ballasts served by each conductor. Do not exceed rating of circuit overcurrent protective device. Provide fuse blanks in neutral conductors. Make up all other splices in pole or pole base using Scotchcast 400 Resin for watertight connection.

3.2 GROUNDING:

- A. Provide equipment grounding connections for each lighting unit installation.

END OF SECTION 26 5600

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DIVISION 31 – EARTHWORK

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Removing surface debris.
2. Removing designated paving, curbs.
3. Removing designated trees, shrubs, and other plant life.
4. Removing abandoned utilities.
5. Excavating topsoil.

B. Related Sections:

1. Section 024116 - Structure Demolition: Removing underground storage tanks and designated utilities.
2. Section 312213 - Rough Grading.
3. Section 312316.26 - Rock Removal.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Section 012000 - Price and Payment Procedures: Contract Sum/Price modification procedures.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for herbicide. Indicate compliance with applicable codes for environmental protection.

1.4 QUALITY ASSURANCE

- A. Conform to applicable code for environmental requirements, disposal of debris.

PART 2 - PRODUCTS

2.1 MATERIALS – NOT APPLICABLE

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of existing conditions before starting work.
- B. Verify existing plant life designated to remain is tagged or identified.
- C. Identify waste area for placing removed materials.

3.2 PREPARATION

- A. Call Local Utility Line Information service at 811 not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.

3.3 PROTECTION

- A. Locate, identify, and protect from damage utilities indicated to remain.
- B. Protect trees, plant growth, and features designated to remain, as final landscaping as specified in Section 015000 - Temporary Facilities and Controls.
- C. Protect bench marks, survey control points, and existing structures from damage or displacement.

3.4 CLEARING

- A. Clear areas required for access to site and execution of Work
- B. Remove trees and shrubs within marked areas indicated. Remove stumps, main root ball.
- C. Clear undergrowth and deadwood, without disturbing subsoil.

3.5 STRIPPING

- A. Soil material containing sod, grass, or other vegetation and topsoil shall be removed to a minimum depth of six (6) inches from all areas to receive fill, from the area within lines 5 feet outside all foundation walls, over all trenches, and from beneath pavement and curb and gutter areas.

- B. The stripped material shall be deposited in such locations as are acceptable to the ENGINEER.
- C. Topsoil shall be placed over designated areas to be landscaped, and over all trench areas (outside of paved areas).

3.6 REMOVAL

- A. Remove debris, rock, and extracted plant life from site.
- B. Remove paving, curbs, and concrete flatwork
- C. Remove abandoned utilities. Indicated removal termination point for underground utilities on Record Documents.
- D. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.
- E. Do not burn or bury materials on site. Leave site in clean condition.

3.7 TOPSOIL EXCAVATION

- A. Excavate topsoil from areas to be further excavated, relandscaped, or regraded, marked areas, without mixing with foreign materials for use in finish grading.
- B. Do not excavate wet topsoil.
- C. Stockpile in area designated on site and protect from erosion. Stockpile material on impervious material and cover over with same material, until disposal.
- D. Remove excess topsoil not intended for reuse, from Site.

END OF SECTION 311000

SECTION 312213 - ROUGH GRADING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating topsoil.
2. Excavating subsoil.
3. Cutting, rough grading, filling, compacting, site for site structures, and building pads.

B. Related Sections:

1. Section 024116 - Structure Demolition.
2. Section 310513 - Soils for Earthwork: Soils for fill.
3. Section 310516 - Aggregates for Earthwork: Aggregates for fill.
4. Section 311000 - Site Clearing: Excavating topsoil.
5. Section 312316 - Excavation: Building excavation.
6. Section 312316.13 - Trenching: Trenching and backfilling for utilities.
7. Section 312316.26 - Rock Removal.
8. Section 312323 - Fill: General building area backfilling.
9. Section 329119 - Landscape Grading: Finish grading with topsoil to contours.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. See Section 012000 - Measurement and Payment Procedures: Contract Sum/Price modification procedures.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:

1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:

1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
3. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
4. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
5. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

6. ASTM D2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
7. ASTM D2434 - Standard Test Method for Permeability of Granular Soils (Constant Head).
8. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
9. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Materials Source: Submit name of imported materials suppliers.
- C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with ASTM C136.
- B. Perform Work in accordance with State and Municipality standards.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Per Geotechnical report unless otherwise indicated.
- B. See Section 312323 - Fill for backfill material options and specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

- B. Verify survey bench mark and intended elevations for the Work are as indicated on Drawings.

3.2 PREPARATION

- A. Call Local Utility Line Information service at 811 not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Identify required lines, levels, contours, and datum.
- C. Notify utility company to remove and relocate utilities.
- D. Protect utilities indicated to remain from damage.
- E. Protect plant life, lawns, rock outcropping and other features remaining as portion of final landscaping.
- F. Protect bench marks, survey control point, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 TOPSOIL EXCAVATION

- A. Excavate topsoil from areas indicated on drawings, without mixing with foreign materials for use in finish grading.
- B. Do not excavate wet topsoil.
- C. Remove excess topsoil not intended for reuse, from site.

3.4 SUBSOIL EXCAVATION

- A. Excavate subsoil from areas indicated in drawings.
- B. Do not excavate wet subsoil.
- C. When excavating through roots, perform Work by hand and cut roots with sharp axe.
- D. Remove excess subsoil not intended for reuse, from site.
- E. Stockpile excavated material in area designated on site.
- F. Benching Slopes: Horizontally bench existing slopes greater as indicated in drawings to key placed fill material to slope to provide firm bearing.
- G. Stability: Replace damaged or displaced subsoil as specified for fill.

3.5 FILLING

- A. Fill areas to contours and elevations with unfrozen materials.
- B. Maintain optimum moisture content of fill materials to attain required compaction density.
- C. Slope grade away from building minimum 2 percent slope for minimum distance of 10 ft, unless noted otherwise.
- D. Make grade changes gradual. Blend slope into level areas.
- E. Repair or replace items indicated to remain damaged by excavation or filling.
- F. Install Work in accordance with State and Municipality standards.

3.6 TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Top Surface of Subgrade: Plus or minus 5/100 foot from required elevation.

3.7 FIELD QUALITY CONTROL

- A. Section 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform laboratory material tests in accordance with ASTM D1557.
- C. In place compaction testing: See Section 312323 - Fill

END OF SECTION 312213

SECTION 312316 - EXCAVATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Soil densification.
2. Excavating for building foundations.
3. Excavating for paving, roads, and parking areas.
4. Excavating for slabs on grade.
5. Excavating for Site structures.
6. Excavating for landscaping.

B. Related Requirements:

1. Section 312213 - Rough Grading: Topsoil and subsoil removal from Site surface.
2. Section 312316.13 - Trenching: Excavating as required for building foundations and utilities within building perimeter.
3. Section 312323 - Fill: Backfilling at building perimeter and Site structures, and fill under slabs on grade, pavement, and landscaped areas.
4. Section 331416 - Site Water Utility Distribution Piping: Pipe materials, fittings, valves, meters, and backflow preventers.
5. Section 335216 - Gas Hydrocarbon Piping: Pipe materials, fittings, and valves normally encountered with Site-piped natural gas or propane gas distribution systems.
6. Geotechnical report: NOT AVAILABLE

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Section 012000 - Price and Payment Procedures: Contract Sum/Price modification procedures.

1.3 REFERENCE STANDARDS

- A. Local utility standards when working within 24 inches of utility lines.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 PREPARATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Utility Service Locator:
 - 1. Call local utility service-line information at 811 not less than three working days before performing Work.
 - 2. Request that underground utilities be located and marked within and immediately surrounding construction areas.
 - 3. Identify required lines, levels, contours, and data.
- C. Existing Utilities:
 - 1. Notify utility company to remove and relocate utilities.
 - 2. Protect from damage utilities indicated to remain.
- D. Protect plant life, lawns, rock outcroppings, and other features designated to remain as portion of final landscaping.
- E. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- F. Do not close or obstruct roadways, sidewalks, or hydrants without permits.
- G. Erect and maintain temporary barriers and security devices, including warning signs, warning lights, and similar measures, for protection of public, Owner and existing improvements indicated to remain.

3.2 EXCAVATION

- A. Excavate subsoil to accommodate building foundations, slabs on grade, paving, and Site structures.
- B. Excavations shall be so braced and supported as needed to prevent the ground, adjacent to the excavation, from sliding or settling.
- C. Compact disturbed load-bearing soil in direct contact with foundations to original bearing capacity, as specified in Section 312323 - Fill and Section 312316.13 - Trenching.
- D. Slope banks with machine to angle of repose or less until shored.

- E. Do not interfere with 45-degree bearing splay of foundations.
- F. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- G. Trim excavation and remove loose matter.
- H. Removal of Deleterious Materials:
 - 1. Remove lumped subsoil, boulders, and rock up to 1/3 cu. yd., measured by volume.
 - 2. Remove larger material as specified in Section 312323 - Fill.
 - 3. Remove excess and unsuitable material from Site.
- I. Notify Engineer of unexpected subsurface conditions.
- J. Correct over-excavated areas with structural fill as specified in Section 312323 - Fill and as directed by Engineer.
- K. Remove excess and unused excavated material from Site.
- L. Repair or replace items indicated to remain that have been damaged by excavation.

3.3 BACKFILL

- A. See Section 312323 - Fill

3.4 FIELD QUALITY CONTROL

- A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.
- B. Inspecting: Request visual inspection of bearing surfaces by Engineer before installing subsequent Work.
- C. Compaction Testing: See Section 312323 – Fill

3.5 PROTECTION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Prevent displacement or loose soil from falling into excavation, and maintain soil stability.
- C. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- D. Protect structures, utilities, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that may be created by earth operations.

END OF SECTION 312316

SECTION 312316.13 - TRENCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating trenches for utilities from 5 feet outside building to utility service.
2. Compacted fill from top of utility bedding to subgrade elevations.
3. Backfilling and compaction.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. See Section 012000 - Measurement and Payment Procedures: Contract Sum/Price modification procedures.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:

1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:

1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³).
2. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³).
4. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
5. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
6. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.4 DEFINITIONS

- A. Utility: Any buried pipe, duct, conduit, or cable.

1.5 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Materials Source: Submit name of imported fill materials suppliers.
- C. Manufacturer's Certificate: Certify bedding and fill materials meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with State and local Municipality standard.

1.7 COORDINATION

- A. Section 013000 - Administrative Requirements: Coordination and project conditions.
- B. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

- A. Pipe Backfill:
 - 1. Pipe Zone Backfill shall consist of the bedding material schedule shown in the Table below. All backfill material shall be free of frozen material, organic material, and debris.

SIEVE SIZE	PERCENT PASSING FOR		
	BEDDING MATERIAL	PIPE ZONE MATERIAL	FINAL BACKFILL MATERIAL
2 inch	---	---	Native material which contains no sod, vegetation, rocks larger than 2" in diameter, asphalt or concrete chunks, etc.
3/4 inch	---	100	
No. 4	100	40 - 70	
No. 50	---	20 - 50	
No. 200	0 - 15	5 - 30	

- B. Trench backfill above the pipe zone shall be Import Granular Backfill Borrow meeting the requirements of APWA Section 02055 for Granular Backfill Borrow. No backfill material in the remainder of the trench shall have rocks larger than 2-inches in diameter. All backfill material shall be free of frozen material, organic material and debris.
- C. Within State Roadways, backfill placed above 12" over the top of the pipe shall be controlled low strength material (CLSM)/(flowable fill) as required by UDOT.

PART 3 - EXECUTION

3.1 LINES AND GRADES

- A. Lay pipes to lines and grades indicated on Drawings.
 - 1. Engineer reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.
- B. Use laser-beam instrument with qualified operator to establish lines and grades.

3.2 PREPARATION

- A. Call Local Utility Line Information service not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Identify required lines, levels, contours, and datum locations.
- C. Protect plant life, lawns, rock outcropping and other features remaining as portion of final landscaping.
- D. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- E. Maintain and protect above and below grade utilities indicated to remain.
- F. Establish temporary traffic control and detours when trenching is performed in public right-of-way. Relocate controls and reroute traffic as required during progress of Work.
- G. Each trench shall be excavated so that the pipe can be laid to the alignment and grade as required. All excavations shall be sheeted, braced, and shored as required to protect the workers and existing utilities and improvements from sliding, sloughing or settling of the trench walls while the work is in progress. All such sheeting, bracing and shoring shall comply with the requirements of the Utah State Industrial Commission. All damage resulting from lack of adequate sheeting, bracing and shoring shall be the responsibility of the CONTRACTOR, and the CONTRACTOR shall affect all necessary repairs or reconstruction resulting from such

damage. All trenches shall be drained so the pipe laying may take place in dewatered conditions.

- H. The trench bottom shall be given a final trim using a string line, laser, or another method approved by the Engineer for establishing grade, such that each pipe section when first laid will be continually in contact with the ground along the extreme bottom of the pipe. Bell holes shall be provided at each joint to permit the jointing to be made properly. The trench grade shall permit the pipe spigot to be accurately centered in the preceding laid pipe joint, without lifting the pipe above the grade, and without exceeding the permissible joint deflection.

3.3 TRENCHING

A. Excavation:

1. Excavation shall be performed to the lines and grades indicated. Excavated material not required or not satisfactory for backfill shall be removed from the site.
2. Excavations shall be sloped or otherwise supported in a safe manner in accordance with applicable State safety requirements and the requirements of OSHA Safety and Health Standards for Construction (29 CFR1926). The CONTRACTOR is responsible for assessing safety needs to meet such requirements, arranging for proper equipment and/or construction methods, and maintaining such equipment, methods and construction practices so as to fully comply with all such safety requirements.
3. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and pipe.
4. When Project conditions permit, slope side walls of excavation starting 2 feet above top of pipe. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this section.
5. The CONTRACTOR is responsible for assessing safety needs related to confined space entry, as defined by OSHA. The CONTRACTOR shall meet all such requirements, arranging for proper equipment and/or construction methods, and maintaining such equipment, methods and construction practices so as to fully comply with all confined space safety requirements.
6. Blasting will not be allowed except by written permit from the LOCAL FIRE AUTHORITY. If the permit is granted, the CONTRACTOR shall comply with all laws, ordinances, and applicable safety code requirements and regulations relative to the handling, storage, and use of explosives and protection of life and property. The CONTRACTOR shall comply with the provisions outlined in the U.S. Bureau of Mines Bulletin No. 656 "Blasting Vibrations and their Effects on Structures", and other applicable ordinances as specified by the Fire Chief.
7. The CONTRACTOR shall be fully responsible for all damage attributable to such blasting operations. Excessive blasting or overshooting will not be permitted and any material outside the authorized cross section which may be shattered or loosened by blasting shall be removed and properly replaced.
8. Perform excavation within 24 inches of existing utility service in accordance with utility's requirements.

- B. Do not advance open trench more than 200 feet ahead of installed and backfilled pipe.

C. Trench Width:

1. The bottom of the trench shall have a minimum width equal the outside diameter of the pipe plus 12 inches on each side of the pipe.
 2. The width of the trench shall be ample to permit the pipe to be laid and jointed properly, and the backfill to be placed as specified. Trenches shall be of such extra width, when required, as will permit the convenient placing of timber supports, sheeting, and bracing, and the handling of special units as necessary. See standard drawing sheet number DT-02 for trench detail.
- D. Do not interfere with 45 degree bearing splay of foundations.
- E. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by Architect/Engineer until suitable material is encountered.
- F. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Type and compact to density equal to or greater than requirements for subsequent backfill material.
- G. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.
- H. Correct areas over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Engineer.
- I. Remove excess subsoil not intended for reuse, from site.
- J. Removal of Water:
1. CONTRACTOR shall provide and maintain at all times ample means and devices with which to remove promptly and to properly dispose of all water entering the trench excavation.
 2. CONTRACTOR shall obtain all necessary permits required for discharge of water.
 3. Water shall be disposed of in a suitable manner without damage to adjacent property or without being a menace to public health and convenience. No water shall be drained into work built or under construction without prior consent of the Engineer.
 4. Dewatering shall be accomplished by well points, sumping, or any other acceptable method which will ensure a dewatered trench. Any dewatering method shall be subject to the approval of the Engineer.

3.4 SHEETING AND SHORING

- A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.
- B. Support trenches more than 5 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.

3.5 BACKFILLING

- A. Pipeline trenches shall be backfilled to a level 12-inches above the top of the pipe with Import Select Fill material. Such material shall be compacted to 90% minimum Modified Proctor density (ASTM D-1557) in six-inch maximum lifts. See standard drawing for trench detail.

- B. After the pipe has been installed and approved and the initial portion of backfill has been placed as specified above, backfilling of the remainder of the trench may proceed. All backfill above the protected pipe shall be carefully placed and compacted. Compaction shall be by mechanical tamping in 12-inch maximum lifts. All backfill material shall be free of frozen material, organic material, and debris. Backfill placed above 12-inches over the pipe in improved areas, and additional areas as designated on the drawings, shall be compacted to 90% minimum Modified Proctor density (ASTM D-1557).
- C. Maintain optimum moisture content of fill materials to attain required compaction density.
- D. Backfill trenches to contours and elevations with unfrozen fill materials.
- E. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
- F. Place fill material in continuous layers and compact in accordance with schedule at end of this section.
- G. Do not leave more than 50 feet of trench open at end of working day.
- H. Protect open trench to prevent danger to the public.

3.6 FINISH GRADING, CLEANUP

- A. CONTRACTOR shall grade the trench line to a smooth grade to effect a neat and workmanlike appearance of the trench line.
- B. All tools, equipment and temporary structures shall be removed. All excess dirt and rubbish shall be removed from the site by CONTRACTOR.
- C. CONTRACTOR shall restore the site to at least as good as original condition, including but not limited to final trench grade, native vegetation and restoration of affected public and private facilities whether in the public right of way or on private property. Any exception to this requirement must be in writing from the Engineer for the job specific conditions. See standard drawing sheet W-08 for trench detail.

3.7 TOLERANCES

- A. Section 014000 - Quality Requirements: Tolerances.
- B. Top Surface of Backfilling Under Paved Areas: Plus or minus .05 feet from required elevations.
- C. Top Surface of General Backfilling: Plus or minus 0.1 feet from required elevations.

3.8 FIELD QUALITY CONTROL

- A. Section 017000 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

- B. Perform laboratory material tests in accordance with ASTM D1557.
- C. In place compaction testing:
 - 1. Compaction Quality Control Testing shall be scheduled a minimum of 24 hours (or as otherwise specified) notice must be given to with the Owner/Engineer.
 - 2. It shall be the responsibility of the CONTRACTOR to accomplish the specified compaction for backfill, fill, and other earthwork. It shall be the responsibility of the CONTRACTOR to control his operations by performing any additional tests necessary to verify and confirm that CONTRACTOR has complied, and is complying at all times, with the requirements of these Specifications concerning compaction, control, and testing.
 - a. Testing of Backfill Materials
 - 1) Characteristics of backfill materials shall be determined in accordance with the gradation requirements contained in the Fill Materials table above.
 - 2) The CONTRACTOR shall demonstrate the adequacy of compaction equipment and procedures before exceeding 200 linear feet of trench backfill.
 - 3) Until the specified degree of compaction on the previously specified amounts of earthwork is achieved, no additional earthwork of the same kind shall be performed.
 - 4) After satisfactory conclusion of the initial compaction demonstration and at any time during construction, earthwork which does not comply with the specified degree of compaction shall not exceed the previously specified quantities.
 - 5) Periodic compliance tests may be made by the Engineer to verify that compaction is meeting the requirements previously specified at no cost to the CONTRACTOR. The Engineer may require retesting of backfill that has settled from water penetration in the trench. CONTRACTOR shall remove the overburden above the level at which the Engineer wishes to test and shall backfill and re-compact the excavation after the test is complete at no additional cost.
 - 6) If compaction fails to meet the specified requirements, the CONTRACTOR shall remove and replace the backfill at proper density or shall bring the density up to specified level by other means acceptable to the Engineer. Subsequent tests required to confirm and verify that the reconstructed backfill has been brought up to specified density shall be paid by the CONTRACTOR. The CONTRACTOR's confirmation tests shall be performed in a manner acceptable to the Engineer. Frequency of confirmation tests for remedial work shall be double that amount specified for initial confirmation tests.
 - 7) Testing Frequency: 1 test per lift every 500 liner feet of trench and 1 test per lift per roadway crossing.

3.9 PROTECTION OF FINISHED WORK

- A. Section 017000 - Execution and Closeout Requirements: Protecting finished work.

- B. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.10 SCHEDULE

- A. Storm and Sanitary Piping:

1. Cover pipe and bedding with Final Backfill Material unless pipe is located under roadway or parking lot. If pipe is located under roadway or parking lot backfill trench with Foundation Material per Fill Material Table.
2. Compact uniformly at 6 inch thick lifts to minimum 95 percent of maximum density for pipes under roadways or parking lots.

END OF SECTION 312316.13

SECTION 312323 - FILL

1.1 SUMMARY

A. Section Includes:

1. Backfilling building perimeter to subgrade elevations.
2. Backfilling site structures to subgrade elevations.
3. Fill under slabs on grade.
4. Fill under paving.
5. Fill for over-excavation.

B. Related Requirements:

1. Section 033000 - Cast-in-Place Concrete: Concrete materials.
2. Section 312213 - Rough Grading: Site filling.
3. Section 312316 - Excavation: Backfilling of building foundations and utilities within building perimeter.
4. Section 312316.13 - Trenching: Backfilling of utility trenches.
5. Section 331416 - Site Water Utility Distribution Piping: Pipe materials, fittings, valves, meters, and backflow preventers.
6. Section 333453 - Distribution Chambers: Materials and installation requirements for distribution chambers used to divert septic tank effluent to drainage fields.
7. Section 334113 - Foundation Drainage: Filter aggregate.
8. Section 334119 - Underslab Drainage: Filter aggregate.
9. Section 334200 - Stormwater Conveyance: Drainage facilities to collect and provide for flow of stormwater.
10. Section 335213 - Liquid Hydrocarbon Piping: Factory-insulated piping for use with oil distribution systems in belowground applications.
11. Section 335216 - Gas Hydrocarbon Piping: Pipe materials, fittings, and valves normally encountered with Site-piped natural gas or propane gas distribution systems.
12. Section 336100 - Hydronic Energy Distribution: Factory-insulated piping for use with hydronic distribution systems in underground applications.
13. Section 336300 - Steam Energy Distribution: Factory-insulated piping for use with steam distribution systems in underground applications.
14. Geotechnical report: NOT AVAILABLE

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Section 012000 - Price and Payment Procedures: Contract Sum/Price modification procedures.

1.3 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:

1. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:

1. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
2. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
4. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
5. ASTM D6031/D6031M - Standard Test Method for Logging In Situ Moisture Content and Density of Soil and Rock by the Nuclear Method in Horizontal, Slanted, and Vertical Access Tubes.
6. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer information for geotextile fabric, indicating fabric and construction.
- C. Materials Source: Submit name of imported materials suppliers.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.5 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Unless Geo-technical report specifies otherwise, fill materials shall be according to the table below:
- B. Foundation Materials:
 1. All foundation materials shall be free from alkali, salt, and petroleum products, roots, sod, limbs, and other vegetative matter, slag, cinders, ashes and rubbish, or other material that in the opinion of the Engineer may be objectional or deleterious.
 2. Undisturbed soil foundation material:
 - a. Shall be natural trench bottom soil unless unable to adequately support pipe or structures.
 - b. Shall not be lumpy or frozen

3. Gravel:

- a. Shall be hard, durable, broken stone or slag.
- b. Shall be graded within the following limits:

Sieve	%Passing
1 inch	100
3/4 inch	85-100
1/2 inch	20-40
No. 4	10-20

C. APWA 1” Base Course:

- 1. Shall be readily compactable and shall be free from alkali, salt, and petroleum products, roots, sod, limbs, and other vegetative matter, slag, cinders, ashes and rubbish, or other material that in the opinion of the Engineer may be objectional or deleterious.
- 2. Shall be graded within the following limits:

Sieve	% Passing
3/4 inch	100
1/2 inch	85 -100
3/8 inch	70
No. 4	45
No. 8	30
No. 16	20
No. 100	10
No. 200	7

D. Backfill Materials

1. Granular backfill:

- a. Shall be readily compactable and shall be free from alkali, salt, and petroleum products, roots, sod, limbs, and other vegetative matter, slag, cinders, ashes and rubbish, or other material that in the opinion of the Engineer may be objectional or deleterious.
- b. Graded within the following limits:

Sieve	% Passing
3 inch	100
No. 10	50 max.
No. 40	30 max.
No. 200	15 max.

- c. May be select material from excavation if it will meet all requirements of granular backfill, including compaction requirements as specified for type of surface improvement above trench.

2. Excavated Soil Backfill Material:

- a. Shall be free from alkali, salt, and petroleum products, roots, sod, limbs, and other vegetative matter, slag, cinders, ashes and rubbish, or other material that in the opinion of the Engineer may be objectional or deleterious.
- b. Shall be select material from excavation, with no particle larger than 4 inches in diameter.
- c. Use on site materials only if specified compaction requirements can be met.

E. Structural Fill:

1. Structural Fill

- a. Naturally or artificially graded mixture of natural or crushed gravel, and natural or crushed sand; ASTM D 2940; well graded.
- b. Graded within the following limits:

Sieve	% Passing
2 inch	100
1 1/2 inch	90
3/4 inch	85 -90
1/2 inch	70 - 80
No. 4	50 - 55
No. 10	30 - 40
No. 40	20 - 25
No. 200	17 max.

F. Subgrade Stabilizing Material

- 1. Use "Granular Backfill" as defined in Section above.

G. Drainage Fill:

- 1. Drainage Fill: Washed, narrowly graded mixture of crushed or uncrushed gravel; ASTM D 448; with 100 percent passing a 1 1/2 inch (38mm) sieve and 0 to 5 percent passing a No. 8 (2.36mm) sieve.

H. Stabilizing Fabric:

- 1. See APWA Utah Chapter Standard Specifications – Section 02075 – Part 1; Part 2.2; Part 3.1.

I. Flowable Fill Concrete:

- 1. Description: Lean.

2.2 ACCESSORIES

NOT USED

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that subdrainage, dampproofing, and waterproofing installations have been inspected.
- C. Verify that underground float able structures such as tanks are anchored to their own foundations to avoid flotation after backfilling.
- D. Verify structural integrity of unsupported walls to support loads imposed by fill.

3.2 PREPARATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Compact subgrade to specified density requirements for subsequent backfill materials.
- C. Soft Subgrade:
 - 1. Cut out soft areas of subgrade not capable of compaction in place.
 - 2. Backfill with structural fill and compact to density equal to or greater than specified requirements for subsequent fill material.
- D. Scarify subgrade surface to depth of 6 inches.

3.3 BACKFILLING

- A. Backfill areas to contours and elevations.
- B. Systematically backfill to allow maximum time for natural settlement.
- C. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces, and do not backfill with frozen materials.
- D. Each lift shall be evenly spread and moistened or dried by disk harrowing or other means so that the required density will be produced.
- E. Geotextile: Install separation fabric on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends where required by Engineer. See APWA Utah Chapter Standard Specifications, Section 02075, Part 2.2, part 3.1, and Part 3.7 for Specifications.
- F. Maximum Compacted Depths:
 - 1. Place material in continuous layers to following depths:

- a. Subsoil Fill: 8 inches.
 - b. Structural Fill: 8 inches
 - c. Granular Fill: 8 inches.
2. Mechanical compaction: Shall be accomplished by the use of sheeps foot rollers, pneumatic tire rollers, vibrating rollers, or other mechanical tampers of a size and type necessary to achieve the required degree of compaction.
- G. Use placement method that does not disturb or damage foundation perimeter drainage, or utilities in trench
- H. Maintain optimum moisture content of fill materials to attain required compaction density.
- I. Structures:
1. Backfill against supported foundation walls.
 2. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- J. Make gradual grade changes and blend slope into level areas.
- K. Remove surplus backfill materials from Site.
- L. Leave fill material stockpile areas free of excess fill materials.

3.4 TOLERANCES

- A. Section 014000 - Quality Requirements: Requirements for tolerances.
- B. Top Surface of Backfilling within Building Areas: Plus or minus 0.5 inch from required elevations.
- C. Top Surface of Backfilling under Paved Areas: Plus or minus 0.5 inch from required elevations.
- D. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.5 FIELD QUALITY CONTROL

- A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.
- B. Inspecting: Request visual inspection of bearing surfaces by Engineer before installing subsequent Work.
- C. Compaction Testing:
1. Laboratory Material Testing: Comply with ASTM D1557
 2. In-Place Compaction Testing:

- a. Under pavements, or other surface improvements, the average density shall be 96% of laboratory maximum density with no individual test lower than 92% of the laboratory maximum density, as determined by AASHTO Designation T 1 80 (ASTM D 1 557).
 - b. In shoulders and other unimproved areas, the average density shall be 90% of laboratory maximum density with no individual test lower than 86% of the laboratory maximum density, as determined by AASHTO Designation T 1 80 (ASTM D 1 557).
 - c. The CONTRACTOR shall demonstrate the adequacy of compaction equipment and procedures before exceeding any of the following amounts of earthwork quantities:
 - 1) One (1) test per 1.5 feet of backfill thickness placed per structure
3. If compaction fails to meet the specified requirements, the CONTRACTOR shall remove and replace the backfill at proper density or shall bring the density up to specified level by other means acceptable to the ENGINEER. Subsequent tests required to confirm and verify that the reconstructed backfill has been brought up to specified density shall be paid by the CONTRACTOR. The CONTRACTOR's confirmation tests shall be performed in a manner acceptable to the ENGINEER. Frequency of confirmation tests for remedial work shall be double that amount specified for initial confirmation tests.
 4. Proof-roll compacted fill surfaces under slabs on grade, pavers, and paving.

3.6 PROTECTION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Reshape and recompact fills subjected to vehicular traffic during construction.

END OF SECTION 312323

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 329223 - SODDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preparation of subsoil.
2. Placement of topsoil.
3. Fertilization.
4. Sod installation.
5. Maintenance.

B. Related Requirements:

1. Section 312316.13 - Trenching: Rough grading over cut.
2. Section 312323 - Fill: Rough grading of Site.
3. Section 320513 - Soils for Exterior Improvements: Topsoil material.
4. Section 328400 - Planting Irrigation: Piped underground irrigation systems.
5. Section 329119 - Landscape Grading: Preparation of subsoil and placement of topsoil in preparation for Work of this Section.
6. Section 329219 - Seeding: Seeding and soil supplements.
7. Section 329300 - Plants: Interior and exterior landscaping.

1.2 DEFINITIONS

- A. Weeds: Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.3 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Shall be per section 012000 Measurement and Payment

1.4 REFERENCE STANDARDS

A. ASTM International:

1. ASTM C602 - Standard Specification for Agricultural Liming Materials.

B. Turfgrass Producers International:

1. TPI - Guideline Specifications to Turfgrass Sodding.

1.5 COORDINATION

- A. Section 013000 - Administrative Requirements: Requirements for coordination.
- B. Coordinate Work of this Section with installation of underground sprinkler system piping and watering heads.

1.6 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data:
 - 1. Submit sod producer's information for sod grass species.
 - 2. Submit manufacturer information for fertilizer, mulch, and other accessories.
- C. Samples:
 - 1. Submit two 10 oz samples of topsoil proposed.
 - 2. Forward samples to approved testing laboratory in sealed containers to prevent contamination.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Sod Producer's Certificate: Certify that sod grass meets or exceeds specified requirements.
- F. Test and Evaluation Reports: Indicate topsoil nutrient and pH levels, with recommended soil supplements and application rates.
- G. Source Quality-Control Submittals: Indicate results of factory tests and inspections.
- H. Qualifications Statements:
 - 1. Submit qualifications for sod producer, manufacturer, and installer.
 - 2. Submit sod producer's approval of installer.

1.7 SUSTAINABLE DESIGN SUBMITTALS

- A. Section 018113 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate:
 - 1. Certify that products meet or exceed specified sustainable design requirements.

1.8 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Operation and Maintenance Data:

1. Submit maintenance instructions, cutting method, and maximum grass height.
2. Submit fertilizer types, application frequency, and recommended coverage.

1.9 QUALITY ASSURANCE

- A. Sod: Ensure root development capable of supporting its own weight without tearing when suspended vertically by holding upper two corners.

1.10 QUALIFICATIONS

- A. Sod Producer: Company specializing in products as specified in this Section with minimum three years' documented experience.
- B. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.
- C. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience].

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Delivery:
1. Deliver sod on pallets or in rolls.
 2. Do not deliver more sod than can be laid within 24 hours.
- C. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- D. Store materials according to manufacturer instructions.
- E. Protection:
1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 2. Protect exposed roots from dehydration.
 3. Provide additional protection according to manufacturer instructions.

1.12 AMBIENT CONDITIONS

- A. Section 015000 - Temporary Facilities and Controls: Requirements for ambient condition control facilities for product storage and installation.

- B. Minimum Conditions: Do not place sod when temperature is lower than 40 deg.

PART 2 - PRODUCTS

2.1 SOD

A. Description:

1. Cultivated grass sod with strong fibrous root system, free of stones and burned or bare spots.
 - a. Top soil to a depth of 6” below finish grade.

2.2 SUSTAINABILITY CHARACTERISTICS

A. Section 018113 - Sustainable Design Requirements: Requirements for sustainable design compliance.

B. Material and Resource Characteristics:

1. Regional Materials: Furnish materials extracted, processed, and manufactured within **500 miles (800 km)** of Project Site [**including:**] [.]
 - a. < _____ >.

2.3 MATERIALS

A. Topsoil:

1. Description: Fertile, agricultural soil typical for locality, capable of sustaining vigorous plant growth, and taken from drained Site.
2. Free of subsoil, clay, impurities, plants, weeds, and roots.

B. Topsoil: Excavated from Site and free of weeds.

2.4 ACCESSORIES

A. Fertilizer:

1. Grade: Commercial.
2. Description: As recommended for grass, with 50 percent of elements derived from organic sources.
3. Proportions: As necessary to eliminate deficiencies of topsoil.

B. Water: Clean, fresh, and free of substances or matter capable of inhibiting vigorous growth of grass.

C. Wood Pegs: Softwood, sufficient size and length to anchor sod on slope.

2.5 SOURCE QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Requirements for testing, inspection, and analysis.
- B. Analysis: Ascertain pH and percentage of nitrogen, phosphorus, potash, < _____ >, soluble salt content, and organic matter.
- C. Provide recommendation for fertilizer and lime application rates for specified sod grass species based on testing.
- D. Prior Tests:
 - 1. Testing is not required if recent tests are available for imported topsoil.
 - 2. Submit such test results to testing laboratory.
 - 3. Indicate, based on test results, information necessary to determine suitability.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that prepared soil base is ready to receive Work of this Section.

3.2 INSTALLATION

- A. Subsoil Preparation:
 - 1. Eliminate uneven areas and low spots.
 - 2. Maintain indicated lines, levels, profiles, and contours.
 - 3. Slopes:
 - a. Make gradual changes in grade.
 - b. Blend slopes into level areas.
 - 4. Foreign Materials:
 - a. Remove foreign materials and undesirable plants and their roots.
 - b. Do not bury foreign materials beneath areas to be sodded.
 - 5. Remove contaminated subsoil.
 - 6. Scarify subsoil to depth of 4 inches where topsoil is to be placed.
 - 7. Repeat cultivation in areas where equipment used for hauling and spreading topsoil has compacted subsoil.
- B. Placing of Topsoil:

1. Spread topsoil to minimum depth of [3] < _____ > inches ([75] < _____ > mm) over area to be sodded.
2. Place topsoil during dry weather and on dry unfrozen subgrade.
3. Remove vegetable matter and foreign nonorganic material from topsoil while spreading.
4. Grade topsoil to eliminate rough, low, or soft areas, and to ensure positive drainage.
5. Install edging at periphery of sodded areas in straight lines to consistent depth.

C. Laying of Sod:

1. Moisten prepared surface immediately prior to laying sod.
2. Lay sod immediately after delivery.
3. Joints:
 - a. Lay sod tightly with no open joints visible and no overlapping.
 - b. Stagger end joints minimum 12 inches
 - c. Do not stretch or overlap sod pieces.
4. Lay **smooth and align with adjoining grass areas.**
5. Place top elevation of sod ½ inch below adjoining [edging] [paving] [curbs].
6. Watering:
 - a. Water sodded areas immediately after installation.
 - b. Saturate sod to 4 soil.
7. Rolling:
 - a. After sod and soil have dried, roll sodded areas to bond sod to soil and to remove minor depressions and irregularities.
 - b. Roll before first watering.

3.3 MAINTENANCE

- A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance service.
- B. Provide service and maintenance of sodded areas for 3 months from date of Substantial Completion.

END OF SECTION 329223

DIVISION 33 – UTILITIES

SECTION 330561 – CONCRETE MANHOLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Modular precast concrete manholes and structures with tongue-and-groove joints and transition to cover frame, covers, anchorage, and accessories.
2. Masonry manhole and structure sections with masonry transition to cover frame, covers, anchorage, and accessories.
3. Doghouse manhole connections to existing sewer lines.
4. Bedding and cover materials.
5. Pile support systems.
6. Vertical adjustment of existing manholes and structures.

B. Related Requirements:

1. Section 031000 - Concrete Forming and Accessories: Erection and bracing of forms.
2. Section 032000 - Concrete Reinforcing: Reinforcing steel as required by this Section.
3. Section 033000 - Cast-in-Place Concrete: Concrete type for manhole and structure foundation slab construction.
4. Section 040513 - Masonry Mortaring: Mortar.
5. Section 040516 - Masonry Grouting: Grout.
6. Section 042000 - Unit Masonry: Clay brick units for use in manhole and structure construction.
7. Section 061300 - Heavy Timber Construction: Timber cradle construction.
8. Section 310513 - Soils for Earthwork: Soils for backfill in trenches.
9. Section 310516 - Aggregates for Earthwork: Aggregate for backfill in trenches.
10. Section 310519.13 - Geotextiles for Earthwork: Filter fabric for subsurface drainage.
11. Section 312316 - Excavation: Excavating for manholes, structures, and foundation slabs.
12. Section 312323 - Fill: Backfilling after manhole and structure installation.
13. Section 316219 - Timber Piles: Pile support systems.
14. Section 330130.61 - Packer Injection Grouting: Grout sealing as required by this Section.
15. Section 330130.86 - Manhole Rim Adjustment: Resetting existing castings and grates.
16. Section 330573 - Polyethylene Manholes: Requirements for manholes constructed of PE.
17. Section 330576 - Fiberglass Manholes: Requirements for manholes constructed of fiberglass.
18. Section 333100 - Sanitary Sewerage Piping: Piping connections to manholes.
19. Section 333111 - Public Sanitary Sewerage Gravity Piping: Piping connections to manholes.
20. Section 334200 - Stormwater Conveyance: Piping connections to manholes and structures.
21. Section 337119 - Electrical Underground Ducts, Ductbanks, and Manholes: Ducts and manholes affected by this Section.

1.2 DEFINITIONS

- A. Bedding: Specialized material placed under manhole prior to installation and subsequent backfill operations.

1.3 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Section 012000 - Price and Payment Procedures: Contract Sum/Price modification procedures.

1.4 REFERENCE STANDARDS

- A. American Association of State Highway Transportation Officials:

1. AASHTO M91 - Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale).
2. AASHTO M288 - Standard Specification for Geotextile Specification for Highway Applications.
3. AASHTO M306 - Standard Specification for Drainage, Sewer, Utility, and Related Castings.

- B. American Concrete Institute:

1. ACI 530/530.1 - Building Code Requirements and Specification for Masonry Structures.

- C. ASTM International:

1. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM C32 - Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale).
4. ASTM C55 - Standard Specification for Concrete Building Brick.
5. ASTM C361 - Standard Specification for Reinforced Concrete Low-Head Pressure Pipe.
6. ASTM C478 - Standard Specification for Circular Precast Reinforced Concrete Manhole Sections.
7. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
8. ASTM C877 - Standard Specification for External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections.
9. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
10. ASTM C923 - Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
11. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
12. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
13. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

1.5 COORDINATION

- A. Section 013000 - Administrative Requirements: Requirements for coordination.
- B. Coordinate Work of this Section with connection to municipal utility service and trenching.

1.6 PREINSTALLATION MEETINGS

- A. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.
- B. Convene minimum one week prior to commencing Work of this Section.

1.7 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer information for manhole covers, component construction, features, configuration, and dimensions.
- C. Shop Drawings:
 - 1. Indicate structure locations and elevations.
 - 2. Indicate sizes and elevations of piping.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
- F. Source Quality-Control Submittals: Indicate results of factory tests and inspections.
- G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.8 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of manholes and connections, and record invert elevations.

1.9 QUALITY ASSURANCE

- A. Perform Work according to local municipality standards.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Handling: Comply with precast concrete manufacturer instructions and ASTM C913 for unloading and moving precast manholes and drainage structures.
- D. Storage:
 - 1. Store materials according to manufacturer instructions.
 - 2. Store precast concrete manholes and drainage structures to prevent damage to Owner's property or other public or private property.
 - 3. Repair property damaged from materials storage.
- E. Protection:
 - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 - 2. Provide additional protection according to manufacturer instructions.

1.11 AMBIENT CONDITIONS

- A. Section 015000 - Temporary Facilities and Controls: Requirements for ambient condition control facilities for product storage and installation.
- B. Cold Weather Requirements: Comply with ACI 530/530.1.

1.12 EXISTING CONDITIONS

- A. Field Measurements:
 - 1. Verify field measurements prior to fabrication.
 - 2. Indicate field measurements on Shop Drawings.

1.13 WARRANTY

- A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.
- B. Furnish five -year manufacturer's warranty for concrete manholes.

PART 2 - PRODUCTS

2.1 CONCRETE MANHOLES

- A. Furnish materials according to manufactures recommendation.
- B. Manhole Sections:
 - 1. Materials:
 - a. Reinforced Precast Concrete: Comply with ASTM C478.
 - b. Gaskets: Comply with ASTM C923.
 - 2. Joints:
 - a. Comply with ASTM C913.
 - b. Maximum Leakage: 0.025 gal. per hour per foot of joint at 3 feet of head.
- C. Shaft and Eccentric Cone or Cylindrical Top Sections:
 - 1. Pipe Sections: Reinforced precast concrete.
 - 2. Joints:
 - a. Lipped male/female.
 - b. Dry.
 - 3. Sleeved to receive pipe sections.
- D. Shape: Cylindrical
- E. Clear Inside Dimensions:
 - 1. As indicated on Drawings.
- F. Design Depth:
 - 1. As indicated on Drawings.
- G. Clear Cover Opening:
 - 1. As indicated on Drawings.
- H. Pipe Entry: Furnish openings as indicated on Drawings.
- I. Structure Joint Gaskets:
 - 1. Comply with ASTM C361.
 - 2. Material: Rubber.

2.2 FRAMES AND COVERS

- A. Furnish materials according to manufactures recommendation.

B. Description:

1. Material:
 - a. Cast iron.
 - b. Comply with AASHTO M306.
2. Lid:
 - a. Bearing Surface: Machined flat.
 - b. Configuration: Removable.
 - c. Security: None.
3. Cover Design: Closed.
4. Live-Load Rating: H-20.
5. Cover: Molded with identifying name and logo.
6. Grate: Bicycle Safe.
7. Nominal Lid or Grate Size: as indicated on drawing.
8. 1' annular collar 6" thick concrete.

2.3 RISER RINGS

A. Furnish materials according to manufactures recommendation.

B. Riser Rings:

1. Thickness of 4 to 6 Inches:
 - a. Precast concrete.
 - b. Comply with ASTM C478.
2. Thickness Less Than 4 Inches:
 - a. Cast iron.
 - b. Comply with AASHTO M306.
3. Rubber Seal Wraps:
 - a. Wraps and Band Widths: Comply with ASTM C877, Type III.
 - b. Cone/Riser Ring Joint: Minimum 3-inch overlap.
 - c. Frame/Riser Ring Joint: 2-inch overlap.
 - d. Additional Bands: Overlap upper band by 2 inches.

2.4 MATERIALS

A. Cover and Bedding:

1. Bedding: Fill Type $\frac{3}{4}$ " gravel
2. Cover: Fill Type, as specified in Section 312323 - Fill

2.5 ACCESSORIES

A. Steps:

1. Rungs: Formed Polypropylene.
2. Diameter: 3/4 inch.
3. Width:
 - a. 12 inches.
4. Spacing:
 - a. 16 inches o.c. vertically, set into structure wall.

B. Foundation Slab:

1. Cast-in-place concrete as specified in Section 033000 - Cast-in-Place Concrete or Precast concrete as specified in Section 034100 – Precast Structural Concrete.
2. Top Surface: Level.

C. Joint Sealant: Comply with ASTM C990.

D. Concrete: As specified in Section 033000 - Cast-in-Place Concrete.

E. Grout: As specified in Section 033000 - Cast-in-Place Concrete.

F. Soil Backfill from Above Pipe to Finish Grade:

1. Soil Type, as specified in Section 312323.00 - Fill.
2. Subsoil: No frozen earth, or foreign matter, or rocks more than 6 inches in diameter.

2.6 FINISHES

A. Steel Galvanizing:

1. Hot-dip galvanize after fabrication.
2. Comply with ASTM A123/A123M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that items provided by other Sections of Work are properly sized and located.
- C. Verify that built-in items are in proper location and are ready for roughing into Work.

- D. Verify that excavation base is ready to receive Work and excavations and that dimensions and elevations are as indicated on Drawings.

3.2 PREPARATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers as indicated on Drawings to indicate its intended use.
- C. Coordinate placement of inlet and outlet pipe or duct sleeves as required by other Sections.
- D. Do not install manholes and structures where Site conditions induce loads exceeding structural capacity of manholes or structures.
- E. Inspect precast concrete manholes and structures immediately prior to placement in excavation to verify that they are internally clean and free from damage; remove and replace damaged units.

3.3 INSTALLATION

- A. Conduct operations not to interfere with, interrupt, damage, destroy, or endanger integrity of surface structures or utilities in immediate or adjacent areas.
- B. Correct over-excavation with granular backfill.
- C. Remove large stones or other hard matter impeding consistent backfilling or compaction.
- D. Protect manhole from damage or displacement while backfilling operation is in progress.
- E. Excavating:
 - 1. As specified in Section 312316 - Excavation and in indicated locations and depths.
 - 2. Provide clearance around sidewalls of manhole or structure for construction operations and granular backfill.
 - 3. If ground water is encountered, prevent accumulation of water in excavations; place manhole or structure in dry trench.
 - 4. Where possibility exists of watertight manhole or structure becoming buoyant in flooded excavation, anchor manhole or structure to avoid flotation as approved by Architect/Engineer.
- F. Base and Alignment:
 - 1. Place foundation slab and trowel top surface level.
 - 2. Grout base of shaft sections to achieve slope to exit piping, trowel smooth, and contour to form continuous drainage channel, as indicated on Drawings.
 - 3. Place manhole sections plumb and level, trim to correct elevations, and anchor to foundation slab.

G. Attachments:

1. Cut and fit for pipe.
2. Set cover frames and covers level to correct elevations without tipping.

H. Backfilling: As specified in Section 312323 - Fill.

I. Precast Concrete Manholes:

1. Lift precast components at lifting points designated by manufacturer.
2. When lowering manholes and structures into excavations and joining pipe to units, take precautions to ensure that interior of pipeline and structure remains clean.
3. Assembly:
 - a. Assemble multisection manholes and structures by lowering each section into excavation.
 - b. Install rubber gasket joints between precast sections according to manufacturer recommendations.
 - c. Lower, set level, and firmly position base section before placing additional sections.
4. Remove foreign materials from joint surfaces and verify that sealing materials are placed properly.
5. Maintain alignment between sections by using guide devices affixed to lower section.
6. Joint sealing materials may be installed on Site or at manufacturer's plant.
7. Verify that installed manholes and structures meet required alignment and grade.
8. Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe; fill annular spaces with mortar.
9. Cut pipe flush with interior of structure.
10. Shape inverts through manhole and structures as indicated on Drawings.

J. Sanitary Manhole Drop Connections: As indicated on Drawings.

3.4 FIELD QUALITY CONTROL

- A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

3.5 ADJUSTING

- A. Section 017000 - Execution and Closeout Requirements: Requirements for starting and adjusting.
- B. Vertical Adjustment of Existing Manholes and Structures:
 1. Set manhole ring and cover 1/4 inch below finished grade.
 2. If required, adjust top elevation of existing manholes and structures to finished grades as indicated on Drawings.
 3. Frames, Grates, and Covers:

- a. Remove frames, grates, and covers cleaned of mortar fragments.
 - b. Reset to required elevation according to requirements specified for installation of castings.
4. Reinforcing Bars:
- a. Remove concrete without damaging existing vertical reinforcing bars if removal of existing concrete wall is required.
 - b. Clean vertical bars of concrete and bend into new concrete top slab or splice to required vertical reinforcement as indicated on Drawings.
5. Clean and apply sand-cement bonding compound on existing concrete surfaces to receive cast-in-place concrete as specified in Section 033000 - Cast-in-Place Concrete.

END OF SECTION 330561