

SPECIFICATIONS AND CONTRACT DOCUMENTS

FOR

BIG SANDY WATER DISTRICT
BOYD COUNTY, KENTUCKY

OFFICE BUILDING

CONTRACT NO. I-1



Joseph F. Sisler
7/29/19

FOR CONSTRUCTION

JULY 2019

SME PROJECT CODE: 15030



SISLER-MAGGARD ENGINEERING, PLLC

220 EAST REYNOLDS ROAD, SUITE A3

LEXINGTON, KY 40517

(859) 271-2978

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BIG SANDY WATER DISTRICT

CONTRACT NO. I-1

OFFICE BUILDING

INDEX

SECTION 1 - ADVERTISEMENT FOR BIDS

SECTION 2 - INSTRUCTIONS TO BIDDERS

**SECTION 3 - RURAL DEVELOPMENT GENERAL CONDITIONS & SUPPLEMENTAL
CONDITIONS**

SECTION 4 - SPECIAL CONDITIONS

**SECTION 5 - TECHNICAL SPECIFICATIONS (SEE TECHNICAL SPECIFICATIONS FOR TABLE
OF CONTENTS)**

SECTION 6 - CONTRACT AND BOND FORMS

AGREEMENT
PAYMENT BOND
PERFORMANCE BOND
CERTIFICATE OF INSURANCE
NOTICE OF AWARD
NOTICE TO PROCEED
CHANGE ORDER
PARTIAL PAYMENT REQUEST
CERTIFICATE OF SUBSTANTIAL COMPLETION
RELEASE OF LIENS (GENERAL)
RELEASE OF LIENS (SUBCONTRACTOR)

SECTION 7 - BID FORMS AND BID BONDS

BID FORMS INCLUDING SUBCONTRACTORS & MANUFACTURERS LIST
BID BOND WITH POWER OF ATTORNEY
BIDDER'S QUALIFICATIONS STATEMENT
COMPLIANCE STATEMENT (RD FORM 400-6)
NOTICE OF REQUIREMENTS FOR CERTIFICATIONS OF NON-SEGREGATED
FACILITIES
CERTIFICATE FOR CONTRACTS, GRANTS, & LOANS (1940-Q)
EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION (EEO-1)
USDA - CERTIFICATE REGARDING DEBARMENT AND SUSPENSION (AD-1048)
INSTRUCTIONS FOR CERTIFICATION
USDA - EQUAL OPPORTUNITY AGREEMENT (RD FORM 400-1)
CONTRACTOR'S CERTIFICATE CONCERNING LABOR STANDARDS AND
PREVAILING WAGE REQUIREMENTS

SECTION 1

ADVERTISEMENT FOR BIDS

ADVERTISEMENT FOR BIDS

1. **INVITATION:** Sealed bids for the construction of the following **BIG SANDY WATER DISTRICT – PHASE V – WATER SYSTEM IMPROVEMENTS - F-1 Water Tank Painting & Repairs, G-1 Water Booster Pump Station Upgrades, H-1 Stream Crossing Replacements & Service Line Replacements and I-1 Office Building** will be received by the Big Sandy Water District Office, 18200 State Route 3, Catlettsburg, KY 41129, until **12:00 NOON**, local time **June 13, 2019** for furnishing all labor and materials and performing all work as set forth by this advertisement, conditions (general, supplemental, and special), specifications, and/or the drawings prepared by Sisler-Maggard Engineering, PLLC., 220 East Reynolds Road, Suite A3, Lexington, Kentucky 40517. Bids will be publicly opened and read at above time.

2. **PROJECT DESCRIPTION:** The project includes but is not limited to the following:

CONTRACT – “F-1” – Water Tank Painting & Repairs

- a) 7 EA. Sandblasting & Painting Existing Ground Storage Tanks (3 @ 60-75,000 gallon, 4 @ 100-150,000 gallon)
- b) 2 EA. Misc. Repairs at Tanks

CONTRACT – “G-1” – Water Booster Pump Station Upgrades

- a) 2 EA. Construct Duplex Pump Stations
- b) 2 EA. Add VFD’s to existing Water Booster Pump Stations

CONTRACT – “H-1” – Stream Crossing Replacements and Service Line Replacements

- a) 925 L.F. 6” & 8” HDPE Horizontal Direct Drilling
- b) 43,600 L.F. ¾” Service Line Replacement by Trenchless Replacement or HDD Method
- c) 3,600 L.F. 1” Service Line Replacement by Trenchless Replacement or HDD Method

CONTRACT – “I-1” – Office Building

- a) Construct 2100 S.F. Masonry Office Building with Metal Roof

3. **OBTAINING PLANS, SPECIFICATIONS AND BID DOCUMENTS:**

Contract documents may be reviewed and obtained at the following locations:

Lynn Imaging Lexington(859) 255-1021	Lynn Imaging Louisville(502) 499-8400
328 Old Vine Street.....(800) 888-0693	11460 Bluegrass Parkway..... (502)499-0022 fax
Lexington, KY 40507.....(859) 233-1558 fax	Louisville, KY 40299

A **non-refundable** deposit will be required for **each** set of documents as follows:

Contract “F-1” – Water Tank Painting & Repairs: \$150.00

Contract “G-1” – Water Booster Pump Station Upgrades: \$150.00

Contract “H-1” – Stream Crossing Replacements & Service Line Replacements: \$250.00

Contract “I-1” – Office Building: \$200.00

Deposit **DOES NOT** include shipping. Partial sets of plans or specifications will **not** be issued.

Contract Documents may also be reviewed at the following locations:

Sisler-Maggard Engineering, PLLC
220 East Reynolds Road, Suite A3
Lexington, Kentucky 40517
(859) 271-2978

Big Sandy Water District
18200 State Route 3
Catlettsburg, Kentucky 41129
(606) 928-2075

Builders Exchange
1035 Strader Avenue, Suite100
Lexington, Kentucky 40505
(859) 288-0011

Builder's Exchange
2300 Meadow Lane
Louisville, Ky. 40218-1336
(502) 459-9800

- 4. METHOD OF RECEIVING BIDS: Bids will be submitted in the manner and subject to the conditions as set forth and described in the Instructions to Bidders and Contract Documents.
- 5. METHOD OF AWARD AND RIGHT TO REJECT: The Contract will be awarded by the Owner to the low responsive, responsible, best and qualified Bidder. Owner reserves the right to reject any and all bids and to waive all informalities and/or technicalities should it be in the best interest of the Owner.
- 6. BID WITHDRAWAL: No Bidder may withdraw his bid for a period of **(90) ninety** calendar days after receipt of bids. Errors and omissions will not be the cause for withdrawal of bid without forfeit of bid bond. Bids may be withdrawn in person prior to the closing time for receipt of bids.
- 7. FUNDING: This project is being funded by U.S.D.A.- **Rural Development and Big Sandy Water District.**
- 8. WAGE RATES: State and Federal wage rates **will not** apply to this project.
- 9. BID SECURITY: Bidders shall furnish (with bid) bid security equal to 5% of bid. A bid bond on Kentucky Resident insurance carrier or certified check is acceptable.
- 9. GENERAL REQUIREMENTS: Bidders who submit a Bid **must** be a Plan Holder of record at the issuing Office (Lynn Imaging). Bids from Bidders who are not on the Plan Holders List may be returned as not being responsive.

Plan Holders are requested to provide an e-mail address with their purchase of plans if they wish to receive addenda and other information electronically.

- 10. PERFORMANCE AND PAYMENT BOND: A Performance and Payment Bond each in the amount of 100 percent of the Contract Price issued by a responsible surety will be required of the successful Bidders.

"EQUAL EMPLOYMENT OPPORTUNITY"

OWNER: Big Sandy Water District

By: Paul E. Thomas
Paul E. Thomas, Chairman

SECTION 2

INSTRUCTIONS TO BIDDERS

INSTRUCTIONS TO BIDDERS

TABLE OF CONTENTS

	Page
ARTICLE 1 – Defined Terms	1
ARTICLE 2 – Copies of Bidding Documents	1
ARTICLE 3 – Qualifications of Bidders	1
ARTICLE 4 – Site and Other Areas; Existing Site Conditions; Examination of Site; Owner’s Safety Program; Other Work at the Site	2
ARTICLE 5 – Bidder’s Representations	4
ARTICLE 6 – Pre-Bid Conference (Not Used)	5
ARTICLE 7 – Interpretations and Addenda	5
ARTICLE 8 – Bid Security.....	5
ARTICLE 9 – Contract Times	5
ARTICLE 10 – Liquidated Damages.....	5
ARTICLE 11 – Substitute and “Or-Equal” Items.....	5
ARTICLE 12 – Subcontractors, Suppliers, and Others.....	6
ARTICLE 13 – Preparation of Bid	6
ARTICLE 14 – Basis of Bid	8
ARTICLE 15 – Submittal of Bid	8
ARTICLE 16 – Modification and Withdrawal of Bid	10
ARTICLE 17 – Opening of Bids	11
ARTICLE 18 – Bids to Remain Subject to Acceptance.....	11
ARTICLE 19 – Evaluation of Bids and Award of Contract	11
ARTICLE 20 – Bonds and Insurance	11
ARTICLE 21 – Signing of Agreement	11
ARTICLE 22 – Sales and Use Taxes, Do Apply To This Contract	12
ARTICLE 23 – Contracts to be Assigned (Not Used)	12
ARTICLE 24 - Wage Rate Requirements (NOT USED)	12

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

1. Sisler Maggard Engineering, PLLC
220 E. Reynolds Road, Ste. A3
Lexington, KY 40517
Phone – (859) 271-2978

2. Lynn Imaging
328 Old Vine Street
Lexington, KY 40503
Phone – (859) 255-1021

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 for Bids.
- 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 written evidence establishing its qualifications such as financial data, previous experience, and present commitments, and the following additional information:
- A. Qualification forms @ end of Section 8 of these Specifications shall be used.
- 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 **may** 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 contiguous 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;
 - 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 (NOT USED)

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 **60 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 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.
- The liquidated damage for **these** contracts shall be **\$500 per calendar day** that the contracts are NOT substantially complete.

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. 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 reply 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 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 any of the work.
- 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.
- 12.02 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.
- 12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.
- 12.04 The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC 7.06.

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.
- 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 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 official address of the firm shall be shown.
- 13.04 A Bid by an individual shall show the Bidder's name and official address.
- 13.05 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 official address of the joint venture shall be shown.
- 13.06 All names shall be printed in ink below the signatures.
- 13.07 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.08 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.
- 13.09 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.
- 13.10 Each bid must be submitted on the prescribed forms accompanied by the following items which will constitute the submittal documents necessary for a complete bid package:
1. Bid Forms Including Subcontractors & Manufacturers List
 2. Bid Bond with Power Of Attorney
 3. Compliance Statement (Rd Form 400-6)
 4. Certificate for Contracts, Grants, & Loans (Rd Form 1940-Q)
 5. Certificate Regarding Debarment, Suspension, And Other Responsibilities (AD-1048)
 6. Equal Employment Opportunity Certification (RD Form 400-1)
 7. Bidder's Qualifications Statement
 8. Contractor's Certification Concerning Labor Standards and Prevailing Wage Requirements
-
- 13.11 Subcontracts: The bidder is specifically advised that any person, for, or other party to whom it is proposed to award a subcontract under this Contract:
- a. Must be acceptable to the Owner and have current eligibility status for federal programs; and
- Approval of the proposed subcontract award cannot be given by the Owner unless and until the proposed subcontractor has submitted the Certifications and/or other evidence showing that it has fully complied with any reporting requirements to which it is or was subject. Although the bidder is not required to attach such Certifications by proposed subcontractors to their bid,

the bidder is hereby advised of this requirement so that appropriate action can be taken to prevent subsequent delay in subcontract awards.

ARTICLE 14 – BASIS OF BID

14.01 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.

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 the **Big Sandy Water District**
- 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.
- 15.04 The **Big Sandy Water District** (herein called the “Owner”), invites bids on the forms attached hereto, all blanks of which must be appropriately filled in. Bids will be received by the Owner at the **Big Sandy Water District, 18200 State Route 3, Catlettsburg, Kentucky 41129** until **12:00 Noon**, local time, **June 13, 2019** and then at said office publicly opened and read aloud. The envelopes containing the bids must be sealed, addressed to the **Big Sandy Water District**, designated as bid for **Phase V – Water System Improvements – Contract “F-1 - Water Tank Painting & Repairs, Contract “G-1” – Water Booster Pump Station Upgrades, Contract “H-1” – Stream Crossings and Service Line Replacements, Contract “I-1” – Office Building.**

The Owner may consider informal any bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid

received after the time and date specified shall not be considered. No bidder may withdraw a bid within 90 days after the actual date of the opening thereof.

- 15.05 **Telegraphic/Facsimile Modification:** Any bidder may modify their bid by telegraphic or facsimile communication at any time prior to the scheduled closing time for receipt of bids, provided such communication is received by the Owner prior to the closing time, and provided further, the Owner is satisfied that a written confirmation of the telegraphic/facsimile modification over the signature of the bidder was mailed prior to the closing time. The communication should not reveal the bid price but should provide the addition or subtraction or their modifications so that the final prices or terms will not be known by the Owner until the sealed bid is opened. If written confirmation is not received within two days from the closing time, no consideration will be given to the telegraphic/facsimile modification.

Method of Bidding: The Owner invites the following bid: **Phase V – Water System Improvements – Contract “F-1 - Water Tank Painting & Repairs, Contract “G-1” – Water Booster Pump Station Upgrades, Contract “H-1” – Stream Crossings and Service Line Replacements, Contract “I-1” – Office Building.**

Time of Completion and Liquidated Damages: Bidder must agree to commence work on or before a date to be specified in a written “Notice to Proceed” of the Owner and to fully complete the project as follows:

Phase V – Water System Improvements:

Contract “F-1 - Water Tank Painting & Repairs - 180 consecutive calendar days

Contract “G-1” - Water Booster Pump Station Upgrades - 150 consecutive Calendar days

Contract “H-1” - Stream Crossings & Service Line Replacements - 210 consecutive calendar days

Contract “I-1” - Office Building - 150 consecutive calendar days

thereafter. Bidder must agree also to pay as liquidated damages, the sum of \$500.00 for each consecutive calendar day thereafter as hereinafter provided in Article 15 of the Special Conditions and in the Agreement.

- 15.06 Every request for such interpretation on **Phase V – Water System Improvements – Contract “F-1” - Water Tank Painting & Repairs, Contract “G-1” – Water Booster Pump Station Upgrades, Contract “H-1” – Stream Crossings and Service Line Replacements, Contract “I-1” – Office Building** should be in writing addressed to **Sisler - Maggard Engineering, PLLC, 220 East Reynolds Road, Suite A3, Lexington, Kentucky 40517** and to be given consideration must be received in writing at least **five days** prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the Specifications which, if issued, will be mailed by certified mail with return receipt requested to all prospective bidders (at the respective addresses furnished for such purposes), not later than three days prior to the date fixed for the opening of bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under their bid as submitted. All addenda so issued shall become part of the Contract Documents.

Security for Faithful Performance: Simultaneously with their delivery of the executed Contract, the Contractor shall furnish a 100% surety bond or bonds as security for faithful performance of this Contract and for the payment of all persons performing labor on the project under this Contract and furnishing materials in connection with this Contract, as specified in the General Conditions included

herein. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner.

- 15.07 Power of Attorney: Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney with Kentucky Resident agent.
- 15.08 Notice of Special Conditions: Attention is particularly called to those parts of the Contract Documents and Specifications which deal with the following:
- a. Inspection and testing of materials.
 - b. Insurance requirements.
 - c. Wage rates - State and Federal – **DO NOT APPLY**
- 15.09 Safety Standards and Accident Prevention: With respect to all work performed under this Contract, the Contractor shall:
- a. Comply with the safety standards provisions of applicable laws, building and construction codes and the “Manual of Accident Prevention in Construction” published by the Associated General Contractors of America, the requirements of the Occupational Safety and Health Act of 1970 (Public Law 91-596), and the requirements of Title 29 of the Code of Federal Regulations, Section 1518 as published in the “Federal Register”, Volume 36, No. 75, Saturday, April 17, 1971.
 - b. Exercise every precaution at all times for the prevention of accidents and the protection of persons (including employees) and property.
 - c. Maintain at their office or other well known place at the job site, all articles necessary for giving first aid to the injured, and shall make standing arrangements for the immediate removal to a hospital or a doctor’s care of persons (including employees), who may be injured on the job site before the employer has made a standing arrangement for removal of injured persons to a hospital or a doctor’s care.
- 15.10 **Federal and State Prevailing Wage Rates do not** apply to this project.

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 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.
- 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 – SALES AND USE TAXES, DO APPLY TO THIS CONTRACT

ARTICLE 23 – CONTRACTS TO BE ASSIGNED (NOT USED)

ARTICLE 24 - WAGE RATE REQUIREMENTS (NOT USED)

- 24.01 If the contract price is in excess of \$100,000, provisions of the Contract Work Hours and Safety Standards Act at 29 CFR 5.5 (b) apply.

SECTION 3

RURAL DEVELOPMENT GENERAL CONDITIONS & SUPPLEMENTAL CONDITIONS

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

	Page
Article 1 – Definitions and Terminology	1
1.01 Defined Terms	1
1.02 Terminology.....	5
Article 2 – Preliminary Matters.....	6
2.01 Delivery of Bonds and Evidence of Insurance	6
2.02 Copies of Documents.....	6
2.03 Before Starting Construction.....	6
2.04 Preconstruction Conference; Designation of Authorized Representatives	7
2.05 Initial Acceptance of Schedules.....	7
2.06 Electronic Transmittals.....	7
Article 3 – Documents: Intent, Requirements, Reuse	8
3.01 Intent	8
3.02 Reference Standards	8
3.03 Reporting and Resolving Discrepancies.....	8
3.04 Requirements of the Contract Documents	9
3.05 Reuse of Documents.....	10
Article 4 – Commencement and Progress of the Work.....	10
4.01 Commencement of Contract Times; Notice to Proceed	10
4.02 Starting the Work	10
4.03 Reference Points.....	10
4.04 Progress Schedule	10
4.05 Delays in Contractor’s Progress.....	11
Article 5 – Availability of Lands; Subsurface and Physical Conditions; Hazardous Environmental Conditions	12
5.01 Availability of Lands.....	12
5.02 Use of Site and Other Areas	12
5.03 Subsurface and Physical Conditions	13
5.04 Differing Subsurface or Physical Conditions.....	14

5.05	Underground Facilities	15
5.06	Hazardous Environmental Conditions at Site	17
Article 6 – Bonds and Insurance		19
6.01	Performance, Payment, and Other Bonds	19
6.02	Insurance—General Provisions	19
6.03	Contractor’s Insurance	20
6.04	Owner’s Liability Insurance	23
6.05	Property Insurance	23
6.06	Waiver of Rights	25
6.07	Receipt and Application of Property Insurance Proceeds.....	25
Article 7 – Contractor’s Responsibilities		26
7.01	Supervision and Superintendence.....	26
7.02	Labor; Working Hours.....	26
7.03	Services, Materials, and Equipment.....	26
7.04	“Or Equals”	27
7.05	Substitutes.....	28
7.06	Concerning Subcontractors, Suppliers, and Others	29
7.07	Patent Fees and Royalties	31
7.08	Permits.....	31
7.09	Taxes.....	32
7.10	Laws and Regulations	32
7.11	Record Documents	32
7.12	Safety and Protection.....	32
7.13	Safety Representative	33
7.14	Hazard Communication Programs.....	33
7.15	Emergencies	34
7.16	Shop Drawings, Samples, and Other Submittals	34
7.17	Contractor’s General Warranty and Guarantee.....	36
7.18	Indemnification	37
7.19	Delegation of Professional Design Services.....	37
Article 8 – Other Work at the Site		38
8.01	Other Work.....	38
8.02	Coordination.....	39

8.03	Legal Relationships	39
Article 9 – Owner’s Responsibilities.....		40
9.01	Communications to Contractor	40
9.02	Replacement of Engineer	40
9.03	Furnish Data	40
9.04	Pay When Due	40
9.05	Lands and Easements; Reports, Tests, and Drawings	40
9.06	Insurance	40
9.07	Change Orders	40
9.08	Inspections, Tests, and Approvals	41
9.09	Limitations on Owner’s Responsibilities.....	41
9.10	Undisclosed Hazardous Environmental Condition	41
9.11	Evidence of Financial Arrangements	41
9.12	Safety Programs.....	41
Article 10 – Engineer’s Status During Construction.....		41
10.01	Owner’s Representative	41
10.02	Visits to Site	41
10.03	Project Representative	42
10.04	Rejecting Defective Work.....	42
10.05	Shop Drawings, Change Orders and Payments	42
10.06	Determinations for Unit Price Work.....	42
10.07	Decisions on Requirements of Contract Documents and Acceptability of Work.....	42
10.08	Limitations on Engineer’s Authority and Responsibilities	42
10.09	Compliance with Safety Program	43
Article 11 – Amending the Contract Documents; Changes in the Work		43
11.01	Amending and Supplementing Contract Documents.....	43
11.02	Owner-Authorized Changes in the Work	44
11.03	Unauthorized Changes in the Work	44
11.04	Change of Contract Price.....	44
11.05	Change of Contract Times	45
11.06	Change Proposals	45
11.07	Execution of Change Orders.....	46
11.08	Notification to Surety	47

Article 12 – Claims	47
12.01 Claims	47
Article 13 – Cost of the Work; Allowances; Unit Price Work	48
13.01 Cost of the Work.....	48
13.02 Allowances.....	50
13.03 Unit Price Work	51
Article 14 – Tests and Inspections; Correction, Removal or Acceptance of Defective Work	52
14.01 Access to Work	52
14.02 Tests, Inspections, and Approvals	52
14.03 Defective Work.....	53
14.04 Acceptance of Defective Work	53
14.05 Uncovering Work.....	53
14.06 Owner May Stop the Work.....	54
14.07 Owner May Correct Defective Work	54
Article 15 – Payments to Contractor; Set-Offs; Completion; Correction Period	55
15.01 Progress Payments	55
15.02 Contractor’s Warranty of Title	58
15.03 Substantial Completion	58
15.04 Partial Use or Occupancy.....	59
15.05 Final Inspection.....	59
15.06 Final Payment	59
15.07 Waiver of Claims.....	61
15.08 Correction Period	61
Article 16 – Suspension of Work and Termination	62
16.01 Owner May Suspend Work.....	62
16.02 Owner May Terminate for Cause	62
16.03 Owner May Terminate For Convenience	63
16.04 Contractor May Stop Work or Terminate	63
Article 17 – Final Resolution of Disputes	64
17.01 Methods and Procedures	64
Article 18 – Miscellaneous	64
18.01 Giving Notice	64
18.02 Computation of Times	64

18.03 Cumulative Remedies.....64
18.04 Limitation of Damages.....65
18.05 No Waiver.....65
18.06 Survival of Obligations.....65
18.07 Controlling Law.....65
18.08 Headings.....65
EXHIBIT GC-A Certificate of Owner’s Attorney.....66

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
 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. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 5. *Bidder*—An individual or entity that submits a Bid to Owner.
 6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
 7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
 8. *Change Order*—A document 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, or other revision to the Contract, issued on or after the Effective Date of the Contract.
 9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
 10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer

has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. (“CERCLA”); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. (“RCRA”); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.
13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .
15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
17. *Cost of the Work*—See Paragraph 13.01 for definition.
18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
20. *Engineer*—The individual or entity named as such in the Agreement.
21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.
23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.
26. *Notice of Award*—The written notice by Owner to a Bidder of Owner’s acceptance of the Bid.
27. *Notice to Proceed*—A written notice 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.
28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor’s plan to accomplish the Work within the Contract Times.
30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.
32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or “RPR” includes any assistants or field staff of Resident Project Representative.
33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals and the performance of related construction activities.
35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

37. *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, and such other lands furnished by Owner which are designated for the use of Contractor.
38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
39. *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.
40. *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.
41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.
42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
43. *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 a Subcontractor.
44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.
45. *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 but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
46. *Unit Price Work*—Work to be paid for on the basis of unit prices.
47. *Work*—The entire 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; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 Terminology

- A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:*
1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, 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 exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the 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 is not intended to and 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 Article 10 or any other provision of the Contract Documents.
- C. *Day:*
1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:*
1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. 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 15.03 or 15.04).
- E. *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. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.
- F. Unless stated otherwise in the Contract Documents, words or phrases that 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 and Evidence of Insurance*

- A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.
- C. *Evidence of Owner’s Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for 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;
 2. a preliminary Schedule of Submittals; 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.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, 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 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Initial Acceptance of Schedules*

- A. At least 10 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 2.03.A. Contractor shall have an additional 10 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 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 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 the component parts of the Work.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.
- B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or

computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required 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.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 *Reference Standards*

- A. Standards Specifications, Codes, Laws and Regulations
 - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, 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, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract 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, reference standard, 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 part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, 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 part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

- A. *Reporting Discrepancies:*
 - 1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict,

error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.
3. 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 had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
 - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); 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 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.
- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers shall not:
1. 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 its consultants, including electronic media editions, or reuse any 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 adaptation by Engineer; or
 2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *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 Contract 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 Contract. 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 Contract, whichever date is earlier.

4.02 *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 such date.

4.03 *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.

4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 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 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

- B. 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, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
 2. abnormal weather conditions;
 3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
 4. acts of war or terrorism.
- D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.
- E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.
- F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

- G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 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.
- 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 permanent improvements are to be made 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.

5.02 Use of Site and Other Areas

A. Limitation on Use of Site and Other Areas:

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all 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 directly or indirectly, in whole or in part

by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent 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 the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas 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 of 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 structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
 1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and
 3. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, 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.

5.04 *Differing Subsurface or Physical Conditions*

- A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site 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 5.03 is materially inaccurate; or
 2. is of such a nature as to require a change in the Drawings or Specifications; 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 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Possible Price and Times Adjustments:*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, 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 fall within any one or more of the categories described in Paragraph 5.04.A;
 - 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 Paragraph 13.03; and,

- c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
 - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or
 - b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 5.04.A.
 3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
 4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent 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 do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; 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 information and data regarding existing Underground Facilities at the Site;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;
 - c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 - d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then 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 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

- C. *Engineer's Review:* Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Possible Price and Times Adjustments:*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;
 - 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 Paragraph 13.03;
 - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and
 - d. Contractor gave the notice required in Paragraph 5.05.B.
 2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 *Hazardous Environmental Conditions at Site*

- A. *Reports and Drawings*: The Supplementary Conditions identify:
1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
 2. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors 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 removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) 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. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. 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, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.
- H. 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, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.
- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, 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 (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, 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 failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE**6.01 Performance, Payment, and Other Bonds**

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.
- B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.
- C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.
- D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.
- E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.
- F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 Insurance—General Provisions

- A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is

maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

- D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, 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.
- G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.
- H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.
- I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.
- J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

- A. *Workers' Compensation:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:
 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.
 2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).
 3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

4. Foreign voluntary worker compensation (if applicable).
- B. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:
1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.
 2. claims for damages insured by reasonably available personal injury liability coverage.
 3. 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.
- C. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:
1. Products and completed operations coverage:
 - a. Such insurance shall be maintained for three years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
 2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
 3. Broad form property damage coverage.
 4. Severability of interest.
 5. Underground, explosion, and collapse coverage.
 6. Personal injury coverage.
 7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.
 8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- D. *Automobile liability:* Contractor shall purchase and maintain automobile liability insurance against 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. The automobile liability policy shall be written on an occurrence basis.
- E. *Umbrella or excess liability:* Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.
- F. *Contractor's pollution liability insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result

of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

- G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, 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 (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.
- H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.
- I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:
1. include at least the specific coverages provided in this Article.
 2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.
 3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.
 4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.
 5. be appropriate for the Work being performed and provide protection from claims that 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.
- J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, 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.
- B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance*

- A. *Builder's Risk:* Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable 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 Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."
 - 2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.
 - 3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.
 - 4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
 6. extend to cover damage or loss to insured property while in transit.
 7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
 8. allow for the waiver of the insurer's subrogation rights, as set forth below.
 9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
 10. not include a co-insurance clause.
 11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
 12. include performance/hot testing and start-up.
 13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.
- B. *Notice of Cancellation or Change:* All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.
- C. *Deductibles:* The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.
- D. *Partial Occupancy or Use by Owner:* If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
- E. *Additional Insurance:* If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.
- F. *Insurance of Other Property:* If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 *Waiver of Rights*

- A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, 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 insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, 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 Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, 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 or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, 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 perils 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 occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.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, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.
- D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, 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 builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the

policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 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.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.02 Labor; Working Hours

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction 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, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.03 Services, Materials, and Equipment

- A. Unless otherwise specified in the Contract Documents, 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, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and

guarantees required 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.

- C. 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.

7.04 "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 Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item 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 is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.
 - 1. If Engineer in its sole discretion determines that 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, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, 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:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
 - 3) it has a proven record of performance and availability of responsive service; and
 - 4) it is not objectionable to Owner.
 - b. Contractor certifies that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense:* Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

- D. *Effect of Engineer's Determination:* Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.
- E. *Treatment as a Substitution Request:* If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 *Substitutes*

- A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.
 - 1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.
 - 2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.
 - 3. Contractor shall 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:
 - a. shall certify that the proposed substitute item will:
 - 1) perform adequately the functions and achieve the results called for by the general design,
 - 2) be similar in substance to that specified, and
 - 3) be suited to the same use as that specified.
 - b. will state:
 - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,
 - 2) whether 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 other work on the Project) to adapt the design to the proposed substitute item, and
 - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
 - c. will identify:
 - 1) all variations of the proposed substitute item from that specified, and

- 2) available engineering, sales, maintenance, repair, and replacement services.
- d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- E. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination:* If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.
- B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

- E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.
- F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. 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 the right of Owner to the completion of the Work in accordance with the Contract Documents.
- H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. 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.
- J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.
- K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.
- L. 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.
- M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.
- N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

- O. Nothing in the Contract Documents:
1. 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
 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *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.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors 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 specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, 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 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.

7.08 *Permits*

- A. Unless otherwise provided in the Contract Documents, 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 the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

7.09 *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.

7.10 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall 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 or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, 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 such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.12 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. 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, other work in progress, 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 Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
 - C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
 - D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
 - E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.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 at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer 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).
 - F. Contractor's duties and responsibilities for safety and protection 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 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
 - G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 *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.

7.14 *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.

7.15 *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.

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements:*

1. Before submitting a Shop Drawing or Sample, Contractor shall have:
 - a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.
3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

- a. Contractor shall submit the number of copies required in the Specifications.
- b. 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 7.16.D.

2. *Samples:*
 - a. Contractor shall submit the number of Samples required in the Specifications.
 - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.
 3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, 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.
- C. *Other Submittals:* Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.
- D. *Engineer's Review:*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of 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 or to safety precautions or programs incident thereto.
 3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
 4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.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. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.
 5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.
 6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
 7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. *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.
2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.
- B. 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.
- C. 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 review and approval of a Shop Drawing or Sample submittal;
 6. 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.

- D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, 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 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 but only to the extent caused 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.
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors 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 7.18.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 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors 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.

7.19 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.
- B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop

Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. 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 such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.
- D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, 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.

8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
 - 1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
 - 2. an itemization of the specific matters to be covered by such authority and responsibility; and
 - 3. the extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

- A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.
- C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

- D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all 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 damage, delay, disruption, or interference.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

9.03 *Furnish Data*

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

9.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *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.

9.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
- B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION**10.01** *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.

10.02 *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 10.08. 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.

10.03 *Project Representative*

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. 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.

10.04 *Rejecting Defective Work*

- A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

- A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.
- B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.
- C. Engineer's authority as to Change Orders is set forth in Article 11.
- D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

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

- A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, 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 15.06.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 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
 - 1. *Change Orders:*
 - a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.
 - b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.
 - 2. *Work Change Directives:* A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes 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. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 *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, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.
- B. 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, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or
 2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or
 3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on

the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

- C. *Contractor's Fee*: When applicable, 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 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 13.01.B.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 Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
 - 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 Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.
- B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

- A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures:* Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.
 2. *Engineer's Action:* Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.
 3. *Binding Decision:* Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- B. *Resolution of Certain Change Proposals:* If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 Execution of Change Orders

- A. Owner and Contractor shall execute appropriate Change Orders covering:
1. 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;
 2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
 3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and
 4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety 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), 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.

ARTICLE 12 – CLAIMS

12.01 *Claims*

- A. *Claims Process:* The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:
 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.
- B. *Submittal of Claim:* The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.
- C. *Review and Resolution:* The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation:*
 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.
 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim

submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
 - F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
 - G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
 2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:
 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 on the Work. 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, and 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 13.01.
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, as 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 6.05), 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 communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *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, safety 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 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here 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 Paragraph 13.01.B.

D. *Contractor's Fee:* When the Work as a whole 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, Change Proposal, Claim, set-off, or other 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 11.04.C.

E. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, 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.

13.02 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 and by such persons or entities as may be acceptable to Owner and Engineer.

- B. *Cash Allowances*: Contractor agrees that:
1. the cash 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, overhead, profit, and other expenses contemplated for the cash 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.
- C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. 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.

13.03 *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.
- B. 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. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. 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.
- D. 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 the following paragraph.
- E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price 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;
 2. there is no corresponding adjustment with respect to any other item of Work; and
 3. Contractor believes that it 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 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

14.02 *Tests, Inspections, and Approvals*

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.
- 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, obtaining, and paying for all inspections and tests required:
 1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 3. by manufacturers of equipment furnished under the Contract Documents;
 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. 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, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

- A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then 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, and provide all necessary labor, material, and equipment.
 - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages 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 pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
 - 2. If the uncovered 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 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, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *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, then 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.

14.07 *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, 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, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or 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, 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 incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. 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 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 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 Progress Payments

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 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 during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments:*
1. At least 20 days before the date established in the Agreement 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, a warehouse bond, 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 progress payments will be as stipulated in the Agreement.
- C. *Review of Applications:*
1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, 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 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, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and 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:
- a. 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; or
 - b. 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:
- a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or
 - e. 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 stated in Paragraph 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
- a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

- e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due:*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner:*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
 - b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
 - f. the Work is defective, requiring correction or replacement;
 - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - h. the Contract Price has been reduced by Change Orders;
 - i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;
 - j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
 - k. 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;
 - l. there are other items entitling Owner to a set off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, 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, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 *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 and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, 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.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy 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, subject to the following conditions:
 1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.
 2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 3. 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 15.03 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.
 4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 *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, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *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, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;
 - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.
 - d. a list of all disputes that Contractor believes are unsettled; and
 - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, 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, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's 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 have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. 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 15.07. 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. *Completion of Work:* The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due:* Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation,

including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

- A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.
- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed 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 Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. correct the defective repairs to the Site or such other adjacent areas;
 - 2. correct such defective Work;
 - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written 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. 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 repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).
- C. 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.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, 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.

- E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *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 written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and 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);
 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:
1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and
 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, 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 complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses,

and damages exceeds 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.

- F. 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, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *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, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 1. 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. 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; and
 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) 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 16.03.
- B. 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 are not intended to preclude Contractor from submitting a Change Proposal 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 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this Article:
1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and
 2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this Article, Owner or Contractor may:
1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or
 2. agree with the other party to submit the dispute to another dispute resolution process; or
 3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 *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:
1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or
 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

- A. When any period of time is referred to in the Contract 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.

18.03 *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. 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.

18.04 *Limitation of Damages*

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

- A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

18.08 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

CERTIFICATE OF OWNER'S ATTORNEY AND AGENCY CONCURRENCE

CERTIFICATE OF OWNER'S ATTORNEY

PROJECT NAME: **BIG SANDY WATER DISTRICT - CONTRACT I-1**

CONTRACTOR NAME:

I, the undersigned, Roger W. Hall, the duly authorized and acting legal representative of Big Sandy Water District, do hereby certify as follows: I have examined the attached Contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements is adequate and has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with the terms, conditions, and provisions thereof.

Name - Roger W. Hall

Date

AGENCY CONCURRENCE

As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

USDA - Rural Development

Agency Representative

Date

Name Julie Anderson - RD

Supplementary Conditions

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract Funding Agency Edition (No. C-700, 2013 Edition). All provisions that are not so amended or supplemented, remain in full force and effect.

The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

TABLE OF CONTENTS

	Page
SC-1.01.A.3 Application for Payment	2
SC-1.01.A.8 Change Order	2
SC-1.01.A.48 Work Change Directive	2
SC-1.01.A.49 Abnormal Weather Conditions	2
SC-1.01.A.50 Project Financing	2
SC-1.02.A.15 Contract Times	2
SC-2.02A. Copies of Documents	2
SC-2.03.A Before Starting Construction	3
SC-4.01 Commencement of Contract Times; Notice to Proceed	3
SC-5.03 Subsurface and Physical Conditions	3
SC-5.05 Underground Utilities	3
SC-5.06 Hazardous Environmental Conditions at Site	4
SC-6.01 Performance, Payment and Other Bonds	4
SC-6.02 Insurance - General Provisions	4
SC-6.03 Contractor's Insurance	5
SC-6.05 Property Insurance	6
SC-7.01 Supervision and Superintendence	6
SC-7.02.A.1 Labor and Working Hours	7
SC-7.03 Services, Materials and Equipment	7
SC-7.04 "Or Equals"	7
SC-7.06 Concerning Subcontractors, Supplier and Others	8
SC-7.08 Permits	8
SC-7.16 Shop Drawings, Samples and Other Submittals	8
SC-10.03 Project Representative	9
SC-11.07 Execution of Change Orders	9
SC-13.02 Allowances	9
SC-14.03 Defective Work	9
SC-14.07 Owner May Correct Defective Work	10
SC-15.01 Progress Payments	10
SC-15.02 Contractor's Warranty of Title	10
SC 18.09, 18.10 and 18.11 Miscellaneous	11
SC-19.1 - 19.12 FEDERAL REQUIREMENTS	11-15

ARTICLE 1 - DEFINITIONS AND TERMS

SC 1.01 Defined Terms

SC-1.01.A.3. Add the following language to the end of Paragraph 1.01.A.3:

The Application for Payment form to be used on this Project is Form RD 1924-18. The Agency must approve all Applications for Payment before payment is made.

SC-1.01.A.8. Add the following language to the end of Paragraph 1.01.A.8:

The Change Order form to be used on this Project is Form EJCDC C-941. Agency approval is required before Change Orders are effective.

SC-1.01.A.48 Add the following language at the end of the last sentence of Paragraph 1.01.A.48:

A Work Change Directive cannot change Price or Contract Times without a subsequent Change Order.

SC-1.01.A.49 Add the following new Paragraph after Paragraph 1.01.A.48:

Abnormal Weather Conditions - Conditions of extreme or unusual weather for a given region, elevation, or season as determined by Engineer. Extreme or unusual weather that is typical for a given region, elevation, or season should not be considered Abnormal Weather Conditions.

SC 1.01 Project Financing

SC 1.01.A.50 Add the following new Paragraph after Paragraph 1.01.A.49:

The project is financed by the **U.S.D.A - Rural Development and the Big Sandy Water District.**

SC 1.02 Terminology

SC-1.02.A.15. Delete in its entirety and replace with the following:

Contract Times: The number of days or date stated in the Agreement to achieve substantial completion, based on remaining work, weather and market conditions.

ARTICLE 2 - PRELIMINARY MATTERS

SC -2.02 Copies of Documents

SC-2.02.A. Amend the first sentence of Paragraph 2.02.A. to read as follows:

Owner shall furnish to Contractor **four** copies of the Contract Documents (including one fully executed counterpart of the Agreement). Additional printed copies of the conformed Contract Documents will be furnished upon request at the cost of reproduction.

SC 2.03 Before Starting Construction

SC-2.03.A. Delete Paragraph 2.03.A in its entirety and insert the following in its place:

A. The Contract Times will commence on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 10 days after the Effective Date of the Agreement.

ARTICLE 4 - COMMENCEMENT AND PROGRESS OF THE WORK

SC 4.01 - Commencement of Contract Times; Notice to Proceed

SC-4.01. Delete the following sentence from Paragraph 4.01A:

In no event will the Contract Times commence to run later than the **sixtieth** day after the day of Bid opening unless agreed to by all parties.

SC 4.05.C.2 Amend Paragraph 4.05.C.2 by striking out the following text:

“abnormal weather conditions;” and inserting the following text:
Abnormal Weather Conditions;

ARTICLE 5 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

SC 5.03 Subsurface and Physical Conditions

SC-5.03. Delete Paragraphs 5.03.A and 5.03B in their entirety and insert the following:

A. No reports of explorations or tests of subsurface conditions at or adjacent to the Site, or drawings of physical conditions relating to existing surface or subsurface structures at the Site, are known to Owner.

SC 5.05 Underground Facilities

SC-5.05

Add the following new paragraphs immediately after Paragraph 5.05 A.1:

a. Special precautions shall be taken by the Contractor to avoid damage to existing overhead and underground utilities owned and operated by the owner or by public or private utility companies.

b. The available information concerning the location of existing underground utilities is shown on the Drawings. While it is believed that the locations shown are reasonably correct, neither the Engineer nor the Owner can guarantee the accuracy of this information.

c. Before proceeding with the work, the Contractor shall confer with all public or private companies, agencies or departments that own and operate utilities in the vicinity of the construction work. The purpose of the conference, or conferences, shall be to notify said companies, agencies or departments of the proposed construction schedule, verify the location of, and possible interference with, the existing utilities that are shown on the Drawings, arrange for necessary suspension of service, and make arrangements to locate and avoid interference with all utilities (including house connections) that are not shown on the Drawings. The Engineer and Owner have no objection to the Contractor arranging for the said utility companies, agencies or departments to locate and uncover their own utilities; however, the Contractor shall bear the entire responsibility and cost of locating and avoiding, or repairing damage to said existing utilities.

SC 5.06 Hazardous Environmental Conditions

SC-5.06 Delete Paragraphs 5.06A and 5.06B in their entirety and insert the following:

- A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.**
- B. Not Used.**

ARTICLE 6 - BONDS AND INSURANCE

SC 6.01 Performance, Payment and Other Bonds

SC-6.01

Add the following new paragraph immediately after Paragraph 6.01.F:

G. The Performance Bond shall remain in full force and effect throughout the Guaranty period referred to in SC 6.03. All warranties and guarantees remaining in effect at and beyond the Guaranty expiration date shall be relinquished and transferred to the Owner. Copies of such warranty/guaranty shall be submitted to the Engineer prior to date of the start of the Guaranty period.

6.02 Insurance - General Provisions

SC-6.02

Add the following paragraph immediately after Paragraph 6.02.B:

1. Contractor may obtain worker's compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the project is located, (b) is certified or authorized as a worker's compensation insurance provider by the appropriate state agency, and (c) has

been accepted to provide worker's compensation insurance for similar projects by the state within the last 12 months.

SC 6.03 Contractor's Insurance

SC 6.03 Contractor's Liability Insurance - add the following new paragraph immediately after Paragraph 6.03J:

K. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amount or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:

a. State:	Statutory
b. Federal, if applicable (e.g. Longshoreman's): (e.g., Longshoremen's)	Statutory
c. Employer's Liability	\$500,000
Bodily injury, each accident	\$500,000
Bodily injury by disease, each employee	\$500,000
Bodily injury/disease aggregate	\$500,000

2. Contractor's General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions:

a. General Aggregate	\$2,000,000
b. Products – Completed Operations Aggregate	\$1,000,000
c. Personal and Advertising Injury	\$1,000,000
d. Each Occurrence (Bodily Injury and property damage)	\$1,000,000
e. General Aggregate	\$5,000,000
f. Each Occurrence	\$2,000,000

3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:

a. Bodily Injury:

Each Person	\$1,000,000
Each Accident	\$1,000,000
b. Property Damage	
Each Accident	\$1,000,000
c. Combined Single Limit of	\$1,000,000
4. Excess or Umbrella Liability:	
a. Per Occurrence	\$1,000,000
b. General Aggregate	\$1,000,000
5. Contractor's Pollution Liability	
a. Each Occurrence	\$1,000,000
b. General Aggregate	\$1,000,000
6. Contractor's Professional Liability	
a. Each Claim	\$1,000,000
b. Annual Aggregate	\$1,000,000

SC 6.05 Property Insurance

Add the following paragraph immediately after Paragraph 6.05.F:

G. The Contractor shall provide INSTALLATION FLOATER INSURANCE when Builder's Risk Insurance is inappropriate, or when Builder's Risk Insurance will not respond, to cover damage or destruction to renovations, repairs, materials, or equipment being installed or otherwise being handled or stored by the Contractor, including off-site storage, transit and installation. The amount of coverage shall provide full replacement value (FRV) of the property, repairs, additions, materials, or equipment being installed, otherwise being handled or stored on or off premises. All risks coverage shall be provided. Coverage cannot be contingent on an external cause or risk, or limited to property for which the Contractor is legally liable. The Contractor will be solely responsible for any deductible carried under this coverage and claims on materials, supplies, machinery, fixture, and equipment that will be incorporated into the Work while in transit or in storage. This policy will include a waiver of subrogation applicable to Owner, Contractor, Engineer, all Subcontractors and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them.

ARTICLE 7 - CONTRACTOR'S RESPONSIBILITIES

SC 7.01 Supervision and Superintendence

Add the following new paragraph C after Paragraph 7.01.B:

C. All General Contractors shall have the authority and be responsible for coordination of the activities among the other prime contractors and subcontractors on the Site to ensure a safe, efficient working environment. This authority covers scheduling delivery of materials, storage of materials, sequencing of construction involving different crafts, resolving interface issues between crafts, scheduling testing, and all other aspects of the Work that do not impact the design or function of the work.

SC 7.02 Labor; Working Hours

SC-7.02.A.1

Add the following new paragraphs immediately after Paragraph 7.02.B:

C. Contractor shall be responsible for the cost of any overtime pay or other expense incurred by the Owner for Engineer's services, Owner's representative and construction observation services occasioned by the performance of work on Saturday, Sunday, any legal holiday, or as overtime on any work day. For purposes of administering the foregoing requirement, additional overtime costs are defined as \$75 per hour.

D. The Contractor shall employ workmen skilled in their various duties and shall remove from the project, at the request of the Engineer, any person employed in, about, or upon the work, who misconducts himself or is incompetent or negligent in the performance of the duties assigned to him. No person under the age of eighteen (18) years and no convict labor shall be employed to perform any work under this Contract. No person whose age or physical condition is such as to make his employment dangerous to his health or safety or to the health or safety of others shall be employed to perform any work under this Contract, provided that this shall not operate against the employment of physically handicapped persons, otherwise employable, where such persons may be safely assigned to work which they can ably perform. There shall be no discrimination because of race, creed, color or political affiliation in the employment of persons for work under this Contract.

With respect to additional skilled, semi-skilled workers employed to perform work on the project, preference in employment shall be given first to persons who reside in the city in which the work is to be performed, and second to persons residing in the county in which the work is to be performed.

SC 7.03 Services, Materials and Equipment

Add the following new paragraph immediately after Paragraph 7.03.C:

D. The Contractor agrees that he will obtain from the manufacturers of equipment and materials furnished under this Contract guarantees against defective materials and workmanship, and if those guarantees furnished by the manufacturer do not extend for the term of one (1) year from and after the date upon which the final estimate of the Engineer is formally approved by the Owner or other established date as set forth herein (such as the substantial completion date), he shall make the necessary arrangements and assume all cost for extending this guarantee for the required period.

SC 7.04 "Or Equals"

SC 7.04.A Amend the third sentence of Paragraph 7.04.A by striking out the following words:

Unless the specification or description contains or is followed by words reading that no like, equivalent, or 'or-equal' item is permitted.

SC 7.04.A.1 Amend the last sentence of Paragraph a.3 by striking out "and;" and adding a period at the end of Paragraph a.3.

SC 7.04.A.1 Delete paragraph 7.04.A.1.a.4 in its entirety and insert the following in its place:

[Deleted]

SC 7.06 Concerning Subcontractors, Suppliers and Others

SC 7.06.B Delete paragraph 7.06.B in its entirety and insert the following in its place:

[Deleted]

SC 7.06.E Amend the second sentence of Paragraph 7.06.E by striking out "Owner may also require Contractor to retain specific replacements; provided, however, that".

Delete Paragraph 7.06.F in its entirety.

SC-7.06 Add a new paragraph immediately after Paragraph 7.06.O:

P. The Contractor shall not award work valued at more than (50%) percent of the Contract Price to Subcontractor(s), without prior written approval of the Owner.

SC 7.08 Permits

Delete Paragraph 7.08.A in its entirety and insert the following in its place.

Owner shall obtain and pay for all construction permits, including building permits. Contractor is responsible for all utility permits and fees for usage during the construction period. Contractor is responsible for any electrical, plumbing and/or building inspections and fees which may be required.

SC 7.16 Shop Drawings, Samples and Other Submittals

Add the following new paragraphs immediately after Paragraph 7.16D.8:

9. CONTRACTOR shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the ENGINEER'S approval thereof.

10. ENGINEER'S review of submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instruction for installation or performance of equipment of systems, all of which remain the responsibility of the Contractor as required by the Contract Documents.

11. ENGINEER'S review and approval of Shop Drawings or Samples do 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 7.16.A.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, or has issued a Change Order that authorizes the deviation.

ARTICLE 10 - ENGINEER'S STATUS DURING CONSTRUCTION

SC 10.03 Project Representative

SC-10.03

The Engineer will provide Resident Project Representative Services for this project. The Duties, Responsibilities, and Limitations of Authority of the Resident Project Representative will be as stated in Exhibit D of the Agreement Between Owner and Engineer, E-510, 2002 Edition, as amended and executed for this specific project. Owner or Engineer will make available upon request.

ARTICLE 11 - AMENDING THE CONTRACT DOCUMENTS: CHANGES IN THE WORK

SC 11.07 Execution of Change Orders

SC 11.07.C Add the following new Paragraph after Paragraph 11.07.B:

All Contract Change Orders must be concurred in by Agency before they are effective.

ARTICLE 13 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

SC 13.02 Allowances

SC 13.02.C Delete Paragraph 13.02.C in its entirety and insert the following in its place:

[Deleted]

ARTICLE 14 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

SC 14.03 Defective Work

SC-14.03

Add the following new paragraph immediately after Paragraph 14.03.D:

1. When the repairs or replacements involve one or more items of installed equipment, Contractor shall provide the services of qualified factory-trained servicemen in the employ of the equipment manufacturers to perform or supervise the repairs or replacements.

SC 14.07 Owner May Correct Defective Work

SC-14.07

Add the following new paragraph immediately after Paragraph 14.07.D:

E. When the Engineer or the Owner deems it necessary, and so orders, such replacements or repairs under this section shall be undertaken by the Contractor within twenty-four (24) hours after service of notice. If the Contractor unnecessarily delays or fails to make the ordered replacements or repairs within the time specified, or if any replacements or repairs within the time specified, or if any replacements or repairs are of such nature as not to admit /of the delay incident to the service of notice, then the Owner shall have the right to make such replacements or repairs and the expense thereof shall be paid by the Contractor or deducted from any moneys due to Contractor.

ARTICLE 15 - PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

SC 15.01 Progress Payments

SC 15.01.B Amend the second sentence of Paragraph 15.01.B.1 by striking out the following text: "a bill of sale, invoice, or other."

**SC 15.01.B.3 Add the following language at the end of paragraph 15.01.B.3:
RUS Bulletin 1780-26 Exhibit H Page 4**

No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage, or invest the retainage for the benefit of the Contractor.

SC 15.01.B.4 Add the following new Paragraph after Paragraph 15.01.B.3:

The Application for Payment form to be used on this Project is EJCDC C-620. The Agency must approve all Applications for Payment before payment is made.

SC-15.01 D

Add the following new paragraph immediately after 15.01 D.1

The Application for Payment with Engineer's recommendations will be presented to the Owner and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 14.02.D will become due thirty days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC 15.02 Contractor's Warranty of Title

SC 15.02.A Amend Paragraph 15.02.A by striking out the following text:

Page 10 of 15

“no later than seven days after the time of payment by Owner” and insert “no later than the time of payment by Owner.”

ARTICLE 18 - MISCELLANEOUS

SC-18.09 Add the following new paragraph:

A. If this Contract exceeds \$100,000, the Contractor shall comply with all applicable standards, orders, or requirements issued under Section 306 of the Clean Air Act (42 USC §1857(h)), Section 508 of the Clean Water Act (33 USC §1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR Part 15).

SC-18.10 Add the following new paragraph:

A. If the Contractor shall fail or refuse to complete the work within the Contract Time, or extension of time granted by the Owner, then the Contractor agrees as a partial consideration for the awarding of this Contact that the Owner may retain from the compensation otherwise to be paid to the Contractor the amount specified below, not as a penalty but as liquidated damages, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract Documents.

SC-18.11 Add the following new paragraph:

18.11 Disruption of water or wastewater operations

A. The Contractor shall take all necessary precautions to minimize the disruption in water and/or wastewater system operations. When a disruption in the operations is required, the Contractor shall coordinate in advance (5 days minimum) the interruption with the Engineer and the Owner; the interruptions shall be held to a minimum by wise and prudent coordination of Contractor work efforts. The Contractor shall be held responsible for all damages brought about by disruption of the operations if such disruptions are a direct cause of Contractor negligence and or a failure of the Contractor to coordinate his work effort with the Engineer and Owner.

SC 18.12 Add the following new paragraph after Paragraph 18.11:

Tribal Sovereignty. No provision of this Agreement will be construed by any of the signatories as abridging or debilitating any sovereign powers of the {insert name of Tribe} Tribe; affecting the trust-beneficiary relationship between the Secretary of the Interior, Tribe, and Indian landowner(s); or interfering with the government-to-government relationship between the United States and the Tribe.

ARTICLE 19 - FEDERAL REQUIREMENTS

SC 19.01 Add the following language as Paragraph 19.01 with the title “Agency Not a Party”:

A. This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees is a party to this Contract.

SC 19.02 Add the following sections after Article 19.01 with the title “Contract Approval”:

A. Owner and Contractor will furnish Owner’s attorney such evidence as required so that Owner’s attorney can complete and execute the following “Certificate of Owner’s Attorney” (Attachment GC-A) before Owner submits the executed Contract Documents to Agency for approval.

B. Concurrence by Agency in the award of the Contract is required before the Contract is effective.

SC 19.03 Add the following language after Article 19.02.B with the title “Conflict of Interest”: *RUS Bulletin 1780-26 Exhibit H Page 5*

A. Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer. Owner’s officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in Contractor. Owner’s officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

SC 19.04 Add the following language after Article 19.03.A with the title “Gratuities”:

A. If Owner finds after a notice and hearing that Contractor, or any of Contractor’s agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may, by written notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.

B. In the event this Contract is terminated as provided in paragraph 19.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

SC 19.05 Add the following language after Article 19.04.B with the title “Audit and Access to Records”:

A. Owner, Agency, the Comptroller General of the United States, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the Contractor which are pertinent to the Agreement, for the purpose of making audits, examinations, excerpts, and transcriptions. Engineer shall maintain all required records for three years after final payment is made and all other pending matters are closed.

SC 19.06 Add the following language after Article 19.05.A with the title “Small, Minority and Women’s Businesses”:

A. If Contractor intends to let any subcontracts for a portion of the work, Contractor shall take affirmative steps to assure that small, minority and women’s businesses are used when possible as sources of supplies, equipment, construction, and services.

Affirmative steps shall consist of: (1) including qualified small, minority and women’s businesses on solicitation lists; (2) assuring that small, minority and women’s businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority, and women’s businesses; (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women’s businesses; (5) using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U.S. Department of Commerce; (6) requiring each party to a subcontract to take the affirmative steps of this section; and (7) Contractor is encouraged to procure goods and services from labor surplus area firms.

SC 19.07 Add the following after Article 19.06.A with the title “Anti-Kickback”:

A. Contractor shall comply with the Copeland Anti-Kickback Act (18 USC 874 and 40 USC 276c) as supplemented by Department of Labor regulations (29 CFR Part 3, “Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States”). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

SC 19.08 Add the following after Article 19.07.A with the title “Clean Air and Pollution Control Acts”:

A. If this Contract exceeds \$100,000, compliance with all applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. 1857(h) and 42 USC 7401et. seq.), section 508 of the Clean Water Act (33 U.S.C. 1368) and Federal Water Pollution Control Act (33 USC 1251 et seq.), Executive Order 11738, and Environmental Protection Agency regulations is required. Contractor will report violations to the Agency and the Regional Office of the EPA.

SC 19.09 Add the following after Article 19.08 with the title “State Energy Policy”:

A. Contractor shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in any applicable State Energy Conservation Plan, shall be utilized.

SC 19.10 Add the following after Article 19.09 with the title “Equal Opportunity Requirements”:

A. If this Contract exceeds \$10,000, Contractor shall comply with Executive Order 11246, “Equal Employment Opportunity,” as amended by Executive Order 11375, “Amending Executive Order 11246 Relating to Equal Employment Opportunity,” and as supplemented by regulations at 41 CFR part 60, “Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor.”
RUS Bulletin 1780-26 Exhibit H Page 7

B. Contractor’s compliance with Executive Order 11246 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4 and its efforts to meet the goals established for the geographical area where the Contract is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the Contract, and in each trade, and Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting Contractor’s goals shall be a violation of the Contract, the Executive Order, and the regulations in 41 CFR part 60-4. Compliance with the goals will be measured against the total work hours performed. C. Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the Contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number; estimated dollar amount of subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the Contract is to be performed.

SC 19.11 Add the following after Article 19.10.C with the title “Restrictions on Lobbying”:

A. Contractor and each subcontractor shall comply with Restrictions on Lobbying (Public Law 101-121, Section 319) as supplemented by applicable Agency regulations. This Law applies to the recipients of contracts and subcontracts that exceed \$100,000 at any tier under a Federal loan that exceeds \$150,000 or a Federal grant that exceeds \$100,000. If applicable, Contractor must complete a certification form on lobbying activities related to a specific Federal loan or grant that is a funding source for this Contract. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. 1352. Each tier shall disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award.

Certifications and disclosures are forwarded from tier to tier up to the Owner. Necessary certification and disclosure forms shall be provided by Owner.

SC 19.12 Add the following after Article 19.11.A with the title “Environmental Requirements”:

When constructing a Project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental conditions:
RUS Bulletin 1780-26 Exhibit H Page 8

A. Wetlands – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert wetlands. B. Floodplains – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert 100-year floodplain areas (Standard Flood Hazard Area) delineated on the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, e.g., alluvial soils on NRCS Soil Survey Maps. C. Historic Preservation – Any excavation by Contractor that uncovers an historical or archaeological artifact or human remains shall be immediately reported to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the State Historic Preservation Officer (SHPO). D. Endangered Species – Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service. E. Mitigation Measures – The following environmental mitigation measures are

SECTION 4

SPECIAL CONDITIONS

SECTION 4 - SPECIAL CONDITIONS

CONTRACT "I-1" – OFFICE BUILDING

	<u>Page No.</u>
1. Contract Change Order	4-2
2. Pre-Construction Conference	4-2
3. Equal Opportunity	4-2
4. Labor Regulations	4-2
5. Protection of Lives and Property	4-2
6. Conflict of Interest	4-3
7. Partial Payments	4-3
8. Withholding Payments	4-3
9. Sanitary Facilities	4-4
10. Final Inspection	4-4
11. Project Signs	4-4
12. Conflicting Requirements	4-4
13. Owner's Right to Award	4-4
14. Owner's Right to Increase or Decrease Units	4-4
15. Workmen's Compensation and Insurance	4-4
16. Wage Rates	4-5
17. Access to Records	4-5
18. Time of Completion and Liquidated Damages	4-5
19. Contractor's Obligations	4-5
20. Quantities of Estimate	4-5
21. Liens	4-5
22. Work Reasonably Inferred But Not Particularly Delineated or Specified	4-5
23. Limit of Liability of Owner to Contractor for Delays, Extra Cost and Damage	4-6
24. Requirements for Highway and Railroad Crossings and Rights-of-Way	4-6
25. Delays and Cost Due to Errors and/or Changes in Lines and Grades	4-6
26. Licenses and Permits	4-6
27. Conflict With or Damage to Existing Utilities	4-6
28. Shop or Setting Drawings	4-7
29. Work Hours Beyond Regular Hours	4-7
30. Excavation	4-7
31. Air and Water Acts	4-7
32. Subcontracting	4-7
33. Materials, Equipment and Labor; Substitute Material or Equipment	4-8
34. Availability of Lands, Physical & Subsurface Conditions: Reference Point	4-9
35. Substantial Completion	4-9
36. Cleaning Up	4-10
37. Miscellaneous	4-10
38. Safety and Health Regulations	4-10
39. Siltation and Soil Erosion	4-10
40. Permanent Reference Points, Bench Marks, and Property Markers	4-10
41. Existing Utilities	4-11
42. Coordination	4-11
43. USDA Rus-KY Bulletin 1780-2 Guidance for Implementation of American Iron & Steel (AIS) (21 Pages plus Exhibits)	4-11

SPECIAL CONDITIONS**CONTRACT "I-1" – OFFICE BUILDING**

1. Contract Change Order - All changes which affect the cost of the construction of the project must be authorized by means of a CONTRACT CHANGE ORDER. The CONTRACT CHANGE ORDER will include extra work, work for which quantities have been altered from those shown in the bidding schedule, as well as decreases or increases in the quantities of installed units which are different than those shown in the bidding schedule because of final measurements. All changes should be recorded on a CONTRACT CHANGE ORDER as they occur so that they may be included in the partial payment estimate.
2. Pre-Construction Conference - Following award of the CONTRACT, the CONTRACTOR will be required to attend a Pre-Construction Conference with OWNER & ENGINEER, during which items pertinent to performance and management of the project, will be thoroughly discussed and documented.
3. Equal Opportunity - If this contract exceeds \$10,000 the CONTRACTOR is subject to provisions of the equal opportunity requirements set forth in the Supplemental General Conditions, included herein with forms.
4. Labor Regulations - The CONTRACTOR and each of his subcontractors shall comply with the following statutes (and with regulations issued pursuant thereto which are incorporated herein by reference):

Title 18 U.S.C., Section 876: Kickback from public works employees. Whoever, by force, intimidation, or threat of procuring dismissal from employment, or by any other manner whatsoever induces any person employed in the construction, prosecution, completion or repair of any public building, public work, or building or work financed in whole or in part by loans (made, insured, or guaranteed) or grants from the United States, to give up any part of the compensation to which he is entitled under his contract of employment, shall be fined not more than \$5,000 or imprisoned not more than five years, or both.

Title 40 U.S.C., Section 276c: Regulations Governing Contractors and Subcontractors. The Secretary of Labor shall make reasonable regulations for Contractors and Subcontractors engaged in the construction, prosecution, completion or repair of public buildings, public works, or buildings or work financed in whole or in part by loans (made, insured, or guaranteed) or grant from the United States, including a provision that each Contractor and Subcontractor shall furnish weekly a statement with respect to the wages paid each employee during the preceding week. The OWNER shall report all suspected or reported violations to the funding agencies.

5. Protection of Lives and Property - In order to protect the lives and health of his employees under the CONTRACT, the CONTRACTOR shall comply with all pertinent provisions of the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc., and shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment or work under the CONTRACT.

The CONTRACTOR alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage which may result from their failure or their improper construction, maintenance or operation.

6. Conflict of Interest - No member of or delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this CONTRACT or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this CONTRACT if made with a corporation for its general benefit.

No official of the OWNER who is authorized in such capacity and on behalf of the OWNER to negotiate, make, accept or approve, or to take part in negotiating, construction or material supply contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in the CONTRACT or in any part thereof. No officer, employee, architect, attorney, engineer, or inspector of or for the OWNER who is authorized in such capacity and on behalf of the OWNER who is in any legislative, executive, supervisory, or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this CONTRACT or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.

7. Partial Payments - Partial Payment estimate forms prepared by the ENGINEER shall be used when estimating periodic payments due the CONTRACTOR.

Computation of quantities that will be the basis for payment estimates, both monthly and final, will be made by the ENGINEER. All payment estimates may be checked and approved by the funding agencies before payment.

Where the computation of areas or volumes by exact geometric methods is unduly laborious or refined, the planimeter shall be held an instrument of precision and may be used in the determination of quantities upon which payments are based.

The measurements of the ENGINEER as to the amount of work done shall be final and conclusive.

Payments shall be made upon the work done within the lines prescribed by the drawings or specifications and in accordance with the unit prices for the items under which the work is done.

To insure the proper performance of the Contract, the OWNER shall retain an amount of each estimate as specified in the General Conditions and/or Supplemental General Conditions.

8. Withholding Payments - The OWNER may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any approved partial payment estimate to such extent as may be necessary to protect the OWNER from loss on account of:

- (a) Defective work not remedied.
- (b) Claims filed or reasonable evidence indicating probable filing of claims.
- (c) Failure of CONTRACTOR to make payments properly to Subcontractors or for material or labor.
- (d) A reasonable doubt that the work can be completed for the balance then unpaid.
- (e) Damage to another CONTRACTOR or the OWNER'S facilities.
- (f) Performance of work in violation of the terms of the CONTRACT DOCUMENTS.
- (g) Where work on unit price items are substantially complete but lack cleanup and/or corrections ordered by the ENGINEER, amounts shall be deducted from unit prices in partial payment estimates to amply cover such clean-up and/or corrections.

When the above grounds are removed, payment shall be made for amounts withheld because of them.

9. Sanitary Facilities - All necessary temporary sanitary facilities shall be provided for by the Prime

Contractor(s) and shall meet with current requirements of the State Environmental Protection Agency. After the completion of the work, all temporary sanitary facilities shall be properly disposed of by the Prime Contractor(s).

10. Final Inspection - Final inspection of the work shall be made for the OWNER by the ENGINEER in collaboration with the Representatives for the funding agencies. Such inspection shall be made as soon as practicable after the CONTRACTOR has notified the OWNER in writing that the work is ready for such inspection.
11. Project Signs – Contract “I-1” – Office Building shall furnish signs as set out in Section 01580 of this Technical Specifications. Location is to be determined by the Engineer at Pre-Construction Conference.
12. Conflicting Requirements - Should conflicting conditions exist within the Specifications, Contract Documents, or Construction Drawings, priorities shall be established as follows:
 - a) Written Contract
 - b) Written Proposal
 - c) Advertisement for Bids
 - d) Instruction to Bidders
 - e) Special Conditions
 - f) General Conditions
 - g) Written Technical Specifications
 - h) Standard Details
 - i) Large Scale Details on Drawings
 - j) General Arrangement Details on Drawings
13. Owner's Right to Award - The OWNER shall retain the right to award or not award any or all of the Contracts covered by these Contract Documents and Specifications.
14. Owner's Right to Increase or Decrease Units - The OWNER shall retain the right to increase or decrease or eliminate up to 20% of any of the units listed in the BID submitted by the

CONTRACTOR as may be required to complete the work at any time concurrent with or following the award of the Contract.

Unit prices previously approved in original bid are acceptable for pricing changes of original bid items. However, when changes in quantities exceed 20 percent of the original bid quantity and the total dollar change of that bid item is significant, the unit price may be reviewed by the OWNER to determine if a new unit price should be negotiated for added work performed after the original contract completion date.

15. Workmen's Compensation and Insurance - Workmen's Compensation: As required by State Statutes - See Supplementary Conditions
 - a) Public Liability and Property Damage Including Vehicular Liability: As listed in General Conditions and Supplementary Conditions.
 - b) Builder's Risk or Installation Floater: Full amount of Contract Price.
16. Wage Rates - All Contractors for this project **DO NOT HAVE TO** comply with **Federal or State codes** as they apply to wages and hours - public works projects.
17. Access to Records - Representatives of the funding agencies and the State D.O.W. shall have access to work whenever it is in preparation or progress. The Comptroller General of the United States, or

any authorized representative, shall have access to any books, documents, papers, and records which are pertinent to the project for the purpose of making audit, examination, excerpts, and transcriptions thereof.

18. Time of Completion and Liquidated Damages –

Contract “I-1” – Office Building shall be completed within **180** calendar days from date of Notice to Proceed.

Liquidated Damages shall be **\$500.00** for each calendar day any Contract remains incomplete after the Time of Contract Completion.

19. Contractor's Obligations - The Contractor shall and will, in good workmanlike manner, do and perform all work and furnish all supplies and materials, machinery, equipment, facilities and means, except as herein otherwise expressly specified, necessary or proper to perform and complete all the work required by this contract, within the time herein specified, in accordance with the provisions of this Contract and said Specifications and in accordance with the plans and drawings covered by this Contract and any and all supplemental plans and drawings, and in accordance with the directions of the ENGINEER as given from time to time during the progress of the work. He shall furnish, erect, maintain, and remove such construction plants and such temporary works as may be required. The CONTRACTOR shall observe, comply with, and be subject to all the terms, conditions, requirements, and limitations of the Contract and Specifications, and shall do, carry on, and complete the entire work to the satisfaction of the ENGINEER and the OWNER.
20. Quantities of Estimate - Whenever the estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of the documents including the BID, they are given for use in comparing bids and the right is especially reserved except as herein otherwise specifically limited, to increase or diminish them as may be deemed reasonably necessary or desirable by the OWNER to complete the work contemplated by this Contract, and such increase or diminution shall not give cause for claims or liability for damages.
21. Liens - Neither the final payment nor any part of the retained percentage shall become due until the Contractor, if required, shall deliver to the OWNER, a complete release of all liens arising out of this Contract or receipt in full in lien thereof, and if required in either case, an affidavit that insofar as he has knowledge or information, the releases and receipts include all the labor and materials for which a lien could be filed; but the Contractor may, if any subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Owner to indemnify him against any lien. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the OWNER all monies that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee.
22. Work Reasonably Inferred But Not Particularly Delineated or Specified - The Contractor shall make a thorough examination of the site and study all drawings and specifications and all conditions relating to the erection of the work, and if any materials or labor are evidently necessary for the proper and complete execution of the work which are not specifically mentioned and included in the drawings and specifications, although reasonably inferred therefrom, unless eliminated by special mention, or if any error or inconsistency appears therein, or in the event of any doubts arising as to the true intent and meaning of the drawings or specifications, he shall report it to the ENGINEER at least five (5) days in advance of receiving the proposals. The ENGINEER will then issue an addendum containing the proper information to all Contractors not later than three (3) days prior to the time for opening of bids, to assure fair competition.

In case the Contractor fails to make such report and the ENGINEER is not otherwise advised of such doubtful matters, the Contractor is hereby made responsible for the furnishing of the necessary labor and material reasonably inferred for any additional work involved in the correction of apparent errors or inconsistencies and in executing the true intent and meaning of the drawings and specifications as interpreted by the ENGINEER, and all such labor and material shall be provided at the Contractor's expense and under no condition will any such labor and material be allowed as an extra.

23. Limit of Liability of Owner to Contractor for Delays, Extra Cost and Damage - If, through no wrongful act or neglect of the OWNER, the Contractor is delayed, stopped, or caused extra cost or damage by injunction, court orders, judgment, or requirements of some other authority or acts beyond the control of the OWNER, he shall not be liable to the Contractor except for extension of time and payments only as reflected in application of quantities, prices, and extra work set forth in these specifications and contract. If sufficient work is otherwise available for application of Contractor's forces, the Owner will not be required to grant extension of time.
24. Requirements for Highway and Railroad Crossings and Rights-of-Way - The specifications herein concerning trenching, pipe laying, jacket pipe crossings, backfilling, maintenance during construction, protection of public, maintaining traffic, tunneling, and re-paving are subject to revision to conform to such requirements as set forth by highway and railroad specifications and such crossings and rights-of-way.
25. Delays and Cost Due to Errors and/or Changes in Lines and Grades - When the OWNER'S engineering forces make errors or changes in lines and grades that cause items of construction to be removed and replaced, the extra cost of such removal and replacement over that of correct construction shall be chargeable as an extra per terms of Article 12 of the General Conditions.

Where the Contractor's forces are delayed only due to ENGINEER'S errors or changes in not more than five in fifty cases of location of points on the whole project, errors and changes will not be above normal to be expected in the execution of the work, and no claims for extra cost due to such delay will be granted. Layout work is considered a normal portion of a construction operation in which it is considered impractical to prevent delays of some of the required labor and equipment while others are performing their portion of the operation. Excessive delay due to such causes shall be chargeable as extra work per terms of Article 12 of the General Conditions. However, to be allowable, time, labor, and equipment delayed must be reported to and approved by the ENGINEER within 24 hours. Labor and equipment must have been applied at the time of stoppage and could not have been applied to other incomplete work during the stoppage.

26. Licenses and Permits - The Owner will secure and pay for permits required for permanent structures and State Highway Encroachment Bonds. The Contractor shall obtain and pay for all other necessary licenses and permits and shall faithfully comply with all laws, ordinances and regulations, Federal, State, or local, which may be applicable to the operations to be conducted hereunder.
27. Conflict With or Damage to Existing Utilities - Insofar as location data is available to the ENGINEER, existing underground utilities (such as water lines, sewer lines, natural gas lines, and underground telephone and electrical conduits) are located on the drawings. However, due to the approximate nature of such data and information, the locations of any particular utility cannot be certified as being correct. In general, locations and elevations are approximate only. The Contractor shall obtain the services of representatives of each of the utilities involved during construction to assist in the location of existing utilities. Lines and grades of lines have been established to minimize interference with utilities as far as possible. However, it shall be the responsibility of the Contractor to determine any relocations necessary for his performance of

the contract, and to pay any fees associated therewith, with no additional cost or liabilities to the OWNER.

28. Shop or Setting Drawings - See Section 01300 of Technical Specifications for further detail. Submittals **must** meet all submittal requirements set out therein or they will be returned to Contractor.
29. Work Hours Beyond Regular Hours - The Contractor shall notify the ENGINEER in writing of any scheduled work beyond regular and normal working hours at least 48 hours in advance of the work. Work performed after regular working hours and without notice to the ENGINEER, shall be considered not in conformance with the Plans and Specifications and may be removed or not paid for.
30. Excavation - All excavation shall be considered unclassified. **Rock excavation is not a separate pay item**, and shall not be cause for claim of additional compensation due to the Contractor.
31. Air and Water Acts - If the contract exceeds \$100,000 the Contractor agrees to comply with all the requirements of Section 114 of the Air Act (41 U.S.C., Section 1857 C-9) and Section 308 of the Water Act (33 U.S.C., Section 1318) relating to inspection, monitoring, entry, reports, and information, as well as all other requirements specified in Section 114 of the Air Act and Section 308 of the Water Act and all regulations (40CFR 15.4) and guidelines issued thereunder after the award of the contract. In so doing, the Contractor further agrees to:
- a) As a condition for the Award of Contract, to notify the OWNER of the receipt of any communication from the Environmental Protection Agency (EPA) indicating that a facility to be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities. Prompt notification is required prior to contract award.
 - b) The Contractor will include, or cause to be included, the above criteria and requirements in every nonexempt subcontract and that he will take such action as the Government may direct as a means of enforcing such provisions.
 - c) To certify that any facility to be utilized in the performance of any nonexempt contractor is not listed on the EPA List of Violating Facilities pursuant to 40 CFR 15.20 as of the date of contract award.
32. Subcontracting - The following is in addition to and in conjunction with Article 6 of the General Conditions.

Prior to the execution and delivery of the Agreement, the successful Bidder will submit to the OWNER and the ENGINEER for acceptance a list of the names of Subcontractors and such other persons and organizations (including those who are to furnish materials or equipment fabricated to a special design) proposed for those portions of the Work as to which the identity of the Subcontractors and other persons and organizations must be submitted as specified in the Contract Documents. Prior to the execution and delivery of the Agreement, the ENGINEER will notify the successful Bidder in writing if either the OWNER or the ENGINEER, after due investigation, has reasonable objection to any Subcontractor, person or organization on such list. The failure of the OWNER or the ENGINEER to make objection to any Subcontractor, person or organization on the list prior to the execution and delivery of the Agreement shall constitute an acceptance of such Subcontractor, person or organization. Acceptance of any such Subcontractor, person or organization shall not constitute a waiver of any right of the OWNER or the ENGINEER to reject defective Work, material or equipment, not in conformance with the requirements of the Contract Documents.

If, prior to the execution and delivery of the Agreement, the OWNER or the ENGINEER has reasonable objection to and refuses to accept any Subcontractor, person or organization on such list, the successful Bidder may, prior to such execution and delivery, either (a) submit an acceptable substitute without an increase in his Bid Price or (b) withdraw his Bid and forfeit his Bid security. If, after the execution and delivery of the Agreement, the OWNER or the ENGINEER refuses to accept any Subcontractor, person or organization on such list, the CONTRACTOR will submit an acceptable substitute and the Contract Price shall be increased or decreased by the difference in cost occasioned by such substitution and appropriate Change Order shall be issued; however, no such increase in the Contract Price shall be allowed in respect of any substitutions unless the CONTRACTOR has acted promptly and reasonably in submitting a name with respect thereto prior to the execution and delivery of the Agreement.

The CONTRACTOR will not employ any Subcontractor (whether initially or as a substitute) against whom the OWNER or the ENGINEER may have reasonable objection, nor will the CONTRACTOR be required to employ any Subcontractor against whom he has reasonable objection. The CONTRACTOR will not make any substitution for any Subcontractor who has been accepted by the OWNER and the ENGINEER, unless the ENGINEER determines that there is good cause for doing so.

The divisions and sections of the Specifications and the identifications of any drawings shall not control the Contractor in dividing the Work among Subcontractors or delineating the Work to be performed by any trade.

The CONTRACTOR agrees to specifically bind every Subcontractor to all of the applicable terms and conditions of the Contract Documents. Every Subcontractor, by undertaking to perform any of the Work, will thereby automatically be deemed to be bound by such terms and conditions.

All Work performed for the CONTRACTOR by a Subcontractor shall be pursuant to an appropriate agreement between the CONTRACTOR and the Subcontractor which shall contain provisions that waive all rights the contracting parties may have against one another for damages caused by fire or other perils covered by insurance provided in accordance with the General Conditions; except such rights as they may have to the proceeds of such insurance held by the OWNER as trustee under the General Conditions. The CONTRACTOR will pay each Subcontractor a just share of any insurance moneys received by the CONTRACTOR under the General Conditions.

33. Materials, Equipment and Labor; Substitute Material or Equipment - The following is in addition to and in conjunction with Article 6 of the General Conditions.

All materials and equipment will be new. If required by the ENGINEER, the CONTRACTOR will furnish satisfactory evidence as to the kind and quality of materials and equipment.

If it is indicated in the Specifications that the CONTRACTOR may furnish or use a substitute that is equal to any material or equipment specified, and if the CONTRACTOR wishes to furnish or use a proposed substitute, he will, promptly after the award of the contract, make written application to the ENGINEER for approval of such a substitute certifying in writing that the proposed substitute will perform adequately the duties imposed by the general design, be similar and of equal substance to that specified by the general design, be similar and of equal substance to that specified and be suited to the same use and capable of performing the same function as that specified. No substitute shall be ordered or installed without the written approval of the ENGINEER who shall be the judge of equality.

34. Availability of Lands, Physical and Subsurface Conditions; Reference Points - The following is in

addition to and in conjunction with Article 4 of the General Conditions.

The OWNER will provide, as indicated in the Contract Documents and not later than the date when needed by the CONTRACTOR, the lands upon which the Work is to be done, rights-of-way for access thereto, and such other lands which are designated for the use of the CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be secured and paid for by the OWNER, unless otherwise specified in the Contract Documents. If the CONTRACTOR believes that any delay in the OWNER'S furnishing these lands or providing such easements entitles him to an extension of the Contract Time, he may make a claim therefore as provided in the General Conditions. The CONTRACTOR will provide all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

The OWNER will, upon request, furnish to the CONTRACTOR copies of all available boundary surveys and subsurface tests.

The CONTRACTOR will promptly notify the OWNER and ENGINEER in writing of any subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents. The ENGINEER will promptly investigate those conditions and advise the OWNER in writing if further surveys or subsurface tests are necessary. Promptly thereafter, the OWNER will obtain the necessary additional surveys and tests and furnish copies to the ENGINEER and the CONTRACTOR. If the ENGINEER finds that the results of such surveys or tests indicate subsurface or latent physical conditions differing significantly from those indicated in the Contract Documents, a Change Order shall be issued incorporating the necessary revisions.

The OWNER will establish such general reference points as in his judgment will enable the CONTRACTOR to proceed with the Work. The CONTRACTOR will be responsible for the layout of the Work and will protect and preserve the established reference points and will make no changes or relocations without the prior written approval of the OWNER. He will report to the ENGINEER whenever any reference point is lost or destroyed or requires relocation because of

necessary changes in grades or locations. The CONTRACTOR will replace and accurately relocate all reference points so lost, destroyed or moved.

35. Substantial Completion - Prior to final payment, the CONTRACTOR shall, in writing to the OWNER and the ENGINEER, certify that the entire Project is substantially complete and request that the ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, the OWNER, CONTRACTOR AND ENGINEER will make an inspection of the Project to determine the status of completion. If the ENGINEER considers the Project substantially complete, he will prepare and deliver to the OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion and the responsibilities between the OWNER and the CONTRACTOR for maintenance, heat and utilities. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment, and the certificate shall fix the time within which such items shall be completed or corrected, said time to be within the Contract Time. The OWNER shall have seven days after receipt of the tentative certificate during which he shall make written objection to the ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, the ENGINEER concludes that the Project is not substantially complete, he shall notify the CONTRACTOR in writing, stating his reasons therefore. If, after said seven days and after consideration of the OWNER'S objections, the ENGINEER considers the Project substantially complete, he will execute and deliver to the OWNER and the 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 he believes justified after consideration of any objections

from the OWNER.

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

36. Cleaning Up - The CONTRACTOR will keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work, and at the completion of the Work he will remove all waste materials, rubbish and debris from and about the premises as well as tools, construction equipment and machinery, and surplus materials, and will leave the site clean and ready for occupancy by the OWNER. The CONTRACTOR will restore to their original condition those portions of the site not designated for alteration by the Contract Documents. Also see paragraph 7 of these Special Conditions pertaining to clean-up.

37. Miscellaneous - Whenever any provisions of the Contract Documents requires the giving of written notice it shall 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 him who gives the notice.

The duties and obligations imposed by the General Conditions and the rights and remedies available hereunder, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon the CONTRACTOR and the rights and remedies available to the OWNER and ENGINEER thereunder, shall be in addition to and not a limitation of any otherwise imposed or available by law, by special guarantee or other provisions of the Contract Documents.

Should the OWNER or the CONTRACTOR suffer injury or damage to its person or property because of any error, omission or act of the other or of any of his employees or agents or others for whose acts he is legally liable, claim shall be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The Contract Documents shall be governed by the law of the place of the Project.

38. Safety and Health Regulations - The Contractor shall comply with the Department of Labor Safety and Health Act of 1970 (P.L. 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (P.L. 91-54).

39. Siltation and Soil Erosion - The Contractor shall make every effort possible to assure a minimum amount of siltation and erosion will occur on the job site during construction.

40. Permanent Reference Points, Bench Marks, and Property Markers - The CONTRACTOR alone will be responsible for the protection and preservation of all permanent reference points, permanent bench marks, property corners, and property line points. The CONTRACTOR will make no changes or relocations without the written approval from the OWNER. The CONTRACTOR will report to the ENGINEER whenever any reference point, etc., is lost, damaged or destroyed or requires relocation and/or establishment of temporary points for relocation of said permanent point. The CONTRACTOR will have a registered land surveyor replace and accurately relocate all permanent points so lost, damaged, destroyed, or moved. The re-establishment of any said point shall be considered incidental to the cost of construction and therefore at no additional cost to the OWNER.

41. Existing Utilities - Also see Technical Specifications, Section 02220. Special precautions shall be taken by the Contractor to avoid damage to existing overhead and underground utilities owned and operated by the Owner or by public or private utility companies.

The available information concerning the location of existing underground utilities is shown on the Drawings. While it is believed that the locations shown are reasonably correct, neither the Engineer nor the Owner can guarantee the accuracy or adequacy of this information.

Before proceeding with the Work, the Contractor shall confer with all public or private companies, agencies, or departments that own and operate utilities in the vicinity of the Construction Work. The purpose of the conference, or conferences, shall be to notify said companies, agencies, or departments of the proposed construction schedule, verify the location of and possible interference with the existing utilities that are shown on the Drawings, arrange for necessary suspension of service, and make arrangements to locate and avoid interference with all utilities (including house connections) that are not shown on the Drawings. The Engineer and Owner have no objection to the Contractor arranging for the said utility companies, agencies, or departments to locate and uncover their own utilities; however, the Contractor shall bear the entire responsibility and cost for locating and avoiding, or repairing damage to said existing utilities.

Where existing utilities or appurtenant structures, either underground or above-ground, are encountered, they shall not be displaced or disturbed unless necessary, and in such case shall be replaced in as good or better condition than found as quickly as possible. Relocation and/or replacement of all utilities and appurtenant structures to accommodate the construction work shall be at the Contractor's expense, unless such relocation and/or replacement is by statute or agreement the responsibility of the owner of the utility.

Where a sewer line is to be installed within 18 inches vertically or 10 feet horizontally of a water line, that section of the sewer line shall be encased in concrete, according to the requirements of Paragraph 3.10 B, Section 02700.

A list of the utility companies which service the project area are on the cover sheet of the drawings. The utilities are not limited to those on said list.

42. Coordination - All Contractors are advised that various Contracts will be awarded simultaneously with their Contracts. It is imperative that the various Contractors coordinate its activities and cooperate with the other Contractors to assure expedient completion of the Project. Any conflicts should be brought to the attention of the Engineer.
43. **USDA Rus-KY Bulletin 1780-2 Guidance for Implementation of American Iron & Steel (AIS)**
- 21 Pages and Exhibits.

UNITED STATES DEPARTMENT OF AGRICULTURE
Rural Utilities Service
KENTUCKY BULLETIN 1780-2

SUBJECT: Guidance for Implementation of American Iron and Steel (AIS).

TO: Applicants, Consulting Engineers, Contractors, and Manufacturers

EFFECTIVE DATE: Date of approval.

INSTRUCTIONS: This is a new Bulletin and does not replace any existing Kentucky Bulletin.

AVAILABILITY: This Bulletin, as well as any RD or RUS instructions, regulations, or forms referenced in this Bulletin are available at any RD State Office or Area Office. The State Office staff is familiar with the use of the documents and can answer specific questions or RD requirements.

The basic concept of this new requirement is that all iron and steel products used in projects funded by RUS WEP must be produced in the United States. Iron and steel products are defined on page 14 of this Bulletin.

PURPOSE: This Bulletin provides information and guidance to effected parties regarding the AIS Requirements mandated by Section 746 of Title VII Consolidated Appropriations Act of 2017 (Division A-Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statues mandating domestic preference.



Julie Anderson
State Engineer
Water and Environmental Programs

April 13th, 2018
Date

TABLE OF CONTENTS

1.	BACKGROUND.....	3
2.	APPLICABILITY.....	3
3.	IMPLEMENTATION.....	4
4.	OWNER RESPONSIBILITIES.....	5
5.	ENGINEER RESPONSIBILITIES.....	5
6.	CONTRACTOR RESPONSIBILITIES.....	6
7.	MANUFACTURER, SUPPLIER, DISTRIBUTOR RESPONSIBILITIES.....	7
8.	RESPONSIBILITIES UNDER THE GUARANTEED LOAN PROGRAM.....	8
9.	ECWAG.....	8
10.	AGREEMENT BETWEEN OWNER & ENGINEER (E-500).....	8
11.	BIDDING AND CONSTRUCTION CONTRACT DOCUMENTS (EJCDC C-SERIES, 2013).....	10
12.	PURCHASE OF EQUIPMENT AND MATERIALS.....	17
13.	WAIVER PROCESS.....	17
14.	MONITORING.....	19
15.	NON-COMPLIANCE.....	19
16.	INTERNATIONAL AGREEMENTS.....	20
17.	USE OF EXHIBITS.....	20

1. BACKGROUND

- A. Section 746 of Title VII Consolidated Appropriations Act of 2017 (Division A- Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statues mandating domestic preference. It applies a new American Iron and Steel (AIS) requirement on the Rural Development (RD) WEP program.
- B. Statutory Language: SEC 746 Division A Title VII the Consolidated Appropriations Act of 2017.
(1) No Federal funds made available for this fiscal year for the rural water, waste water, waste disposal, and solid waste management programs authorized by sections 306, 306A, 306C, 306D, and 310B of the Consolidated Farm and Rural Development Act (7 USC 1926 et seq.) shall be used for a project for the construction, alteration, maintenance, or repair of a public water or wastewater system unless all of the iron and steel products used in the project are produced in the United States.
(2) In this section, the term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipe flanges, manhole covers, and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

2. APPLICABILITY

- A. The requirements of AIS apply only to projects that construct, alter, enlarge, extend, maintain, repair or otherwise improve rural water, sanitary sewage, solid waste disposal, and storm wastewater disposal facilities.
- B. The requirements apply to projects using funds from RD WEP. Any amount of funding from this program requires compliance with the AIS requirements. Use of funds from this program is not allowed unless the requirements for AIS are met for the entire project. Projects that leverage funds from other funding sources are also subject to the requirements.
- C. The requirements apply in the United States as defined in Section 746 (g) of the statute and therefore do not apply to projects located in Puerto Rico, the Virgin Islands, or Western Pacific Territories.
- D. The requirements apply to any used iron and steel products to be constructed in the project.
- E. The requirements do not apply to projects for which any funds were obligated on or before May 5, 2017. The requirements therefore do not apply to subsequent obligation of funds for projects which had an initial obligation of funds on or before May 5, 2017.
- F. The requirements do not apply to contracts which were executed prior to or on May 5, 2017, regardless of date of obligation.

- G. The requirements do not apply to projects for which contracts were executed and/or construction is already underway and/or completed prior to applying to USDA for funding.
 - H. The requirements do not apply to products primarily composed of iron and/or steel (composed of more than 50%) if they are not listed in the statute.
 - I. The requirements do not apply to raw materials used in the production of iron or steel such as iron ore, limestone, scrap iron and scrap steel.
 - J. The requirements do not apply to any items that are at the construction site temporarily, such as scaffolding, trench boxes, and equipment temporarily used or stored on site.
 - K. The requirements do not apply when the sole purpose of the loan and/or grant is to fund non-construction activities such as capacity/connection fees or the acquisition of a system.
 - L. The requirements supersede any regulation on full and open competition stated in 7 CFR 1780.70 (b) and 2 CFR Part 200.319. For example, if an iron and steel product that is compliant with AIS is made by only one manufacturer, provided documentation is submitted and verified, sole source procurement of said product may be used.
 - M. The requirements only apply to the final product as delivered to the work site and incorporated into the project. The need for compliance of an item with AIS depends on whether or not the final assembled product is listed. Components of a final product, even if they are listed, do not need to comply with the AIS requirements. In the case of an assembled product where the primary component is not listed in the 2017 Consolidated Appropriations Act and includes components/appurtenances that are specifically listed, said assembled product is not subject to AIS (e.g. pump assembly).
3. IMPLEMENTATION (Agency, Owner, Engineer, Contractor, manufacturer's et al)
- A. There are several parties involved in compliance with the AIS requirement and some requirements are specific to a party.
 - B. The parties that have one or more responsibilities under AIS include: the Agency funding recipients under the Water and Waste Disposal Loan and Grant program and Guaranteed Loan Program, consulting engineers, construction contractors, suppliers, distributors, manufacturers; lenders under the Guaranteed Loan Program; and grantees under 306C and ECWAG programs.

4. OWNER RESPONSIBILITIES:

- A. Sign loan resolutions, grant agreements and letters of intent to meet conditions which include AIS language, accepting AIS requirements in those documents and in the letter of conditions.
- B. Sign Agreement for Engineering Services, executed construction contracts and all other appropriate and necessary documents which include AIS language.
- C. Acknowledge responsibility for compliance with AIS requirements by signing change orders (i.e. C-941 of EJCDC or RD Form 1924-7) and partial payment estimates (i.e. C-602 of EJCDC or RD Form 1924-18).
- D. Obtain the certification letters from the Engineer once substantial completion has been achieved and maintain this documentation for the life of the loan.
- E. In special cases where the Owner provides its' own engineering and/or construction services, provide copies of Engineer's Certification Letter (Exhibit B) and Contractor's Certification Letter (Exhibit C) to the Agency. Manufacturer's Certification Letter (Exhibit D) must be obtained by the Owner for each AIS qualifying product. All certification letters must be kept in the Engineer's project file and on site during construction. For Owner Construction (Force Account), all AIS clauses from Section 11 must be included in the Agreement for Engineering Services.

5. ENGINEER RESPONSIBILITIES

- A. Costs of compliance with AIS should be included in the engineering fees (if appropriate) and in Engineer's opinions of probable project costs.
- B. Develop the initial AIS Materials List (Exhibit J) for each contract using project specifications and include the initial qualifying list with the bid documents. An excel version that will compute all totals can be obtained from the RD State Office that can be used as a working copy.
- C. Include AIS language (Section 11) in the Agreement for Engineering Services.
- D. Plans, specifications, bidding documents and bid addenda must include required AIS language (Section 12). For any AIS products specified by brand names, obtain a Manufacturer's Certification Letter (Exhibit D) from the manufacturer to verify the products comply with AIS.
- E. Certify that plans, specifications, and bidding documents comply with AIS and commit that bid addenda, executed contracts and change orders will comply with AIS and submit Engineer's Certification Letter (Exhibit B) to the Agency prior to authorization to advertise for bids.

- F. Provide a copy of the Manufacturer's Certification Letter (Exhibit D) on any specified brand name AIS products in the plans, specifications and bidding documents including any bid addenda to the Contractor.
 - G. Coordinate with the Contractor(s) to compile a complete AIS Materials List (Exhibit J) for each contract, sign and date, and provide a copy to the Agency in the construction contract(s).
 - H. Review shop drawings and change orders to ensure compliance with AIS. For shop drawings under consideration for any brand name, equal and/or substitute, any iron and steel products subject to AIS, obtain the Manufacturer's Certification Letter (Exhibit D) from the Contractor to verify the products comply with AIS.
 - I. Keep all certification letters (including those from the Engineer, Contractor, and any manufacturer providing AIS products) in the Engineer's project file.
 - J. Review AIS Materials List (Exhibit J) submitted with each invoice to verify accuracy and sign and date.
 - K. For any change order under consideration for any AIS products, obtain a Manufacturer's Certification Letter (Exhibit D) from party submitting the change proposal to ensure compliance with AIS.
 - L. Acknowledge responsibility for compliance with AIS requirements by signing change orders (i.e. C-941 of EJCDC or RD Form 1927-7) and partial pay estimates (i.e. C-620 of EJCDC or RD Form 1924-18).
 - M. Upon substantial completion of project, obtain the Contractor's Certification Letter (Exhibit C) and a complete and final AIS Materials List (Exhibit J) to submit to the RD State Engineer. Obtain copies of any/all manufacturers' certification letters for all AIS products used in the project to be kept in the Owner's project file.
 - N. Resident project representative (RPR) reports must include verification, either by picture or written statement, that an item subject to AIS was installed and was in compliance with requirements.
6. **CONTRACTOR RESPONSIBILITIES**
- A. Review the Engineer's AIS Materials List (Exhibit J) prior to bid preparation.
 - B. Bid submittal with a request for consideration from a proposed equal or substitute should also include a Manufacturer's Certification Letter (see Exhibit D) to verify the products comply with AIS.
 - C. Upon award of the contract, obtain copies of any and all manufacturers' certification letters from the Engineer for brand name products specified by the Engineer.

- D. Work with the Engineer to compile a complete AIS Materials List (Exhibit J) for each contract as bid.
- E. Shop drawing submittals for proposed equals, substitutes, and any iron and steel product subject to AIS, provide a Manufacturer's Certification Letter (Exhibit D) to verify the product complies with AIS.
- F. Prior to construction, ensure that copies of any and all manufacturers' certification letters, including those from others (e.g. Engineer, Owner, etc.), for any AIS products to be used in the project are in the project file on site prior to installation.
- G. Pay request must have an updated AIS Materials List (Exhibit J) submitted with each pay request. All columns must be filled out completely as applicable. Do not complete columns under "De Minimis Materials Only" for qualifying materials. Sign and date. An excel version that will compute all totals can be obtained from the RD State Office that can be used as a working copy.
- H. Change orders for any AIS products must include a Manufacturer's Certification Letter (Exhibit D) to the Engineer to verify the products comply with AIS.
- I. Acknowledge responsibility for compliance with AIS requirement by signing change orders (i.e. C-941 of EJCDC or RD Form 1924-7) and partial pay estimates (C-620 of EJCDC or RD Form 1924-18).
- J. Keep all manufacturer certification letters (including those from the Engineer, Contractor and any manufacturer providing AIS products) on site during construction in the construction project file.
- K. Upon substantial completion of the project, provide Contractor's Certification Letter (Exhibit C) to the Engineer that all iron and steel products installed comply with AIS

7. MANUFACTURER, SUPPLIER, DISTRIBUTOR RESPONSIBILITIES

- A. If iron and steel products are produced in the United States as defined in this Bulletin, prepare (applicable to manufacturers and fabricators) or obtain (applicable to suppliers, distributors, vendors, etc.) Manufacturer's Certification Letters (Exhibit D) and make available upon request to Engineer, Contractor, etc.

8. RESPONSIBILITIES UNDER THE GUARANTEED LOAN PROGRAM

AIS applies to projects funded by Section 306A- Guaranteed Loan Program

- A. Lenders are responsible to ensure that loan recipients comply with AIS requirements.
- B. Loan recipients are ultimately responsible for compliance with AIS requirements.

9. ECWAG

- A. If construction contracts were awarded and/or executed or construction began prior to application, these projects are not subject to AIS (Section 2).
- B. If construction contracts were awarded and/or executed or construction began during the application process, these projects are subject to AIS.

10. AGREEMENT BETWEEN OWNER AND ENGINEER (EJCDC E-500) PROVISIONS

- A. Article 5.01.A: Add the following "Opinions of probable cost and any revisions thereof should reflect compliance with American Iron and Steel (AIS) requirements mandated in the Consolidated Appropriations Act of 2017 and any subsequent mandating domestic preferences."
- B. Add paragraph 5.03.B: "Opinions of total project cost and any revisions thereof should reflect compliance with AIS and any subsequent statutes mandating domestic preference."
- C. Add paragraph A.1.03.A.13: "Services required to determine and certify that to the best of the Engineer's knowledge and belief that all iron and steel products referenced in engineering analysis, the plans, specifications, bidding documents, and associated bid addenda requiring design revisions are either produced in the US or are subject to approved waiver. Services required to determine to the best of the Engineer's knowledge and belief that approved substitutes, equals, and all iron and steel products proposed in the shop drawings, change orders and partial payment estimates are either produced in the US, or are subject of an approved waiver. The de minimis and minor components waiver {add project specific waivers if applicable} apply to this contract."
- D. Add paragraph A.1.04.A.10: "Provide copies of all manufacturers' certification letters to the Bidders on brand name iron and steel products along with plans, specifications and bidding documents. Manufacturers' certification letters are to be included in the bidding documents and must be kept in the Engineer's project file and in site during construction."
- E. Add paragraph A.1.04.11: "Provide copies of all manufacturers' certification letters to the Contractor on any brand name iron and steel products along with the plans, specifications, bidding documents. Including any bid addenda and change orders. Manufacturers' certification letters must be kept in the Engineer's project file for the duration of construction."
- F. Add paragraph A.1.04.12: "Develop AIS Materials list (Exhibit J) for bidding purposes and finalize with the Contractor for tracking. Review updated AIS Materials list for accuracy each month and include in each pay request. An excel version that will compute all totals can be obtained from the RD State Office that can be used as a working copy."

- G. **Modify A.1.05.A.17: Add the following prior to the first sentence "Review and approve, or take other appropriate action, with respect to shop drawings, samples, and other required Contractor submittals to ensure compliance with AIS requirements and any subsequent statutes mandating domestic preference. Any iron and steel products included in any submittal by the Contractor, must include the Manufacturer's Certification Letter (Exhibit D) to verify the products were produced in the U.S. Copies of these letters must be kept in the Engineer's project file and on site during construction."**
- H. **Article A.1.05.A.18: Add the following at the end of the paragraph as amended by Kentucky Bulletin 1780-1 "Prior to approval of any substitute "or equal" obtain the Manufacturer's Certification Letter (Exhibit D) to verify the products were produced in the U.S. Manufacturers' certification letters must be kept in Engineer's project file and on site during construction to ensure compliance with AIS requirements and any subsequent statutes mandating domestic preference, if applicable."**
- I. **Add subparagraph A.1.05.A.19.d: "Receive and review all manufacturers' certification letters for materials required to comply with AIS and any subsequent statutes mandating domestic preference to verify the products were procured in the U.S. Manufacturers' certification letters must be kept in the Engineer's project file on site during construction."**
- J. **Add subparagraph (c) to the end of A.1.05.A.20: (c) Review change proposals to ensure compliance with AIS requirements and any subsequent statutes mandating domestic preference."**
- K. **Add item "a" as a deliverable under paragraph A.1.05.A.25: (s) Obtain the Contractor's Certification Letter (Exhibit C) and copies of manufacturers' certification letters for all AIS used in the project. Upon substantial completion, provide copies of Engineer's, Contractor's, and all manufacturers' certification letters to the Owner. Attach Contractor's Certification Letter (Exhibit C) and a final AIS Materials List (Exhibit J) with letter of substantial completion and submit it to the Agency."**
- L. **Add the following language to B.2.02: "Owners are ultimately responsible for compliance with AIS and any subsequent statutes mandating domestic preference and will be responsible for the following:**
 - 1. **Signing loan resolutions, grant agreements and letter of intent to meet conditions which include AIS language, accepting AIS requirements in those documents and in the letter of conditions.**
 - 2. **Signing change orders (i.e. C-941 of EJCDC or RD Form 1924-7) and partial pay estimates (C-620 of EJCDC or RD Form 1924-18) and thereby acknowledging responsibility for compliance with AIS requirements.**
 - 3. **Obtaining all certification letters from the Engineer upon substantial completion of the project and maintaining this documentation for the life of the loan.**

4. Where the Owner provides their own engineering and/or construction services, provide copies of Engineer's, and Contractor's certification letters to the Agency, and obtain all manufacturers' certification letters as required. All certification letters must be kept in the Engineer's project file and on site during construction. For Owner Construction (Force Account), all clauses from Section 11 must be included in the Agreement or Engineering Services.
 5. Where the Owner directly procures AIS products, including AIS clauses in the procurement contracts and obtaining manufacturers' certification letters and providing copies to consulting engineers and contractors.
- M. Add subparagraph D.1.01.C.11.g: "(g) Maintain all manufacturers' certification letters in the project file and on site during construction to ensure compliance with AIS requirements and any subsequent statutes mandating domestic preference, as applicable."
- N. Add the following at the end of D.1.01.c.11b: Daily reports should document installation of an AIS material and verify by picture or statement on the report that the manufacturer was the same as that listed on the AIS materials list and complied with AIS requirements.
11. **BIDDING AND CONSTRUCTION CONTRACT DOCUMENTS (EJCDC C-SERIES, 2013)**
- A. **Advertisement for Bids (C-111)**
Add at the end of C-111 prior to the Owner's name: "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 applies to American Iron and Steel requirement to this project. All listed iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron and steel: lines 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. The de minimis and minor components waiver {all project specific waivers as applicable} apply to this contract."
 - B. **Instruction to Bidders (C-200)**
 1. Article 5.01.C: Delete the semicolon at the end of the article and insert the following "included but not limited to the AIS requirements as mandated and any 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.
 2. Article 11.01: Modify article as previously amended by Kentucky Bulletin 1780-1 by inserting the following sentence after "Each such request shall comply with the requirements of Paragraphs 7.04 and 7.05 of the General Conditions. Each such request shall include the Manufacturer's Certification Letter (Exhibit D) for compliance with AIS requirements and any subsequent statutes mandating domestic preference, if applicable.

3. **Article 24.02:** Add paragraph 24.02:Section 746 of Title VII Consolidated Appropriations Act of 2017 (Division A- Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and any subsequent statues mandating domestic preference applies an American Iron and Steel requirement to this project. All iron and steel products used in this project must be procured in the United States. "Iron and Steel Products" is defined in Section 1.b.2. The de minimis and minor components waivers (add project specific waivers as applicable) apply to this contract."
- C. Bid Form (C-410)**
1. **Article 3.01.C:** Add language at the end of the sentence "...and including all AIS requirements.
 2. **Article 7.01:** Add 7.01.K "Manufacturer's Certification Letter (Exhibit D) on any approved "or equal" or substitute request to ensure compliance with AIS requirements and any subsequent statues mandating domestic preference.
- D. Supplementary General Conditions (C-800)**
1. **SC 1.01.A.51:** "Manufacture's Certification Letter (Exhibit D) is documentation provided by the manufacturer, supplier, distributor, vendor, fabricator, etc. to various entities stating that the AIS products to be used in the project are produced in the U.S. in accordance with the AIS requirements.
 2. **SC 1.01.A.52:** "AIS refers to requirements mandated by Section 746 Title VII of the Consolidated Appropriation s Act of 2017 and any subsequent statutes mandating domestic preference. "Iron and Steel Products" is defined in Section 1.b.2.
 3. **SC 7.03:** Add sentence "all iron and steel must meet AIS requirements.
 4. **SC 7.04.B.1:** "Contractor shall include the Manufacturer's Certification Letter (Exhibit D) for compliance with AIS requirements to support data, if applicable. In addition, Contractor shall maintain an updated AIS Materials List (Exhibit J), to ensure that for de minimis waiver, cost is less than 5% of total materials cost for project and for minor components waiver, the cost of the non-domestically produced component is less than 5% of the total materials cost of the product." An excel version that will compute all totals can be obtained from the RD State Office that can be used as a working copy.
 5. **SC 7.05.A.3.a4:** "4) comply with AIS by providing the Manufacturer's Certification Letter (Exhibit D), if applicable.
 6. **SC 7.11.A:** Modify by inserting the following after "written interpretations and clarifications,"; "Manufacturer's Certification Letter (Exhibit D) is documentation provided by the manufacturer, supplier, distributor, vendor, fabricator, etc. to various entities stating that the iron and steel products to be used in the project are produced in the U.S. in accordance with AIS requirements.
 7. **SC 7.16.A.1.e:** "e. obtain the Manufacturer's Certification Letter (Exhibit D) for any item in the submittal subject to AIS requirements and include the certificate in the submittal.
 8. **SC 7.16.D.9:** "Engineer's review and approval of shop drawings or sample shall include review of compliance with AIS requirements, as applicable."

9. SC 7.17.E: "Contractor shall certify upon substantial completion that all work and materials has complied with AIS requirements as mandated and any subsequent statutes mandating domestic preference. Contractor shall provide Contractor's Certification Letter (Exhibit C) to Owner.
10. SC 10.10.A: "A: Services required to determine and certify that, to the best of the Engineer's knowledge and belief, all iron and steel products referenced in the engineering analysis, the plans, specifications, bidding documents, and associated bid addenda requiring design revisions are either produced in the U.S. or are the subject of an approved waiver. Services required to determine, to the best of the Engineer's knowledge and belief, that approved substitutes, equals, and all iron and steel products proposed in the shop drawings, change orders, and partial pay estimates are either produced in the U.S. or are the subject of an approved waiver under the Consolidate Appropriations Act of 2017.
11. SC 11.06.A.1: Modify by inserting the following sentence after "within 15 days after the submittal of the change proposal..." "Include supporting data (project name, name of manufacturer, city and state where the product was manufactured, description of product, signature of authorized manufacturer's representative) in the Manufacturer's Certification Letter (Exhibit D), as applicable."
12. SC 14.03G: Installation of materials that are non-compliant with AIS requirements shall be considered defective work.
13. SC 15.01.B.4: "4. By submitting materials for payment, Contractor is certifying that the submitted materials are compliant with AIS requirements. Manufacturers' Certification letter for Materials satisfy this certification. Refer to Manufacturer's Certification Letter provided in these Contract Documents.
14. SC 15.01.D.2: An updated AIS Materials List (See Exhibit J) included in these contract documents must be dated and signed and submitted with each pay request prior to payment being authorized. An excel version that will compute all totals can be obtained from the RD State Office that can be used as a working copy.
15. SC 15.01.C.2d: "d. The materials presented for payment comply with AIS requirements.
16. SC 15.03.A: Modify by adding the following "Services required to determine and certify that, to the best of the Contractor's knowledge and belief, all substitutes, equals, and iron and steel products proposed in the shop drawings, change orders, and partial payment estimates are produced in the U.S. or are the subject of an approved waiver. Services required to certify that, to the best of the Contractor's knowledge, all those products installed for the project are either produced in the U.S. or are the subject of an approved waiver.
17. SC19.14: 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 any subsequent statutes mandating domestic preference applies in AIS requirement to this project. All iron and steel products used in this project must be produced in the U.S. The term "iron and steel products" is defined in Section 1.b.2. The de minimis and minor components waivers {add project specific waivers as applicable} apply to this contract."

18. SC 19.15: add Definitions:

"Assistance recipient" is the entity that received funding assistance from programs required to comply with AIS requirements in the Consolidated Appropriations Act of 2017 and any subsequent statutes mandating domestic preference. This term includes owner and/or applicant.

"Certifications" means the following:

- *Manufacturers'* certification is the documentation provided by the manufacturer or fabricator to various entities stating that the iron and steel products to be used in the project are produced in the U.S. in accordance with AIS requirements. If items are purchased via a supplier, distributor, vendor, etc. vs. direct from the manufacturer or fabricator directly, then the supplier, distributor, vendor, etc. will be responsible for obtaining and providing these certification letters to the parties purchasing the product.
- *Engineer's* certification is documentation that plans, specifications, and bidding documents comply with AIS.
- *Contractors'* certification is documentation submitted upon substantial completion of the project that all iron and steel products installed were produced in the U.S.

"Coating" means a covering that is applied to the surface of an object. If a coating is applied to the external surface of a domestic iron or steel component, and the application takes place outside of the U.S., said product will be considered a compliant product under the AIS requirements. Any coating processes that are applied to the external surface of iron and steel components that would otherwise be AIS compliant would not disqualify the product from meeting the AIS requirements regardless of where the coating processes occur, provided that final assembly of the product occurs in the U.S. This exemption only applies to coatings on the *external surface* of iron and steel products, such as the lining of lined pipes. All manufacturing processes for lined pipes, including the application of pipe lining, must occur in U.S. for the product to be compliant with AIS requirements.

"Contractor" is the individual or entity with which the applicant has contracted (or is expected to) to perform construction services (or for water and waste projects funded by the programs which are subject to AIS requirements). This includes bidders and/or contractors that have received an award from the applicant and any party having a direct contractual relationship with the owner/applicant. A general contractor is often referred to as the prime contractor.

"Construction materials" are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not included mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered "structural steel".

Note: Mechanical and electrical components, equipment, and systems are not considered construction materials. See definition of mechanical and electrical equipment.

"De minimis incidental components" are various miscellaneous low-cost components that are essential for, but incidental to, the construction and are incorporated into the physical structure of the project. Examples of incidental components could include small washers, screws, fasteners (such as "off the shelf" nuts and bolts, miscellaneous wire, corner bead, ancillary tube, signage, trash bins, door hardware etc. Costs for de minimis incidental components cumulatively may comprise no more than a total of five percent of the total cost of the materials used in and incorporated into a project. The cost of an individual item may not exceed one percent of the total cost of the materials used in and incorporated into a project.

"Engineer" is an individual or entity with which the owner has contracted to perform engineering/architectural services for water and waste projects funded by the programs subject to AIS requirements.

"Iron and Steel Products" are defined as the following products made primarily of iron and 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. Only items on the above list made of primarily iron or steel, permanently incorporated into the project must be produced in the U.S. For example; trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. Iron or Steel.

"Manufacturers" meaning supplier, fabricator, distributor, materialman, or vendor is an entity with which the applicant, general contractor or with any subcontractor has contracted to furnish materials or equipment to be incorporated in the project by the applicant, contractor or subcontractor.

"Manufacturing processes" are processes such as melting, refining, forming, rolling, drawing, finishing, and fabricating. Further, if a domestic iron and steel product is taken out of the U.S. for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone, and iron and steel scrap are not covered by the AIS requirements, and the material(s), if any, being applied as coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-U.S. sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin. Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-U.S. sources.

"Mechanical equipment" is typically that which has motorized parts and/or is powered by a motor. "Electrical equipment" is typically any machine powered by electricity and included components that are part of the electrical distribution system. AIS does not apply to mechanical equipment.

"Minor components" are components within an iron or steel product otherwise compliant with the AIS requirements. This is different from the de minimis definition where de minimis pertains to the entire project and the minor component definition pertains to a single product. This waiver would allow non-domestically produced miscellaneous minor components comprising up to five percent of the total material cost of an otherwise domestically produced iron and steel product to be used. However, unless a separate waiver for a product has been approved, all other iron and steel components in said product must still meet the AIS requirements. This waiver does not exempt the whole product from the AIS requirements. Only minor components within said product and the iron or steel components of the product must be produced domestically. Valves and hydrants are also subject to the cost ceiling requirements described here. Examples of minor components could include items such as pins and springs in valves/hydrants, bands/straps in couplings, and other low cost items such as small fasteners etc.

"Municipal castings" are cast iron and steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and solid waste infrastructure.

"National Office" refers to the office responsible for the oversight and administration of the program nationally. The National Office sets policy, develops program regulations, and provides training and technical assistance to help the state offices administer the program. The National Office is located in Washington, D.C.

"Owner" is the individual or entity with which the general contractor has contracted regarding the work, and which has agreed to pay the general contractor for the performance of the work pursuant to the terms of the contract for water and waste projects funded by the programs subject to AIS requirement. For the purpose of this Bulletin, the term is synonymous with the term "applicant" as defined in 7 CFR 1780.7 (a) (1), (2), and (3), and is an entity receiving financial assistance from the programs subject to AIS requirements.

"Primarily iron or steel" is defined as a product made of greater than 50 percent iron or steel, measured by cost. The cost should be based on the material costs. An exception to this definition is reinforced precast concrete (see Definition). All technical specifications and applicable industry standards (e.g. NIST, NSF, AWWA) must be met. If a product is determined to be less than 50 percent iron and steel, the AIS requirements do not apply.

For example, the cost of a fire hydrant includes:

1. The cost of materials used for the iron portion of the fire hydrant (e.g. bonnet, body, and shoe); and
2. The cost to pour and cast and create those components (e.g. labor and energy).

Not included in the cost are:

1. The additional material costs for the non-iron and steel internal working of the hydrant (e.g. stem, coupling, valve, seals, etc.); and
2. The cost to assemble the internal workings into the hydrant body.

"Produced in the United States" means that the production in the United States of the iron or steel products used in the project requires that all manufacturing processes must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives.

"Project" is the total undertaking to be accomplished for the applicant by consulting engineers, general contractors, and others, including the planning, study, design, construction, testing, commissioning, and start-up of which the work to be performed under the contract is a part. A project includes all activity that an applicant is undertaking to be financed in whole or part by programs subject to AIS requirements. The intentional splitting of projects to separate into smaller contracts or obligations to avoid AIS requirements is prohibited.

"Reinforced Precast Concrete" may not consist of at least 50 percent iron or steel, but the reinforcing bar and wire must be produced in the United States and meet the same standards for any other iron or steel product. Additionally, the casting of the concrete product must take place in the United States. The cement and other raw materials used in concrete production are not required to be of domestic origin. If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered to be a construction material and must be produced in the United States.

"Steel" means an alloy that includes at least 50 percent iron between 0.02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of steel covers carbon steel, alloy steel, stainless steel, tool steel, and other specialty steels.

"Structural steel" is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I beams, channels, angles, tees, and zees. Other shapes include but are not limited to, H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

"United States" means each of the several states, the District of Columbia, and each Federally Recognized Indian Tribe.

12. PURCHASE OF EQUIPMENT AND MATERIALS

Irrespective of who purchases AIS products, owner, contractor or other parties must ensure that the products were produced in the United States as defined in this Bulletin. It is the manufacturers' responsibility to provide manufacturers' certification letters to ensure compliance with AIS requirements. The AIS requirements supersede any regulation on full and open free competition stated in 7 CFR 1780.70(b) and (d) and 2 CFR Part 200.319. For example, if an iron and steel product that is compliant with AIS is made by only one manufacturer, sole source procurement of said product may be used.

13. WAIVER PROCESS

A. General

Each entity that receives financial assistance for the construction, alteration, maintenance, or repair of water and waste infrastructure from programs mandated to comply with the statute, must use iron and steel products produced in the United States. A waiver is a legal document granting a project an exception to AIS requirements, to use iron and steel products of non-domestic origin specified in the waiver(s). More than one waiver could be applied to a project.

Any funding recipient subject to AIS requirements are eligible to apply for waivers as outlined in the statute which states:

"A waiver may be granted by the Secretary of Agriculture or designee, if one or more of the following conditions are met:

1. Applying the American Iron and Steel requirements of the Act would be inconsistent with the public interest;
2. Iron and Steel products are not produced in the United States in sufficient and reasonably available quantities or of satisfactory quality; or
3. Inclusion of iron and steel products produced in the United States will increase the overall cost of the project by more than 25 percent."

Until a waiver is granted by USDA, the AIS requirement stands except with respect to municipalities covered by international agreements (see Section 17).

One public interest waiver has been granted by the Secretary of Agriculture or designee that addresses: (1) de minimis items and (2) minor components. This waiver is national in scope and applies to all projects. The term de minimis applies to products when they occur as a de minimis incidental components as intended for assistance recipients to use for their projects. The term minor components applies to minor components within an iron and/or steel product and is intended for manufacturers to certify that their products comply with AIS requirements. For definitions of de minimis and minor components see Definitions.

B. Application

To request a project specific waiver, proper and sufficient documentation must be provided by the assistance recipient (see Exhibit H).

To apply for a waiver under condition one (public interest), applicants and their consulting engineers must demonstrate definitive impacts on the community if a specified product is not utilized. Information must be submitted to the National Office (via ESEEngineering@wdc.usda.gov), copy to the RD State Engineer and approved by the Administrator of RUS. Public interest waivers national in scope will be identified and approved by the Administrator of RUS.

To apply for a waiver under special condition two (quality or quantity), applicants and their consulting engineers must submit information outlined in Exhibit I and J to the National Office (via ESEEngineering@wdc.usda.gov).

All waiver applications must be submitted to National Office. If RD State Office receives any waiver requests, the request must be submitted to National Office for approval.

C. Timing

Waivers should be submitted prior to and no later than the submission of final plans, specifications, and bidding documents for any iron and steel products of known foreign origin. All waiver requests must be approved by the Agency prior to authorization to advertise for bids. In the event that a waiver is requested during construction such as via change order, it must be approved by the Agency prior to installation.

D. Evaluation by USDA

After receiving an application for a waiver of the AIS requirements, USDA National Office will publish the request on its website for 15 days and receive informal comment. National Office will evaluate whether the application adequately documents the statutory basis cited for the waiver. The Secretary or designee will determine whether or not to grant the waiver. Approved and disapproved waivers will be posted on the USDA AIS website. For project specific waivers where EPA and USDA are co-funding and the applicant has already submitted a request to and received an approval waiver from EPA, USDA will review said waiver for the co-funded project. Applicants/owners or their representatives are required to submit approved waiver to ESEngineerig@wdc.usda.gov for USDA RD review and concurrence.

All approved waivers must be included in the bidding documents, any bid addenda, change orders, and partial estimates. All information presented in waiver requests are subject to verification. Waiver requests deliberately containing false information will be rejected.

14. MONITORING

In order to comply with the Executive Order 13788 "Buy American, Hire American", dated April 18, 2017, and AIS requirements, monitoring activities will be completed by the State Office and/or National Office.

15. NON-COMPLIANCE

No Federal funds made available for the rural water, waste water, waste disposal, and solid waste management programs authorized by sections 306, 306A, 306C, 306D, 306E, and 310B of the Consolidated Farm and Rural Development Act (7 U.S.C. 1926 et seq.) shall be used for a project for the construction, alteration, maintenance, or repair of a public utility system unless all of the iron and steel products used in the project are produced in the United States.

Noncompliance occurs when funds are used from these programs for construction, alteration, maintenance, or repair using non-domestic iron or steel products and the product is not covered by either a project-specific or a national waiver. Loan and grant recipients should avoid non-compliance at all times as it is a violation of a Federal statute.

Process for Noncompliance

- (1) Identify the noncompliant product.
- (2) The loan or grant recipient notifies appropriate USDA RD State or National Office contact.
- (3) If USDA RD State Office is notified, the Program Director will notify the National Office, Director of EES.
- (4) USDA will apply remedies for noncompliance as per 2 CFR 200 338-342.

16. INTERNATIONAL AGREEMENTS

The AIS requirements apply in a manner consistent with United States obligations under international agreements. In a few cases where such an agreement exists between a loan and/or grant recipient and an international entity, the recipient is under the obligation to determine the applicability of the AIS requirements and document the actions taken to comply with these requirements.

17. USE OF EXHIBITS

The following explains the purpose of each Exhibit to this Bulletin:

- A. **AMERICAN IRON AND STEEL:** Exhibit A is to be read by the RD Specialist at the pre-construction and signed by all parties subject to the AIS requirements on the project. Signature of this form will serve as certification of advisement and acknowledgement of the AIS requirements.
- B. **ENGINEER'S CERTIFICATION OF COMPLIANCE:** Exhibit B consists of a letter to be completed and signed by the consulting engineer certifying that he/she will ensure that plans, specifications, bidding documents, and associated bid addenda, executed contracts and change orders for this project will comply with the AIS requirements. This certification letter is to be submitted to the Agency for approval prior to the Advertisement for Bids and must be kept in the engineer's project file and on-site during construction.
- C. **GENERAL (PRIME) CONTRACTOR'S CERTIFICATION OF COMPLIANCE**
Exhibit C consists of a letter to be completed and signed by the general contractor certifying that he/she will ensure that all iron and steel products installed for this project, comply with the AIS requirements. This includes not only installation and/or construction by their own company, but any and all subcontractors and manufacturers their company has contracted with on this project. This certification letter is to be submitted upon substantial completion of the project to the project engineer.
- D. **EXAMPLE OF A MANUFACTURER'S CERTIFICATION LETTER OF COMPLIANCE:** Exhibit D is an example of a letter to be completed and signed by the manufacturer certifying that he/she will ensure that all iron and steel products and/or materials shipped or provided for the subject project are in full compliance with the AIS requirements. This includes listing each individual item/product/material provided to the project and providing the location of this/these item(s) being manufactured, including assembly. All manufacturers' certification letters must be kept in the engineer's project file and on site during construction.
- E. **EXAMPLES OF MUNICIPAL CASTINGS:** Exhibit E provides a sample list of iron and steel products that are subject to the AIS requirements. This list is not exhaustive and is meant only to provide examples. A unique list should be completed for each specific project/contract.

- F. **EXAMPLES OF CONSTRUCTION MATERIALS:** Exhibit F provides a sample list of construction materials that are subject to the AIS requirements. This list is not exhaustive and is meant only to provide examples.
- G. **EXAMPLES OF NON-CONSTRUCTION MATERIALS:** Exhibit G provides a sample list of items that are not subject to AIS requirements. This list is not exhaustive and is meant only to provide examples.
- H. **INFORMATIONAL CHECKLIST FOR PROJECT SPECIFIC WAIVER REQUEST:** Exhibit I is a checklist that is to be completed by the applicant and/or consulting engineer to help ensure that all appropriate and necessary information is submitted with the request to USDA. This checklist should not be used for public interest waiver. It is for informational purposes only and does not need to be included as part of the waiver application. Project specific waivers may be requested if one or more of the following conditions applies: (1) The iron and/or steel products are not produced in the United States in sufficient and reasonably available quantities and of satisfactory quality; (2) The inclusion of iron and/or steel products produced in the United States will increase the overall cost of the project by more than 25 percent. All approved waivers must be included in the bidding documents, any bid addenda, change orders, and partial estimates. All information presented in waiver requests are subject to evaluation. Waiver requests deliberately containing false information will be rejected.
- I. **EXAMPLE COST TABLE FOR A PROJECT COST WAIVER:** Exhibit I is an example of a table that must be included with any cost based project waiver request. Information included in the table; product reference in the specification, brief description of the product, quantity, unit, unit price and two costs of the item: (1) cost of an AIS compliant product and (2) cost of a non-domestic product. The total cost for all items will be part of the evaluation. Waiver requests deliberately containing false information in order to receive a project cost waiver will be rejected.
- J. **AIS MATERIALS TRACKING:** Exhibit J is a spreadsheet to track all AIS products, de minimis components, and minor components. An updated list must be signed and dated and submitted to the Engineer by the Contractor with each pay request. Once reviewed for accuracy, the signed and updated list must be submitted to the Agency with each pay request. If an AIS qualifying or de minimis material is delivered more than once, a new line will be required for each delivery of that material. An excel version that will compute all totals can be obtained from the RD State Office that can be used as a working copy.

AMERICAN IRON AND STEEL COMPLIANCE STATEMENT

"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 statues mandating domestic preference applies an American Iron and Steel requirement to this project.

All parties are required to comply with these requirements and to ensure that all iron and steel products used on this project are produced in the United States. The term "iron and steel products" means the following products made of primarily 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."

RD Specialist Signature

Date

Printed Name

Borrower Signature or Approved Representative

Date

Printed Name

Engineer's Signature

Date

Printed Name

Contractor's Signature

Date

Printed Name

ENGINEER'S CERTIFICATION LETTER

DATE:

RE: APPLICANT
PROJECT NAME
CONTRACT NUMBER

I hereby certify that to the best of my knowledge and belief, iron and steel products referenced in the Plans, Specifications, and Bidding Documents for this project comply with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 and any subsequent statutes mandating domestic preference or are the subject of a waiver approved by the Secretary of Agriculture or designee. This certification is not intended to be a warranty in any way, but rather the designer's professional opinion that to the best of their knowledge, the products comply.

I hereby commit that to the best of my ability, all iron and steel products that will be referenced in the Bid Addenda, Executed contracts, and Change Orders will comply with Section 746 of the Title VII of the Consolidated Appropriations Act, 2017 and any subsequent statutes mandating domestic preference or are/will be the subject of a waiver approved by the Secretary of Agriculture or designee.

Name of Engineering Firm (Print)

By Authorized Representative (Signature)

Title

This document is to be submitted prior to Agency authorization for Advertisement for Bids.

CONTRACTOR'S CERTIFICATION LETTER

DATE:

RE: **APPLICANT**
PROJECT NAME
CONTRACT NUMBER

I hereby certify that, to the best of my knowledge and belief, all iron and steel products installed for this project by my company and by any and all subcontractors and manufacturers my company has contracted with for this project, comply with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 and any subsequent statutes mandating domestic preference or are the subject of a waiver approved by the Secretary of Agriculture or designee.

Name of Construction Company (Print)

By Authorized Representative (Signature)

Title

This certification is to be submitted upon completion of the project to the project engineer.

MANUFACTURER'S CERTIFICATION LETTER

Date:

Company Name:

Company Address:

Subject: AIS Step Certification for Project (X), Owner's Name, and Contract Number

I, (company representative), certify that the (melting, bending, galvanizing, cutting, etc.) processes for (manufacturing or fabricating) the following products and/or material shipped or provided for the subject project is in full compliance with the mandated AIS requirements.

Item, Products and/or Materials, and location of delivery (City, State)

- 1.
- 2.
- 3.

Such process for AIS took place in the following location:

City, State

This certification is to be submitted upon request to interested parties (e.g. municipalities, consulting engineers, general contractors, etc.)

If any of the above compliance statements change while providing materials to this project, please immediately notify the person(s) who is requesting to use your product(s).

Authorized Company Representative

(Note: Authorized signature shall be manufacturer's representative and not the materials distributor or supplier)

EXAMPLES OF MUNICIPAL CASTINGS *(includes but not limited to):*

Access Hatches
Ballast Screen
Benches (Iron or Steel)
Bollards
Cast Bases
Cast Iron Hinged Hatches, Square and Rectangular
Cast Iron Riser Rings
Catch Basin Inlet
Cleanout/Monument Boxes
Construction Covers and Frames
Curb Corner Guards
Curb Openings
Detectable Warning Plates
Downspout Shoes (Boot, Inlet)
Drainage Grates, Frames and Curb Inlets
Inlets
Junction Boxes
Lampposts
Manhole Covers, Rings and Frames, Risers
Meter Boxes
Service Boxes
Steel Hinged Hatches, Square and Rectangular
Steel Riser Rings
Trash Receptacles
Tree Grates
Tree Guards
Trench Grates
Valve Boxes, Covers and Risers

EXAMPLES OF CONSTRUCTION MATERIALS (included but not limited to)

Wire rod, bar, angles
Concrete reinforcing bar, wire, wire cloth
Wire rope and cables
Tubing
Framing
Joists
Trusses
Fasteners (i.e., nuts and bolts)
Welding rods
Decking
Grating
Railings
Stairs
Access ramps
Fire escapes
Ladders
Wall panels
Dome structures
Roofing
Ductwork
Surface drains
Cable hanging systems
Manhole steps
Fencing and fence tubing
Guardrails
Doors
Stationary screens

EXAMPLES OF NON-CONSTRUCTION MATERIALS- (includes but not limited to):

(Note: includes appurtenances necessary for their intended use and operation and are not subject to AIS requirements)

Pumps

Motors

Gear Reducers

Drives (including variable frequency drives (VFD's)

Electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators).

Mixers

Gates (e.g. sluice and slide gates)

Motorized screens (such as traveling screens)

Blowers/aeration equipment

Compressors

Meters (flow and water meters)

Sensors

Controls and switches

Supervisory control data acquisition (SCADA)

Membrane filtration systems (includes RO package plants)

Filters

Clarifier arms and clarifier mechanisms

Rakes

Grinders

Disinfection systems

Presses (including belt presses)

Conveyors

Cranes

HVAC (excluding network)

Water heaters

Heat exchangers

Generators

Cabinetry and housing (such as electrical boxes/enclosures)

Lighting fixtures

Electrical conduit

Emergency life systems

Metal office furniture

Shelving

Laboratory equipment

Analytical instrumentation

Dewatering equipment

INFORMATIONAL CHECKLIST FOR PROJECT SPECIFIC WAIVER REQUEST

Please reference the specifications of the product.

Information	<input type="checkbox"/>	Note
<p>General</p> <ul style="list-style-type: none"> • Waiver request includes the following information: <ul style="list-style-type: none"> — Description of the foreign and domestic construction materials — Unit of measure — Quantity — Price — Date that product is needed (e.g. time of delivery or availability) — Location of the construction project — Name and address of the proposed supplier — A detailed justification for the use of foreign construction materials • Waiver request was submitted according to the instructions in the memorandum • Assistance recipient made a good faith effort to solicit bids for domestic iron and steel products, as demonstrated by language in requests for proposals, contracts, and communications with the prime 		
<p>Cost Waiver Requests</p> <ul style="list-style-type: none"> • Waiver request includes the following information: <ul style="list-style-type: none"> — Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and steel products (Exhibit J) — Relevant excerpts from the bid documents used by the contractors to complete the comparison — Supporting documentation indicating that the contractor made a reasonable survey of the market, such as a description of the process for identifying suppliers and a list of contacted suppliers 		
<p>Availability Waiver Requests</p> <ul style="list-style-type: none"> • Waiver request includes the following supporting documentation necessary to demonstrate the availability, quantity, and/or quality of the materials for which the waiver is requested: <ul style="list-style-type: none"> — Supplier information or pricing information from a reasonable number of domestic suppliers indicating availability/delivery date for construction materials — Documentation of the assistance recipient's efforts to find available domestic sources, such as a description of the process for identifying suppliers and a list of contacted suppliers. — Date that product is needed (e.g. time of delivery or availability) to provide justification — Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of construction materials • Waiver request includes a statement from the prime contractor and/or supplier confirming the non-availability of the domestic construction materials for which the waiver is sought • Has the State received other waiver requests for the materials described in this waiver request, for comparable projects? 		

TECHNICAL SPECIFICATIONS
 CONTRACT "I-1" OFFICE BUILDING
 TABLE OF CONTENTS

DIVISION 01 – CONTRACT ADMINISTRATION

SECTION 01010 – GENERAL REQUIREMENTS	01010-1 THRU 5
SECTION 01060 – REGULATORY REQUIREMENTS	01060-1 THRU 1
SECTION 01070 – ABBREVIATIONS AND SYMBOLS	01070-1 THRU 3
SECTION 01090 – REFERENCE STANDARDS	01090-1 THRU 3
SECTION 01300 – SUBMITTALS	01300-1 THRU 4
SECTION 01420 – INSPECTION SERVICES	01420-1 THRU 2
SECTION 01440 – CONTRACTOR QUALITY CONTROL	01440-1 THRU 4
SECTION 01550 – ACCESS ROADS AND PARKING AREAS	01550-1 THRU 2
SECTION 01580 – PROJECT IDENTIFICATION AND SIGN	01580-1 THRU 3
SECTION 01700 – PROJECT CLOSEOUT	01700-1 THRU 3
SECTION 01710 – PROJECT CLEANING	01710-1 THRU 2
SECTION 01720 – PROJECT RECORD DOCUMENTS	01720-1 THRU 2
SECTION 01740 – BASIS OF PAYMENT – Contract "I-1"	01740-1 THRU 2

DIVISION 02 - SITE WORK

SECTION 02220 – EXCAVATION	02220-1 THRU 3
SECTION 02221 – EXCAVATION, TRENCHING & BACKFILLING FOR UTILITIES SYSTEMS	02221-1 THRU 4
SECTION 02270 - EROSION CONTROL, SEDIMENTATION AND CONTAINMENT OF CONSTRUCTION MATERIALS	02270-1 THRU 2
SECTION 02480 - SEEDING, FERTILIZING AND MULCHING	02480-1 THRU 5
SECTION 02741 - HOT-MIX ASPHALT PAVING	02741-1 THRU 6

DIVISION 03 - CONCRETE

SECTION 03100 – CONCRETE FORM WORK	03100-1 THRU 4
SECTION 03200 – CONCRETE REINFORCEMENT	03200-1 THRU 4
SECTION 03210 – REINFORCING STEEL	03210-1 THRU 2
SECTION 03250 - EXPANSION JOINTS, CONTRACTION JOINTS, AND WATER STOPS	03250-1 THRU 4
SECTION 03300 – CONCRETE	03300-1 THRU 17
SECTION 03410 - STRUCTURAL PRECAST CONCRETE - PLANT CAST	03410-1 THRU 11

DIVISION 04 - MASONRY

SECTION 04200 - MASONRY	04200-1 THRU 8
-------------------------	----------------

DIVISION 05 - METALS

SECTION 05500 - MISCELLANEOUS METAL	05500-1 THRU 6
-------------------------------------	----------------

DIVISION 06 - CARPENTRY

SECTION 06100 - ROUGH CARPENTRY	06100-1 THRU 12
---------------------------------	-----------------

Continued on next page ...

DIVISION 07 - SPECIAL CONSTRUCTION

SECTION 07210 - BUILDING INSULATION	07210-1 THRU 5
SECTION 07600 - SHEET METAL WORK	07600-1 THRU 6

DIVISION 08 - DOORS AND WINDOWS

SECTION 08000 - DOORS AND FRAMES	08000-1 THRU 3
SECTION 08110 - STEEL DOORS AND FRAMES	08110-1 THRU 5
SECTION 08700 - HARDWARE; BUILDERS' (GENERAL PURPOSE)	08700-1 THRU 9
SECTION 08800 - GLASS AND GLAZING	08800-1 THRU 3

DIVISION 09 - FINISHES

SECTION 09900 - PROTECTIVE COATING AND PAINTING	09900-1 THRU 27
---	-----------------

DIVISION 10 - SPECIALTIES

SECTION 10100 - DEDICATION PLAQUE	10100-1 THRU 1
-----------------------------------	----------------

DIVISION 11 - EQUIPMENT

SECTION 11034 - SERVICE AND TELLER WINDOW UNITS	11034-1 THRU 2
---	----------------

DIVISION 12 - FURNISHINGS

SECTION 12352 - CASEWORK	12352-1 THRU 17
--------------------------	-----------------

DIVISION 13 - SPECIAL CONSTRUCTION

SECTION 13120 - METAL ROOFING	13120-1 THRU 16
-------------------------------	-----------------

DIVISION 15 - MECHANICAL

SECTION 15010 - MECHANICAL GENERAL REQUIREMENTS	15010-1 THRU 6
SECTION 15040 - EXCAVATION, TRENCHING, BACKFILLING & GRADING	15040-1 THRU 4
SECTION 15400 - PLUMBING	15400-1 THRU 5
SECTION 15440 - PLUMBING FIXTURES AND EQUIPMENT	15440-1 THRU 3
SECTION 15740 - HVAC EQUIPMENT AND TERMINAL UNITS	15740-1 THRU 2
SECTION 15850 - DUCTWORK AND AIR HANDLING SPECIALTIES	15850-1 THRU 4
SECTION 15870 - OUTLETS AND INLETS	15870-1 THRU 2
SECTION 15910 - ELECTRIC TEMPERATURE CONTROL SYSTEMS	15910-1 THRU 1
SECTION 15990 - TESTING, ADJUSTING AND BALANCING	15990-1 THRU 2

DIVISION 16 - ELECTRICAL

SECTION 16005 - SCOPE OF THE ELECTRICAL WORK	16005-1 THRU 2
SECTION 16010 - GENERAL PROVISIONS - ELECTRICAL	16010-1 THRU 24
SECTION 16110 - RACEWAYS & FITTINGS	16110-1 THRU 7
SECTION 16120 - CONDUCTORS, IDENTIFICATIONS, SPLICING DEVICES & CONNECTORS	16120-1 THRU 3

Continued on next page ...

SECTION 16135 - CABINETS, OUTLET BOXES & PULL BOXES	16135-1 THRU 2
SECTION 16143 - WIRING DEVICES & PLATES	16143-1 THRU 3
SECTION 16195 - IDENTIFICATIONS	16195-1 THRU 1
SECTION 16452 - GROUNDING AND GROUND FAULT PROTECTION	16452-1 THRU 2
SECTION 16470 - ELECTRICAL DISTRIBUTION EQUIPMENT	16470-1 THRU 3
SECTION 16515 - LIGHTING	16515-1 THRU 3
SECTION 16671 - TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS)	16671-1 THRU 6
SECTION 16721 - FIRE ALARM SYSTEM	16721-1 THRU 4
SECTION 16740 - TELECOM/DATA RACEWAY SYSTEM	16740-1 THRU 1

SECTION 01010

GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Division 1 - General Requirements shall apply to all Divisions of the Specifications. Any conflict shall be called to the attention of the Engineer for clarification and ruling.
- B. These specifications and drawings accompanying them describe the work to be done and the materials to be furnished for installation of all specified work, on **Contract "I-1" – Office Building**.
- C. By submission of his bid, the Contractor acknowledges that he has acquainted himself with all conditions which may affect the work as would be evident from a thorough investigation of the job site, and these specifications covering the work, for the purpose of coordinating his work and cost, and agrees that the Owner will not be held liable for any additional costs incurred by the Contractor for causes or conditions which could or should have been determined by such an investigation.

1.2 MANAGER'S NAME AND PHONE NUMBER

Mr. Sherman "Randy" McDaniel
Big Sandy Water District
18200 S.R. No. 3
Catlettsburg, Kentucky 41129
(606) 928-2075

1.3 DRAWINGS AND SPECIFICATIONS

- A. The Drawings and Specifications are intended to be fully explanatory, however, should anything be shown, indicated or specified on one and not the other, it shall be done the same as if shown, indicated or specified in both.
- B. It shall be the responsibility of all Contractors and subcontractors to carefully examine all Drawings, Specifications and Contract Documents pertaining to all phases of the construction in order that Contractor and Subcontractors may foresee all requirements for coordination of their work. Submission of a bid shall be construed as evidence that such an examination has been made. Claims based on unforeseen requirements will not be considered.
- C. Should any error or inconsistency appear in Drawings or Specifications,

the Contractor, before proceeding with the work, must make mention of the same to the Engineer for proper adjustment, and in no case proceed with the work in uncertainty or with insufficient drawings.

- D. Contractors shall follow sizes in specifications or figures on drawings, in preference to scale measurements and follow detail drawings in preference to general drawings.
- E. Where it is obvious that a drawing illustrates only a part of a given work or of a number of items, the remainder shall be deemed repetitious and so constructed.

1.4 SCOPE OF WORK

- A. General
 - 1. The work to be performed consists of furnishing all materials, labor, equipment and the execution of all operations necessary for the completion of this **Contract "I-1" – Office Building.**
 - 2.. All the miscellaneous items of work shown by the drawings and/or described in the specifications.

1.5 CONTRACTS

- A. Notice and Service Thereof:

Any notice to the Contractor from the Owner relative to any part of this Contract, shall be in writing and considered delivered and the service thereof completed, when such notice is posted, by mail, to the Contractor at his last given address, or delivered in person to the Contractor or his authorized representative on the work site.

1.6 DIVISION OF SPECIFICATIONS

- A. Division of specifications into sections is done for convenience of reference and is not intended to control Contractors in dividing work among subcontractors or to limit scope of work performed by any trade under any given section.

1.7 CONFLICTS

- A. If and when doubt exists in the mind of the Bidder as to the true meaning of any part of the Bidding Documents, the Bidder shall request interpretation thereof in accordance with the Instructions to Bidders. Alleged "answers by telephone" will not be adjudged as legitimate interpretations of conflicting information. Official interpretations shall be by Addendum only, within the time frame indicated in the Instructions to Bidders and/or the individual sections of the Specifications. In the absence of an official Addendum, the following shall prevail:

1. If a conflict occurs in or between bidding documents regarding methods of performing the work or the material required, and the Bidder does not obtain a written decision (official Addendum) with respect thereto prior to submitting his proposal, he shall be deemed to have bid upon the more expensive way of doing the work and the better quality of material. If the Owner and/or Engineer later elects to use the less expensive method, less expensive quality or less quantity of material the Owner shall receive a suitable credit.
2. Refer to the General Conditions and Special Conditions for Contract requirements.
3. The intent of the contract documents is to include all items necessary for the proper execution and completion of the work. Anything called for in the specifications and not shown on the drawings or shown on the drawings and not called for in the specifications, shall be included in the Contractor's work the same as if included in both. In case of a doubt arising as to the true intent and meaning of the drawings and specifications, the Contractor shall report it at once to the Engineer. The Engineer shall furnish, with reasonable promptness, additional instructions, by means of drawings or otherwise, necessary for the proper execution of the work. All such drawings and instructions shall be consistent with the contract documents, true developments thereof and reasonably inferable therefrom. The work shall be executed in conformity therewith and the Contractor shall do no work without proper drawings and instructions. In case of conflicts between the various contract documents, the order of precedence will be as follows: (1) Written Contract (2) Written Proposal, (3) Advertisements for Bids, (4) Instructions to Bidders, (5) Special Conditions, (6) General Conditions, (7) Written Technical Specifications, (8) Standard Details, (9) Large Scale Details on Drawings, and (10) General Arrangement Details on Drawings.
4. The Contractor shall make a thorough examination of the site and study all drawings and specifications and all conditions relating to the erection of the work. Materials or labor evidently necessary for the proper and complete execution of the work, which are not specifically mentioned although reasonably inferred therefrom, shall be included in the work.

1.8 BENEFICIAL USAGE (SUBSTANTIAL COMPLETION)

- A. The date of beneficial usage of the project, or a designated portion thereof, is the date where construction is sufficiently completed on the project for the use for which it is intended.
- B. Corrective work and the replacement of defective equipment or materials and the adjustment of control apparatus shall not delay the determination

of beneficial usage.

- C. When the majority of the work is complete and ready for operation, but cannot be certified as substantially complete because of incomplete items impossible to complete due to weather conditions, payments will be authorized for the amount of work completed, withholding reasonable amounts to cover the incomplete work. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims, and shall not cancel the contract.
- D. When the Owner begins to use the facilities or any portion thereof, before contract completion, the operation, maintenance, utilities and insurance become the responsibility of the Owner.

1.9 LIQUIDATED DAMAGES

Should the Contractor fail to complete the work under his Contract and make the Project available for Beneficial Usage on or before the date stipulated for Beneficial Usage (or such later date as may result from extensions in the Contract Time granted by the Owner), the Contractor agrees that the Owner is entitled to, and shall pay the Owner, as liquidated damages, the sum of Five Hundred Dollars (\$500.00) for each consecutive calendar day until Beneficial Usage is reached as described herein.

1.10 SUBSTITUTION - MATERIALS AND EQUIPMENT

- A. Substitution of major equipment and materials previously submitted by the Contractor and reviewed by the Engineer will be considered only for the following reasons:
 - 1. Unavailability of the material or equipment due to conditions beyond the control of the supplier.
 - 2. Inability of the supplier to meet contract schedule.
 - 3. Technical noncompliance to specifications.
- B. Substitution of other equipment and materials named in the specifications will be considered, provided the proposed substitution will perform adequately the functions called for by the general design, be similar and of equal substance to that specified and be suited to the same use and capable of performing the same function of that specified. The burden for proving equality is that of the Contractor.
- C. Inclusion of a certain make or type of materials or equipment in the Contractor's estimate shall not obligate the Owner to accept such material or equipment if it does not meet the requirements of the plans and specifications.

1.11 CONTRACTOR USE OF PREMISES

- A. Release of Site:
 - 5. All access to the site shall be as defined by the Owner.
 - 6. Contractor shall insure that no hazardous situations exist at the site during working hours or are left during non-working hours.

1.12 SCHEDULING OF WORK

- A. The work shall be scheduled so the lines can be put into service by phases and at the earliest possible date.
- B. The Contractor shall coordinate all required shutdowns of existing systems with the various utilities; so as to cause the least inconvenience to existing users thereof.
- C. All work shall be completed within time limits established in other portions of the Contract Documents.

1.13 TRAFFIC MAINTENANCE

- A. All traffic must be maintained at all times on public streets and roadways. No road or street shall be closed without special written permission from the Owner.
- B. Traffic must be maintained on State maintained roads in accordance with the Standard Drawings, details and specifications. Contractor will be required to adhere to all provisions of the Kentucky Transportation Cabinet Permit for the project.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 01060

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 CODES

All construction work shall be done in strict accordance with the latest edition of the Kentucky Building Code, National Electrical Code (NEC) and supplements, the requirements of the local electrical utility company, local codes, and as specified herein. Skilled workmen shall perform all work in a neat manner and all equipment shall be cleaned before final acceptance. A partial list of codes is as follows:

Kentucky Building Code
City and/or County Building Inspector
National and Local Electrical Codes
National Fire Protection Association (NFPA)
State Fire Marshal
Local Fire Marshal
Standards of Safety
O.S.H.A.
KY Division of Water

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION

SECTION 01070

ABBREVIATIONS AND SYMBOLS

PART 1 - GENERAL

1.1. REQUIREMENTS INCLUDED

Where any of the following abbreviations are used in the Contract Documents, they shall have the meaning set forth as follows.

1.2. QUALITY ASSURANCE

- A. For the products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. The date of the standard is that in effect as of the Bid date, or date of Owner-Contractor Agreement when there are no bids, except when a specific date is specified.
- C. When required by individual Specifications section, obtain a copy of standard. Maintain a copy at job site during submittals, planning and progress of the specific work, until Substantial Completion.

1.3. SCHEDULE OF REFERENCES

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturers Association.
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
IEEE	Institute of Electrical and Electronic Engineers, Inc.
AISC	American Institute of Steel Construction
AMCA	Air Moving and Conditioning Association
ANS	American National Standards Institute

API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
CS	Commercial Standard
IBR	Institute of Boiler and Radiator Manufacturers
IPS	Iron Pipe Size
JIC	Joint Industry Conference Standards
KDOH	Kentucky Department of Highways
NBS	National Bureau of Standards
NEC	National Electrical Code; latest edition
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc.
Fed.	Federal Specifications issued by the Federal Supply Spec. Service of the General Services Administration, Washington, D.C.
125-lb ANS	American National Standard for Cast-Iron Pipe
150-lb ANS	Flanges and Flanged Fittings, Designation B16.1-1975, for the appropriate class
AWG	American or Brown and Sharpe Wire Gage
NPT	National Pipe Thread
OS&Y	Outside screw and yoke
Stl.Wg	U. S. Steel Wire, Washburn and Moen, American Steel and Wire or

	Roebing Gage
UL	Underwriters' Laboratories
USS	United States Standard Gage
WOG	Water, Oil, Gas
WSP	Working Steam Pressure

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION

SECTION 01090

REFERENCE STANDARDS

PART 1 - GENERAL

1.1. QUALITY ASSURANCE

- A. For Products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Material shall bear Underwriters' Laboratories label where such a standard has been established and listed by Underwriters' Laboratories, Inc. All materials, equipment and appliances shall conform to requirements of standards referenced here.
- C. Conform to reference standard by date of issue current on date of Contract Documents.
- D. Should specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.
- E. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.2. SCHEDULE OF REFERENCES

ACI	American Concrete Institute Box 19150 Reford Station Detroit, MI 48219
AGC	Associated General Contractors of America 1957 E Street, N.W. Washington, DC 20006
AITC	American Institute of Timber Construction 333 W. Hampden Avenue Englewood, CO 80110
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018

ASTM American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103

CDA Copper Development Association
57th Floor, Chrysler Building
405 Lexington Avenue
New York, NY 10174

CRSI Concrete Reinforcing Steel Institute
933 Plum Grove Road
Schaumburg, IL 60195

FCC Federal Communications Commission
DOT, M443.2
Utilization and Storage Section
Washington, DC 20590

FM Factory Mutual System
1151 Boston-Providence Turnpike
Norwood, MA 02062

IEEE Institute of Electrical and Electronics Engineers
345 East 47th Street
New York, NY 10017

NEMA National Electrical Manufacturers' Association
2101 L Street, N.W.
Washington, DC 20037

NFPA National Fire Protection Association
1619 Massachusetts Avenue, N.W.
Washington, DC 20036

PCA Portland Cement Association
5420 Old Orchard Road
Skokie, IL 60077

REA Rural Electrification Administration
USDA-REA-ASD
Room 0180
ATTN: Publications
14th and Independence Avenue, S.W.
Washington, DC 20250

UL Underwriters' Laboratories, Inc.
333 Pfingston Road
Northbrook, IL 60062

PART 2 - REFERENCED STANDARDS

2.1 All work performed in connection with this contract shall be in accordance with the latest version of the following standards:

Occupational Safety and Health Administration (OSHA)

Applicable Telecommunications Standards

National Fire Protection Association

National Electrical Code (NEC)

National Electrical Safety Code (NESC)

Federal Communications Commission

National Telecommunications and Information Administration

Electronics Industries Association (EIA)

American National Standards Institute

Rural Electrification Administration

PART 3 - EXECUTION

NOT USED.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.1. WORK INCLUDED

Shop drawings, descriptive literature, project data and samples (when samples are specifically requested) for all manufactured or fabricated items shall be submitted by the Contractor to the Engineer for examination and review in the form and in the manner required by the Engineer. All submittals shall be furnished as set out in paragraph 1.5 hereinafter and shall be checked and reviewed and stamped and signed as approved by the Contractor before submission to the Engineer. The review of the Drawings by the Engineer shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Review of such drawings will not relieve the Contractor of the responsibility for any errors which may exist, as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work.

1.2. RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. General Conditions.

B. Section 01720 - Project Record Documents (As Builts).

1.3. DEFINITIONS

The term "submittals" shall mean shop drawings, manufacturer's drawings, catalog sheets, brochures, descriptive literature, diagrams, schedules, calculations, material lists, performance charts, test reports, office and field samples, and items of similar nature which are normally submitted for the Engineer's review for conformance with the design concept and compliance with the Contract Documents.

1.4. GENERAL CONDITIONS

Review by the Engineer of shop drawings or submittals of material and equipment shall not relieve the Contractor from the responsibilities of furnishing same of proper dimension, size, quality, quantity, materials, and all performance characteristics to efficiently perform the requirements and intent of the Contract Documents. Review shall not relieve the Contractor from the responsibility for errors of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the Project and compliance with the information given in the Contract Documents.

Review of shop drawings shall not be construed as releasing the Contractor from the responsibility of complying with the Specifications.

1.5. GENERAL REQUIREMENTS FOR SUBMITTALS

A. Shop Drawings

1. Shop drawings shall be prepared by a qualified detailer. Details shall be identified by reference to sheet and detail numbers shown on Contract Drawings. Where applicable, show fabrication, layout, setting, and erection details.
2. Shop drawings are defined as original drawings prepared by the Contractor, subcontractors, suppliers, or distributors performing work under this Contract. Shop drawings illustrate some portion of the work and show fabrication, layout, setting, or erection details of equipment, materials, and components. The Contractor shall, except as otherwise noted, have prepared the number of reviewed copies required for contractor distribution plus three (3), which will be retained by the Engineer. Shop drawings shall be folded to an approximate size of 8-1/2" x 11" and in such manner that the title block will be located in the lower right-hand corner of the exposed surface.

B. Project data shall include manufacturer's standard schematic drawings modified to delete information which is not applicable to the Project, and shall be supplemented to provide additional information applicable to the Project. Each copy of descriptive literature shall be clearly marked to identify pertinent information as it applies to the Project.

C. Where samples are required, they shall be adequate to illustrate materials, equipment, or workmanship, and to establish standards by which completed work is judged. Provide sufficient size and quantity to clearly illustrate functional characteristics of product and material, with integrally related parts and attachment devices, along with a full range of color samples.

D. All submittals shall be referenced to the applicable item, section, and division of the Specifications, and to the applicable Drawing(s) or Drawing schedule(s). All submittals shall bear the Engineer's project code as noted in the upper right corner of this sheet.

- E. The Contractor shall review and check submittals. Including those of any subcontractor(s) and shall indicate his review and approval by placing and executing the following on all shop drawings:

This shop drawing has been reviewed by [*Name of Contractor*] and approved with respect to the mean, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incidental thereto. [*Name of Contractor*] also warrants that this shop drawing complies with contract documents and comprises no variation thereto.

By

Date _____

- F. If the submittals deviate from the Contract Drawings and/or Specifications, the Contractor shall advise the Engineer, in letter of transmittal of the deviation and the reasons therefore. All changes shall be clearly marked on the submittal with a bold red mark. Any additional costs for modifications shall be borne by the Contractor.
- G. In the event the Engineer does not specifically reject the use of material or equipment at variance to that which is shown on the Drawings or specified, the Contractor shall, at no additional expense to the Owner, and using methods reviewed by the Engineer, make any changes to structures, piping, controls, electrical work, mechanical work etc., that may be necessary to accommodate this equipment or material. Should equipment other than that on which design drawings are based be accepted by the Engineers, shop drawings shall be submitted detailing all modification work and equipment changes made necessary by the substituted items.
- H. Additional information on particular items, such as special drawings, schedules, calculations, performance curves, and material details, shall be provided when specifically requested in the technical Specifications.
- I. Submittals for all electrically operated items (including instrumentation and controls) shall include complete wiring diagrams showing leads, runs, number of wires, wire size, color coding, all terminations and connections, and coordination with related equipment.
- J. Equipment shop drawings shall indicate all factory or shop paint coatings applied by suppliers, manufacturers, and fabricators; the Contractor shall be responsible for ensuring the compatibility of such coatings with the field-applied paint products and systems.
- K. Fastener specifications of manufacturer shall be indicated on equipment shop drawings.
- L. Where manufacturers' brand names are given in the Specifications for building and construction materials and products, such as grout, bonding compounds, curing compounds, masonry cleaners, waterproofing solutions, and similar products, the Contractor

tor shall submit names and descriptive literature of such materials and products he proposes to use in this Contract.

- M. No material shall be fabricated or shipped unless the applicable drawings or submittals have been reviewed by the Engineer and returned to the Contractor.
- N. All bulletins, brochures, instructions, parts lists, and warranties packaged with and accompanying materials and products delivered to and installed in the Project shall be saved and transmitted to the Owner through the Engineer.

1.6. CONTRACTOR RESPONSIBILITIES

- A. Verify field measurements, field construction criteria, catalog numbers, and similar data.
- B. Coordinate each submittal with requirements of Work and of Contract Documents.
- C. Notify Engineer, in writing at time of submission, of deviation in submittals from requirement of Contract Documents.
- D. Begin no work, and have no material or products fabricated or shipped which require submittals until return of submittals with Engineer's stamp and initials or signature indicating review.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION

SECTION 01420

INSPECTION SERVICES

PART 1 - TEST AND INSPECTION

1.1. GENERAL

- A. The Engineer shall be notified forty-eight (48) hours in advance when equipment is to be subjected to tests before any work is concealed and before trenches are backfilled. Failing to comply with the above-mentioned notice, this Contractor shall uncover the work for the Engineer's observation, and repair any damages to other Contractor's work. This Contractor shall provide these services without charge.
- B. Periodic inspection shall be scheduled by the Contractor for rough as well as finished work. The rough-in inspections shall be divided into as many inspections as may become necessary to cover all roughing-in.
- C. Before requesting a final inspection, this Contractor shall inspect the installation to assure that the job is complete in every detail and that all requirements of the Contract Documents have been fulfilled.
- D. A punch list inspection shall be scheduled by this Contractor with the Engineer or his representative present. The punch list inspection shall be made with junction box covers removed.
- E. The Contractor shall be responsible and shall pay all costs for the preparation, job curing (if required) and transportation of materials and equipment to the laboratory or inspection agency retained by the Owner except where these documents say specifically the Owner will pay these costs.
- F. The Contractor will be responsible for the procurement, administration and payment of all specified inspection and testing procedures. Only qualified licensed/ certified firms for the designated services will be approved. The Contractor shall submit the names of the firms for approval by the Owner prior to administering of the inspection or testing services.

1.2. ELECTRICAL INSPECTION

- A. Electrical inspections will be performed throughout the course of construction by a certified electrical inspector from the State Fire Marshal's Office.
- B. All cost of the electrical inspections shall be borne by the Contractor.

- C. Acceptance by the electrical inspector, however, does not relieve the Contractor from the responsibility of the requirements set forth in these Plans and Specifications. All work under this Contract is subject to the observation of the Engineer. When it is the opinion of the Engineer that the Contractor has failed to properly coordinate his work or provide materials and installation, or to meet the intent of these specifications, the codes and standards, then the Contractor shall remove the work and replace the work to meet the intent of the Specifications, Codes, and Standards without reimbursement.

1.3 CERTIFICATES

The Contractor shall furnish the Owner with Certificates of Inspections and Approval where required.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION

SECTION 01440

CONTRACTOR QUALITY CONTROL

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. The General Contractor shall set forth for immediate execution a detailed and well-organized quality control plan and implementation program.

1.2. CODES, STANDARDS AND INDUSTRY SPECIFICATIONS

- A. Material or operations specified by reference to published specifications of a manufacturer, testing agency, society, association or other published standards shall comply with requirements in latest revisions thereof and amendments or supplements thereto in effect on date of (Advertisement for Bids).
- B. Discrepancies between referenced codes, standards, specifications and Contract Documents shall be governed by the latter unless written interpretation is obtained from Engineer.
- C. Material or work specified by reference to conform to a standard, code, law or regulation shall be governed by Contract Documents when they exceed requirements of such references; referenced standards shall govern when they exceed Contract Documents.
- D. Proof of Compliance

Whenever Contract Documents require that a project be in accordance with Federal Specification, ASTM designation, ANSI specification, or other association standard, at Engineer request, Contractor shall present an affidavit from manufacturer certifying that product complies therewith. Where requested or specified, submit supporting test data to substantiate.

- E. PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices and/or lump-sum prices contained in the Bidding Schedule.

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices and/or lump-sum prices contained in the Bidding Schedule.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

3.1. GENERAL

The General Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both on-site and off-site, and shall be keyed to the proposed construction sequence.

3.2. QUALITY CONTROL PLAN

A. General

The General Contractor shall furnish for review by the Engineer and Owner not later than 30 days after receipt of notice to proceed, a Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract. The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Engineer will consider an interim plan for the first 30 days of operation.

B. Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Engineer/Owner reserves the right to require the Contractor to make changes in his CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.3. SUBMITTALS

Submittals shall be as specified in Section 01300 SUBMITTAL. The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements.

3.4. CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. The controls shall be adequate to cover all construction operations, including both on-site and off-site fabrication, and will be keyed to the proposed construction sequence.

3.5. TESTS

A. Testing Procedure

The Contractor shall perform tests specified or required to verify that control measures are adequate to provide a product which conforms to contract requirements. Testing includes operation and/or acceptance tests when

specified. A list of tests to be performed shall be furnished as a part of the CQC plan. The list shall give the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required. The Contractor shall perform the following activities and record and provide the following data:

1. Verify that testing procedures comply with contract requirements.
2. Verify that facilities and testing equipment are available and comply with testing standards.
3. Check test instrument calibration data against certified standards.
4. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
5. Results of all tests taken, both passing and failing tests, will be recorded on the Quality Control report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test will be given. Actual test reports may be submitted later, if approved by the Engineer, with a reference to the test number and date taken. An information copy of tests performed by an off-site or commercial test facility will be provided directly to the Engineer. Failure to submit timely test reports, as stated, may result in nonpayment for related work performed and disapproval of the test facility for this contract.

B. Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials will be borne by the Contractor.

3.6. COMPLETION INSPECTION

At the completion of all work or any increment thereof established by a completion time, the Contractor shall conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved plans and specifications. Such a list of deficiencies shall be included in the CQC documentation, and shall include the estimated date by which the deficiencies will be corrected. The Contractor shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the Engineer. These inspections and any deficiency corrections required by this paragraph will be accomplished within the time stated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

3.7. DOCUMENTATION

- A. The Contractor shall maintain current records of quality control operations, activities, and tests performed, including the work of subcontractors and suppliers. These records shall be on an acceptable form and shall include factual evidence that required quality control activities and/or tests have been performed, including but not limited to the following:
1. Contractor/subcontractor and their area of responsibility.
 2. Operating plant/equipment with hours worked, idle, or down for repair.

3. Work performed today, giving location, description, and by whom.
4. Test and/or control activities performed with results and references to specifications/plan requirements.
5. Material received with statement as to its acceptability and storage.
6. Identify submittals reviewed, with contract reference, by whom, and action taken.
7. Off-site surveillance activities, including actions taken.
8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
9. List instructions given/received and conflicts in plans and/or specifications.
10. Contractor's verification statement.
11. These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Engineer weekly within 20 hours after the date(s) covered by the report, except that reports need not be submitted for days on which no work is performed. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the Contractor. The report from the Contractor shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.8. SAMPLE FORMS

Sample forms for Daily Construction Quality Control Report and Deficiency shall be provided by the General Contractor and submitted to Engineer for acceptance.

3.9. LINES AND GRADES

- A. Be responsible for properly laying out work, and for lines and measurements for the work executed under Contract Documents. Verify figures indicated on Drawings before laying out work, and report errors or inaccuracies in writing to the Engineer before commencing work.
- B. All trades shall be responsible for layout of their work, based on reference lines and measurements established by the General Contractor.
- C. Establish and maintain permanent hubs and other control points throughout construction.

END OF SECTION

SECTION 01550

ACCESS ROADS AND PARKING AREAS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Access Roads
- B. Parking Areas
- C. Graveled Areas

1.2 REFERENCES

- A. Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, Latest Edition.

1.3 RELATED SECTIONS

- A. 02741 – Hot-Mix Asphalt Paving

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aggregate shall be size No. 57, Size No. 610, or Size No. 710 and shall meet the requirements of Section 805 of the KDOH Specifications.
- B. Filter fabric as set out in Standard Details in Drawings.

PART 3 – EXECUTION

3.1. GENERAL

- A. Access Roads and areas shall be constructed of one or more courses of coarse aggregate uniformly spread on a prepared subgrade to the width and depth specified.
- B. Compaction will be accomplished pursuant to KDOH Specifications.

3.2. PLACING AGGREGATES

- A. Distribution of aggregate, in general, shall proceed from the point on the project nearest the source of supply so that as much compaction as possible may be gained from the passage of hauling equipment over the previously laid aggregate.

Hauling equipment shall be routed uniformly over all portions of the previously laid courses of the base. The procedure for distribution of the aggregate may be revised with permission or as directed.

- B. The aggregate shall be spread in the number of courses and at the rate of application indicated in the contract, unless otherwise directed. The Contractor shall hold in reserve a quantity of the aggregate for the purpose of strengthening weakened areas that may develop during construction operation.
- C. The material applied each day shall be shaped by means of a grader, as directed. In addition, the Contractor shall be required to make one complete round trip with the grader at least twice each week, and more often when deemed necessary, by the Engineer until the work is accepted as completed.

3.3. DRAINAGE

- A. Ditches and drainage elements shall be constructed and/or maintained as shown on the Contract Drawings and Details.

END OF SECTION

SECTION 01580

PROJECT IDENTIFICATION AND SIGN

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. The Contractor shall provide sign required by these specifications near the site of the work. The sign shall set forth the description of the work and the names of the Owner, Engineer and Contractor as shown hereinafter in these Specifications.
- B. The Contractor for **Contract "I-1" – Office Building** shall furnish and install one (1) project sign as described in previous paragraph and as detailed hereafter.

PART 2 - PRODUCTS

2.1. SIGN.

- A. The sign shall be constructed of 3/4" thick APA A-B Exterior grade or marine plywood. Posts shall be 4" x 4" of fencing type material. Prime all wood with white primer.

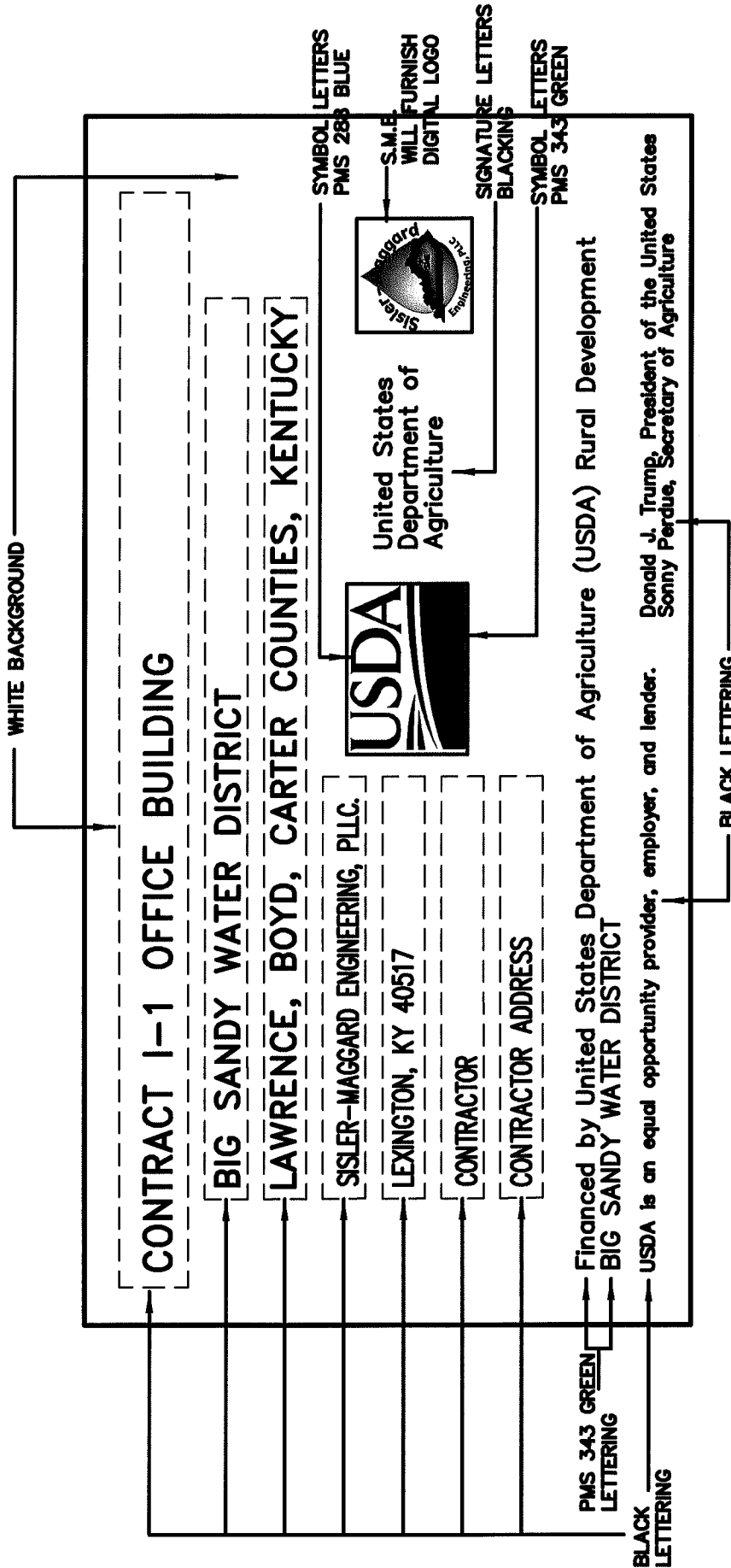
PART 3 - EXECUTION

3.1. MAINTENANCE

- A. The sign shall be maintained in good condition until completion of the Project. The sign shall be removed at completion of project.

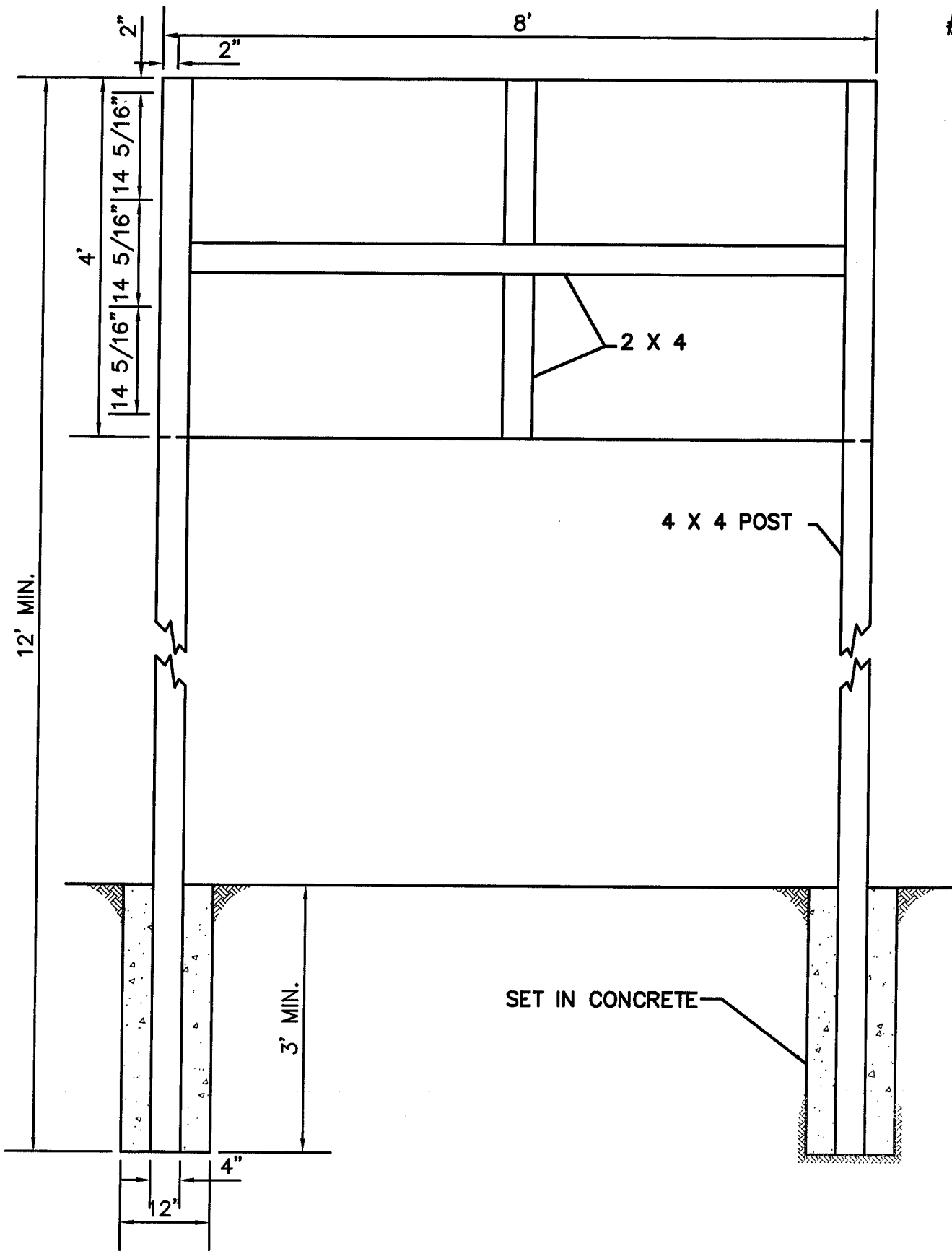
3.2. LOCATION OF SIGN.

The sign called for in these Specifications shall be placed at the location selected by the Engineer.



SIGN DIMENSIONS: 1200mm X 2400mm X 19mm (approx. 4' X 8' X 3/4")
 PLYWOOD PANEL (APA RATED A-B GRADE - EXTERIOR)

#15030



ASSEMBLY OF PLYWOOD SIGN

NOT TO SCALE

END OF SECTION
01580-3

SECTION 01700
PROJECT CLOSEOUT

PART 1 - GENERAL

1.1. RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Liquidated Damages: BID PROPOSAL, AGREEMENT AND GENERAL CONDITIONS
- B. Cleaning: Section 01710
- C. Project Record Documents: Section 01720

1.2. SUBSTANTIAL COMPLETION

- A. Contractor:
 - 1. Submit written certification to Engineer that Project is substantially complete.
 - 2. Submit list of items to be completed or corrected.
- B. Engineer will make an inspection within seven days after receipt of certification, together with Owner's and Contractor's Representatives.
- C. Should Engineer consider the project substantially complete:
 - 1. Contractor shall prepare and submit to Engineer a list of items to be completed or corrected, as determined by the inspection.
 - 2. Engineer will prepare and issue a Certificate of Substantial Completion containing:
 - a. Date of Substantial Completion.
 - b. Contractor's list of items to be completed or corrected, verified and/or amended by Engineer.
 - c. The time within which Contractor shall complete or correct work of listed items.
 - d. Time and date Owner will assume possession of project or designated portion thereof.
 - e. Responsibilities of Owner and Contractor for:
 - i. Insurance
 - ii. Utilities
 - iii. Operation of mechanical, electrical, and other systems
 - iv. Maintenance and cleaning
 - v. Security

- f. Signatures of:
 - i. Contractor
 - ii. Engineer
 - iii. Owner
 - 3. Owner occupancy of Project or Designated Portion of Project:
 - a. Contractor shall:
 - i. Obtain certificate of occupancy.
 - ii. Perform final cleaning in accordance with Section 01710.
 - b. Owner will occupy Project under provisions stated in Certificate of Substantial Completion.
 - 4. Contractor: Complete work listed for completion or correction, within designated time.
- D. Should Engineer consider that work is not substantially complete:
- 1. He shall immediately notify Contractor, in writing, stating reasons.
 - 2. Contractor: Complete work, and send second written notice to Engineer, certifying that Project, or designated portion of Project is substantially complete.
 - 3. Engineer and Owner will re-inspect work.

1.3. FINAL INSPECTION

- A. Contractor shall submit written certification that:
 - 1. Contract Documents have been reviewed.
 - 2. Project has been inspected for compliance with Contract Documents.
 - 3. Work has been completed in accordance with Contract Documents.
 - 4. Equipment and systems have been tested in presence of Engineer and Owner's Representative and are operational.
 - 5. Project is completed and ready for final inspection.
- B. Engineer will make final inspection within seven (7) days after receipt of certification.
- C. Should Engineer consider that work is finally complete in accordance with requirements of Contract Documents, he shall request Contractor to make Project Closeout submittals.
- D. Should Engineer consider that work is not finally complete:
 - 1. He shall notify Contractor, in writing, stating reasons.
 - 2. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to Engineer certifying that work is complete.
 - 3. Engineer and Owner will re-inspect work.

1.4. FINAL CLEANING UP

The Work will not be considered as completed and final payment made until all final clean up has been done by the Contractor in a manner satisfactory to the Engineer and Owner. See Section 01710 for detailed requirements.

1.5. CLOSEOUT SUBMITTALS

Project Record Documents: See requirements of Section 01720.

1.6. FINAL APPLICATION FOR PAYMENT

Contractor shall submit final applications for payment in accordance with requirements of GENERAL CONDITIONS (Section 19).

1.7. FINAL CERTIFICATE FOR PAYMENT

A. Engineer will issue final certificate in accordance with provisions of GENERAL CONDITIONS.

B. Should final completion be materially delayed through no fault of Contractor, Engineer may issue a Semi-Final Certificate for Payment.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION

SECTION 01710

CLEANING

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. During its progress, the work and the adjacent areas affected thereby shall be kept cleaned up and all rubbish, surplus materials, and unneeded construction equipment shall be removed and all damage repaired so that the public and property owners will be inconvenienced as little as possible.
- B. Where material or debris has washed or flowed into or been placed in existing watercourses, ditches, gutters, drains, pipes, structures, work done under this contract, or elsewhere during the course of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during the progress of the project. The ditches, channels, drains, pipes, structures, and any other work shall, upon completion of the work, be left in a clean and neat condition.
- C. On or before the completion of the project, the Contractor shall, unless otherwise specifically directed or permitted in writing, tear down and remove all temporary buildings and structures built by him; shall remove all temporary works, tools, and machinery or other construction equipment furnished by him; shall remove, acceptably disinfect, and cover all organic matter and material containing organic in, under, and around privies, hoses and other buildings used by him; shall remove all rubbish from any grounds which he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operations in a neat and satisfactory condition.
- D. The Contractor shall thoroughly clean all materials and equipment installed by him and his subcontractors, and on completion of the project shall deliver it undamaged and in fresh and new appearing conditions.
- E. The Contractor shall restore or replace, when and as directed, any public or private property damaged by his work, equipment, or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk, and landscaping work. Suitable materials, equipment, and methods shall be used for such restoration. The restoration of existing property or structures shall be done as promptly as practicable as work progresses and shall not be left until the end of the contract period.

1.2. DESCRIPTION

- A. Related Requirements Specified Elsewhere:
Project Closeout: Section 01700.
- B. On a continuous basis, maintain premises free from accumulations of waste, debris, and rubbish caused by operations.
- C. At completion of project, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all sight-exposed surfaces; leave Project clean and ready for occupancy.

1.3. SAFETY REQUIREMENTS.

A. Hazards Control:

1. Store volatile wastes in covered metal containers, and remove from premises daily.
2. Prevent accumulation of wastes which create hazardous conditions.
3. Provide adequate ventilation during use of volatile or noxious substances.

B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

1. Do not burn or bury rubbish and waste materials on Project site without written permission from the Owner.
2. Do not dispose of volatile wastes such as mineral spirits, oil, or fuel in open drainage ditches or storm or sanitary drains.
3. Do not dispose of wastes in streams or waterways.

PART 2 - PRODUCTS

2.1. MATERIALS

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.1. DURING CONSTRUCTION

- A. Execute cleaning to ensure that grounds and public properties are maintained free from accumulations of waste materials and rubbish.
- B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
- C. At reasonable intervals during progress of Work, clean site and public properties, and properly dispose of waste materials, debris, and rubbish.
- D. Provide on-site containers for collection of waste materials, debris, and rubbish.
- E. Remove waste materials, debris, and rubbish from site and legally dispose of at public or private dumping areas off Owner's property.
- F. The Contractor shall thoroughly clean all materials and equipment installed.

3.2. FINAL CLEANING

- A. Employ experienced workmen, or professional cleaners, for final cleaning.
- B. The Contractor shall restore or replace existing property or structures as promptly and practicable as work progresses.

END OF SECTION

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1. WORK INCLUDED

The contractor shall obtain from the Engineer one (1) set of blueline prints of the Contract Drawings. These prints shall be kept and maintained in good condition at the project site and qualified representative of the Contractor shall enter upon these prints, from day-to-day, the actual "as built" record of the construction progress. Entries and notations shall be made in a neat and legible manner and these prints shall be delivered to the Engineer upon completion of the construction. APPROVAL FOR FINAL PAYMENT WILL BE CONTINGENT UPON COMPLIANCE WITH THIS PROVISION.

1.2. RELATED REQUIREMENTS SPECIFIED ELSEWHERE:

- A. Maintain at job site, one copy of:
 - 1. Contract Drawings
 - 2. Specifications
 - 3. Addenda
 - 4. Reviewed Shop Drawings
 - 5. Change Orders
 - 6. Other Modifications to Contract.
- B. Store documents in approved location, apart from documents used for construction.
- C. Provide files and racks for storage of documents.
- D. Maintain documents in clean, dry, legible condition.
- E. Do not use record documents for construction purposes.
- F. Make documents available at all times for inspection by Engineer and Owner.

1.3. MARKING DEVICES

Provide colored pencil or felt-tip pen for all marking.

1.4. RECORDING

- A. Label each document "PROJECT RECORD" in 2-inch high printed letters.
- B. Keep record documents current.
- C. Do not permanently conceal any work until required information has been recorded.
- D. Contract Drawings: Legibly mark to record actual construction:
 - 1. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
 - 2. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
 - 3. Field changes of dimension and detail.
 - 4. Changes made by Change Order or Field Order.
 - 5. Details not on original Contract Drawings.
- E. Specifications and Addenda: Legibly mark up each Section to record:
 - 1. Manufacturer, trade name, catalog number, and supplier or each product and item of equipment actually installed.
 - 2. Changes made by Change Order or Field Order.
 - 3. Other matters not originally specified.
- F. Shop Drawings: Maintain as record documents; legibly annotate Shop Drawings to record changes made after review.

1.5. SUBMITTAL

- A. At completion of project, deliver record documents to Engineer.
- B. Accompany submittal with transmittal letter, in duplicate, containing:
 - 1. Date Project Title and Number Contractor's Name and Address
 - 2. Title and Number of each Record Document
 - 3. Certification that each Document as Submitted is Complete and Accurate
 - 4. Signature of Contractor or his authorized Representative.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED.

END OF SECTION

SECTION 01740
BASIS FOR PAYMENT

CONTRACT "I-1" – Office Building

PART 1 - GENERAL

All payment for work done under the provisions of this contract shall be in accordance with this basis for payment for the specific items listed herein and in the bid proposal. The item numbers in this section correspond with the item numbers in the bid proposal.

Items 1 – Building Complete

Payment for this item shall be based on the lump sum price bid as shown on the Civil, Architectural, Mechanical & Electrical and Structural plans and in the specifications. This item shall include all work and materials necessary for general and final grading with storm drainage, excavate footer (including rock excavation) to required depth, construct proposed building including HVAC, concrete pads for drive thru, propane tank, access doors, etc., handicap parking striping, guardrail in front of building, mechanical and plumbing to include connection to Septic System (furnished and installed by others), electrical in building including necessary accommodations for security system inside and outside building (to be furnished and installed by others), and electrical service drops, masonry, carpentry work, concrete, seeding, fertilizer, strawing, testing, painting, cleanup and all material and labor necessary to complete the proposed project, all in accordance with the drawings, details and Technical Specifications.

Cabinet(s) and shelving shall be furnished and installed by others. The General Contractor shall coordinate cabinetry with the outside cabinet sub-contractor for kitchen and drive thru window.

The cost of all associated items not specifically listed for separate payment in the proposal shall be included as an incidental expense.

Rock excavation is **not** a separate pay item.

Items 2 – Stone Base

Payment for this item shall be based on the unit price bid per square yard and shall include all work and materials necessary for complete installation, including excavating and grading, filter fabric, stone base and compaction in accordance with the Technical Specifications and DETAIL "C" on site plan. Payment is to be based on the measured quantity of the various items placed within limits as necessary to furnish and place same.

The cost of all associated items not specifically listed for separated payment in the proposal shall be included as an incidental expense.

Rock excavation is **not** a separate pay item.

Items 3 – Asphalt Paving on Existing Stone Base

Payment for this item shall be based on the unit price bid per square yard and shall include all work and materials necessary for complete installation, including excavating and grading and asphalt furnishing and placement and compaction in accordance with the Technical Specifications and DETAIL "B" on site plan. Payment is to be based on the measured quantity of the various items placed within limits as necessary to furnish and place same.

The cost of all associated items not specifically listed for separated payment in the proposal shall be included as an incidental expense.

Items 4 – Asphalt Paving including Stone Base

Payment for this item shall be based on the unit price bid per square yard and shall include all work and materials necessary for complete installation, including excavating and grading, filter fabric, stone base and asphalt furnishing and placement and compaction in accordance with the Technical Specifications and DETAIL "A" on site plan. Payment is to be based on the measured quantity of the various items placed within limits as necessary to furnish and place same.

The cost of all associated items not specifically listed for separated payment in the proposal shall be included as an incidental expense.

Rock excavation is **not** a separate pay item.

END OF SECTION

SECTION 02220

EXCAVATION

PART 1 - GENERAL

All excavation on this project is unclassified.
Rock removal is not a pay item.

PART 2 - PRODUCTS

Not used.

PART 3 - EXCAVATION FOR TRENCHES

3.1. INSPECTION

- A. All excavation on this project is unclassified. Rock removal is not a pay item.
- B. If the foundation is good firm earth and the machine excavation has been accomplished, the remainder of the material shall be excavated by hand and the earth pared or molded to give full support to the lower quadrant of the barrel of each pipe. Where bell and spigot pipe are involved, bell holes shall be excavated during this latter operation to prevent the bells from being supported on undisturbed earth. If for any reason the machine excavation in earth is carried below an evaluation that will permit the type of bedding in undisturbed earth, then a layer of granular material shall be placed so that the lower quadrant of the pipe will be securely bedded in the granular fill as described in Section 02700, Part 3, Article 3.03.
- C. If the foundation is rock and the excavation has been undercut as set out hereinbefore, a bed of No. 9 crushed stone aggregate shall be placed to provide continuous support for the lower quadrant of the pipe. This bedding is incidental cost of construction and is **not** a pay item.
- D. Trenches shall be of sufficient width to provide free working space on each side of the pipe and to permit proper backfilling around the pipe, but unless specifically authorized by the Engineer, trenches shall in no case be excavated or permitted to become wider than 2'6" plus the nominal diameters of the pipe at the level of or below the top of the pipe. Trenches cut in roads and streets shall not exceed a maximum width of 3'6" plus the nominal diameters of the pipe at the level of the road or street surface.
- E. All excavated materials shall be placed a minimum of 2 feet back from the edge of the trench.

- F. Unless specifically directed otherwise by the Engineer, not more than 500 feet of trench shall be opened ahead of the pipe laying work of any one crew, and not more than 500 feet or open ditch shall be left behind the pipe laying work of any one crew or a total of 1000 feet or open ditch. Watchmen or barricades, lanterns, and other such signs and signals as may be necessary to warn the public of the dangers in connection with open trenches, excavations, and other obstructions, shall be provided by and at the expense of the Contractor.
- G. When so required, or when directed by the Engineer, only one-half of street crossings and road crossings shall be excavated before placing temporary bridges over the side excavated, for the convenience of the traveling public. All backfilled ditches shall be maintained in such manner that they will offer no hazard to the passage of traffic. The convenience of the traveling public and the property owners abutting the improvements shall be taken into consideration. All public or private drives shall be promptly backfilled or bridged at the direction of the Engineer.
- H. Where existing drainage ditches coincide with the proposed gravity sewer alignment, the Contractor shall re-establish the drainage ditch after the sewer line has been laid and properly backfilled. The drainage ditch shall be of equal size as the previously existing one and free of any restrictions which might impede flow.

3.2. REMOVAL OF WATER

- A. The Contractor, at his own expense, shall provide adequate facilities for promptly and continuously removing water from all excavation.
- B. To ensure proper conditions at all times during construction, the Contractor shall provide and maintain ample means and devices (including spare units kept ready for immediate use in case of breakdowns) with which to interpret and/or remove promptly and dispose properly for all water entering trenches and other excavations. Such excavation shall be kept dry until the structures, pipes, and appurtenances to be built therein have been completed to such extent that they will not be floated or otherwise damaged.
- C. All water pumped or drained from the work shall be disposed of in a suitable manner without undue interference with other work, damage to pavements, other surfaces, or property. Suitable temporary pipes, flumes, or channels shall be provided for water that may flow along or across the site of work.
- D. If necessary, The Contractor shall dewater the excavations by means of an efficient drainage wellpoint system which will drain the soil and prevent saturated soil from flowing into the excavation. The wellpoints shall be designed especially for this type of service. The pumping unit shall be designed for use with the wellpoints, and shall be capable of maintaining a high vacuum and of handling large volumes of air and water at the same time.

- E. The installation of the wellpoints and pump shall be done under the supervision of a competent representative of the manufacturer. The Contractor shall do all special work such as surrounding the wellpoints with sand or gravel or other work which is necessary for the wellpoint system to operate for the successful dewatering of the excavation

3.03 DISPOSITION OF EXCAVATED MATERIAL

Material excavated for gravity sewers, manholes, or other structures shall be disposed of by the Contractor at his own expense. All excavated material which is not needed or is unacceptable for backfilling purposes shall be disposed of by the Contractor in a manner satisfactory to the Engineer.

3.04 UNAUTHORIZED EXCAVATION

Whenever the excavation is carried beyond or below the required lines and grades, the Contractor, at his own expense, shall refill said excavated space with suitable material in a manner approved by the Engineer.

3.05 EXISTING UTILITIES AND OTHER OBSTRUCTIONS

The Engineer has endeavored to show all existing utilities and or obstructions to the best of his ability within the confines of information furnished by others. It is the full responsibility of the Contractor to verify locations as set out hereinafter and open sufficient ditch in advance to assure no conflicts. Relocations, adjustments, and damages due to improper planned methods and procedures will be at the cost of the Contractor. Any conflicts or damages by this project with existing utilities shall be immediately brought to the attention of the Engineer. If any utility is damaged or disrupted the Contractor must take what ever measures necessary to restore service immediately at his cost.

Prior to the commencement of construction on the project, the Contractor shall contact the utility companies whose lines (above and below ground) may be affected during construction and verify the locations of the utilities as shown on the Contract Drawings. The Contractor shall ascertain from said companies if he will be allowed to displace or alter, by necessity, those lines encountered or replace those lines disturbed by accident during construction, or if the companies themselves are only permitted by policy to perform such work. If the Contractor is permitted to perform such work, he shall leave the lines in as good condition as were originally encountered and complete the work as quickly as possible. All such lines or underground structures damaged or disrupted in the construction shall be replaced at the Contractors expense, unless, in the opinion of the Engineer, such damage was caused through no fault of the Contractor

END OF SECTION

SECTION 02221

EXCAVATION, TRENCHING, AND BACKFILLING
FOR UTILITIES SYSTEMS

PART 1 - GENERAL

1.01 WORK INCLUDED, EXCAVATION, TRENCHING AND BACKFILLING FOR THE
FOLLOWING SYSTEMS

A. Water Systems.

1.02 RELATED WORK

- A. Section 02202 - Rock Removal
- B. Section 02270 - Erosion Control
- C. Section 02480 - Seeding

1.03 Applicable Publications

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

- A. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
AASHTO T 180 (1986) Moisture-Density Relations of Soils Using a 10-lb. Rammer an 18-in Drop
- B. AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM)
ASTM D 2487 (1985) Classification of Soils for Engineering Purposes

1.04 DEFINITIONS

Degree of Compaction

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in -AASHTO T 180-, Method D.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Satisfactory Materials
Satisfactory materials shall consist of any material classified by -ASTM D 2487- as GW, GP, and SW.
- B. Unsatisfactory Materials
Unsatisfactory materials shall be materials that do not comply with the requirements for satisfactory materials. Unsatisfactory materials include but are not limited to those materials containing roots and other organic matter, trash, debris, frozen materials and stones larger than 3 inches, and materials classified in -ASTM D 2487-, as PT, OH, and OL. Unsatisfactory materials also include man-made fills, refuse, or backfills from previous construction.

- C. Cohesionless and Cohesive Materials
Cohesionless materials shall include materials classified in -ASTM D 2487- as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are non-plastic.
- D. Rock - See Section 02202
- E. Unyielding Material
Unyielding material shall consist of rock and gravelly soils with stones greater than 3 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.
- F. Unstable Material
Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenant structure.
- G. Select Granular Material
Select granular material shall consist of well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve and no less than 95 percent by weight passing the 1-inch sieve. The maximum allowable aggregate size shall be 1 inch, or the maximum size recommended by the pipe manufacturer, whichever is smaller.
- H. Initial Backfill Material
Initial backfill shall consist of select granular material or satisfactory materials free from rocks 3 inches or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. When the pipe is coated or wrapped for corrosion protection, the initial backfill material shall be free of stones larger than 2 inches in any dimension or as recommended by the pipe manufacturer, whichever is smaller.

PART 3 - EXECUTION

3.01 EXCAVATION

Excavation shall be performed to the lines and grades indicated. Rock excavation shall include removal and disposition of material. Earth excavation shall include removal and disposal of material not classified as rock excavation. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to 1/2 the depth of the excavation, but in no instance closer than 2 feet. Excavated material not required or not satisfactory for backfill shall be removed from the site. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed to maintain the stability of the bottom and sides of the excavation.

3.02 Trench Excavation

The trench shall be excavated as specified for applicable utility. Trench walls below the top of the pipe shall be sloped, or made vertical, and of such width as

recommended in the manufacturer's installation manual. Where no manufacturer's installation manual is available, trench walls shall be made vertical. Trench walls more than 4 feet high shall be shored, cut back to a stable slope, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave in. Vertical trench walls more than 4 feet high shall be shored. Trench walls which are cut back shall be excavated to at least the angle of repose of the soil. Special attention shall be given to slopes which may be adversely affected by weather or moisture content. The trench width below the top of pipe or cable shall not exceed 24 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter and shall not exceed 36 inches plus pipe outside diameter for sizes larger than 24 inches inside diameter. Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized by the Contractor. The cost of redesign, stronger pipe, or special installation procedures shall be borne by the Contractor without any additional cost to the Owner.

3.03 Bottom Preparation

The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of 3 inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

3.04 Removal of Unyielding Material

Where over-depth is not indicated and unyielding material is encountered in the bottom of the trench, such material shall be removed 4 inches below the required grade and replaced with suitable materials as provided in paragraph "BACKFILLING AND COMPACTION."

3.05 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in paragraph "BACKFILLING AND COMPACTION." When removal of unstable material is required due to the fault or neglect of the Contractor in his performance of the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

3.06 Jacking, Boring, and Tunneling

Unless otherwise indicated, excavation shall be by open cut except that sections of a trench may be jacked, bored, or tunneled if, in the opinion of the Engineer, the pipe, cable, or duct can be safely and properly installed and backfill can be properly compacted in such sections.

3.07 Stockpiles

Stockpiles of satisfactory and wasted materials shall be placed and graded. Stockpiles shall be kept in a neat and well drained condition, giving due consideration to drainage at all times. The ground surface at stockpile locations shall be cleared, grubbed, and sealed by rubber-tired equipment, excavated satisfactory and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory materials shall be protected from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, such material shall be removed and replaced

with satisfactory material from approved sources at no additional cost to the Government.

3.08 Placement of facilities (pipe, cable, ducts) may be on solid good clean compacted earth. See details.

3.09 BACKFILLING AND COMPACTION

Backfill material shall consist of satisfactory material, select granular material, or initial backfill material as required. Backfill shall be placed in layers not exceeding 6 inches loose thickness for compaction by hand operated machine compactors, and 8 inches loose thickness for other than hand operated machines, unless otherwise specified. Each layer shall be compacted to at least 95 percent maximum density for cohesionless soils and 90 percent maximum density for cohesive soils, unless otherwise specified.

3.10 Trench Backfill

Trenches shall be backfilled to the grade shown. The trench shall be backfilled to 2 feet above the top of pipe prior to performing the required pressure tests. The joints and couplings shall be left uncovered during the pressure test.

- A. Replacement of Unyielding Material
Unyielding material removed from the bottom of the trench shall be replaced with select granular material or initial backfill material.
- B. Replacement of Unstable Material
Unstable material removed from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding 6 inches loose thickness.
- C. Bedding and Initial Backfill
Bedding of bank run sand or #9 gravel 4" thick shall be placed under water lines. Initial backfill material shall be placed and compacted with approved tampers to a height of at least one foot above the utility pipe or cable. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.
- D. Final Backfill

The remainder of the trench, shall be filled with satisfactory material. Backfill material shall be placed and compacted as follows:

Sidewalks, Turfed or Seeded Areas and Miscellaneous Areas: Backfill shall be deposited in layers of a maximum of 12-inch loose thickness, and compacted to 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils. Compaction by water flooding or jetting will not be permitted. This requirement shall also apply to all other areas not specifically designated above.

END OF SECTION

SECTION 02270

EROSION CONTROL, SEDIMENTATION, AND CONTAINMENT
OF CONSTRUCTION MATERIALS

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. The Contractor shall do all work and take all measures necessary to control soil erosion resulting from construction operations, shall prevent the flow of sediment from the construction site, and shall contain construction materials (including excavation and backfill) within his protected working area so as to prevent damage to the adjacent wetlands. **Necessary precautions set out hereunder shall take place immediately upon excavation or completion thereof. Under no circumstances shall any area of disturbance remain exposed longer than the end of the week of construction. Also see Section 01710 – Cleaning.**
- B. The Contractor shall not employ any construction method that violates a rule, regulation, guideline, or procedure established by Federal, State or local agencies having jurisdiction over the environmental effects of construction.
- C. Pollutants such as chemicals, fuels, lubricants, bitumen, raw sewage, and other harmful waste shall not be discharged into or alongside of any body of water or into natural or man-made channels leading thereto.

PART 2 - PRODUCTS

2.1. METHODS OF CONSTRUCTION

- A. The Contractor shall use any of the acceptable methods necessary to control soil erosion and prevent the flow of sediment to the maximum extent possible. These methods shall include, but not be limited to, the use of water diversion structures, diversion ditches, and settling basins.
- B. Construction operations shall be restricted to the areas of work indicated on the Drawings and to the area, which must be entered for the construction of temporary, or permanent facilities. The Engineer has the authority to limit the surface area of awardable earth material erodible by clearing and grubbing, excavation, borrow and fill operations, and to direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of the wetlands and adjacent watercourses. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, slope drains, and use of temporary mulches, mats, or other control devices or methods as necessary to control erosion.
- C. Excavated soil material shall not be placed adjacent to the wetlands or watercourses in a manner that will cause it to be washed away by high water or runoff. Earth berms or diversions constructed to intercept outlets shall be stable or shall be stabilized by means acceptable to the Engineer. If for any reason construction materials are washed away during the course of construction, the

Contractor shall remove those materials from the fouled areas as directed by the Engineer.

- D. For work within easements, all materials used on construction such as excavation, backfill, roadway and pipe bedding and equipment, shall be kept within the limits of the easements.
- E. The Contractor shall not pump silt-laden water from trenches or other excavations into the wetlands or adjacent watercourses. Instead, silt-laden water from his excavations shall be discharged within areas surrounded by baled hay or into sediment traps to ensure the only sediment-free water is returned to the watercourses. Damage to vegetation by excessive watering or silt accumulation in the discharge area shall be avoided.
- F. Prohibited construction procedures include, but are not limited to, the following:
 - 1. Dumping of spoil material into any streams, wetlands, surface waters, or unspecified locations.
 - 2. Indiscriminate, arbitrary, or capricious operation of equipment in wetlands or surface waters.
 - 3. Pumping of silt-laden water from trenches or excavations into surface waters or wetlands.
 - 4. Damaging vegetation adjacent to or outside of the construction area limits.
 - 5. Disposal of trees, brush, debris, paints, chemicals, asphalt products, concrete curing compounds, fuels, lubricants, insecticides, washwater from concrete trucks or hydroseeders, or any other pollutant in wetlands, surface waters, or unspecified locations.
 - 6. Open burning of debris from the construction work.
- G. Any temporary working roadways required shall consist of clean fill approved by the Engineer. In the event fill is used, the Contractor shall take every precaution to prevent the fill from mixing with native materials of the site. All such foreign materials shall be removed from the site following construction.

2.2. EROSION CHECKS

- A. The Contractor shall furnish and install baled hay or straw erosion checks in all locations indicated on the Drawings, surrounding the base of all deposits of stored excavated material outside of the disturbed area, and where indicated by the Engineer.
- B. Checks, where indicated on the Drawings, shall be installed immediately after the site is cleared and before trench excavation is begun at the location indicated. Checks located surrounding stored material shall be located approximately 6 feet from that material.
- C. Bales shall be held in place with two 2-inch by 2-inch by 4-foot wooden stakes. Each bale shall be butted tightly against the adjoining bale to preclude short-circuiting of the erosion check.

END OF SECTION

SECTION 02480

SEEDING, FERTILIZING AND MULCHING

PART 1 - GENERAL

1.1. WORK INCLUDED

A. CONDITIONS

1. General provisions of CONTRACT DOCUMENTS apply to this section.

B. DESCRIPTION OF WORK

1. Provide labor, material, equipment and services necessary for proper and complete seeding, fertilizing and mulching. **Necessary precautions set out hereunder shall take place immediately upon excavation or completion thereof. Under no circumstances shall any area of disturbance remain exposed longer than seven days. See Section 01710 - Cleaning**
2. Seed all new and disturbed lawn areas not otherwise indicated to be sodded.
3. **Restoration of all work areas including clean-up, grading, seeding, mulching, etc. shall begin immediately upon completion of installation of facilities. See Section 01710 – Cleaning.**

1.2. QUALITY ASSURANCE

- A. The intent of these Specifications is to require the Contractor to provide, in all areas to be seeded, fertilized and mulched, a smooth uniform turf of the grasses specified free from bare spots, eroded areas, weeds or other deficiencies. Acceptance by the Engineer is conditional upon compliance with this intent after initial growing season.
- B. Areas outside limits of construction, damaged by work under this Contract, shall be repaired as required to match existing conditions. This includes borrow areas for excavation.

PART 2 - PRODUCTS

2.1. MATERIALS

- A. Mulch shall be straw or hay mulch, tacked with asphalt, straw or hay mulch fixed in place with disk land packers or disk harrows; or fiber mulch applied simultaneously with grass seed and fertilizer by the use of hydroseeding machinery.
 1. Straw shall be stalks from oats, wheat, rye, barley, or rice that are free from noxious weeds, mold, or other objectionable material. Straw shall be in an air-dry condition suitable for placing with blower equipment.
 2. Hay shall be native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings, free from noxious weeds, mold or other objectionable material. Hay shall be in an air-dry condition and suitable

- for placing with blower equipment.
3. Wood cellulose fiber for use with hydraulic application or grass seed and fertilizer shall consist of specially prepared wood cellulose fiber or a combination of wood cellulose and recycled newsprint fibers, processed to contain no growth or germination - inhibiting factors and dyed an appropriate color to facilitate visual metering of the application of materials. On an air-dry weight basis, the wood cellulose fiber shall contain a maximum of 12 percent moisture, plus or minus 3 percent at the time manufactured. The combination of wood cellulose and recycled newsprint fibers shall contain a maximum of 10 percent moisture plus or minus 3 percent at the time of manufacture. The pH range for either mix shall be between 4.5 and 6.5.
- B. Commercial fertilizer shall be a complete commercial fertilizer of 10-10-10 formula, uniform in composition, dry and free flowing. Fertilizer which becomes caked or otherwise damaged making it unsuitable for use will not be accepted.
 - C. Limestone shall be finely pulverized (calcium carbonate) containing equivalent of at least 45% calcium oxide, and so pulverized that the residue on #30 and #200 sieves is not more than 0.5% and 15% respectively.
 - D. Seed Mixture
Lawn seed shall be guaranteed by dealer and distributed as follows:
 - 50% Fine Leaf Falcon Fescue
 - 20% Kentucky Bluegrass "Ken-Blue"
 - 30% Perennial Ryegrass

2.2 SOIL IMPROVEMENTS

- A. A soil test shall be performed for pH, chemical analysis and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of turf specified. Cost of soil tests is not a pay item and is an incidental cost to the Contractor.
- B. Lime shall be applied at the rate recommended by the soil test. Lime shall be incorporated into the soil to a minimum depth of 4 inches or may be incorporated as part of the tillage operation.
- C. Fertilizer shall be applied at the rate recommended by the soil test. Fertilizer shall be incorporated into the soil to a minimum depth of 4 inches or may be incorporated as part of the tillage or hydroseeding operation.

2.3 SEEDING AND MULCHING

- A. Planting Seasons and Conditions: Planting shall not be done when the ground is frozen, snow-covered, or in an unsatisfactory condition for planting. Spring seeding season shall be between February 15 and April 15. Fall seeding shall be between August 15 and October 15.
- B. Seeding seasons may be extended only at direction of Engineer.
 1. Seeding:
 - a. Seed shall be broadcast uniformly by approved sowing equipment at the rate of 5 pounds per 1,000 square feet over a designated area. One half of the seed shall be sown in one direction, and the

remainder shall be sown at right angles to the first sowing. The seed shall be covered to an average depth of (0.2-0.4) inch by means of spike tooth harrow, cultipacker, or other approved device. Seed shall not be broadcast when winds are above 10 miles per hour.

- b. Drill seeding shall be accomplished using approved equipment such as cultipacker seeders and grass seed drills. The seed shall be drilled uniformly to an average depth of (0.2-0.4) inch at a rate of 5 pounds per 1,000 square feet.
- c. When hydroseeding, the (seed and fertilizer), (seed, fertilizer, and approved mulch material) shall be mixed in the required amount of water to produce a homogeneous slurry and then uniformly applied. Wood cellulose or straw mulch shall be added after the seed and fertilizer have been thoroughly mixed. Lime, when applied hydraulically, shall be a single, separate operation.
- d. Immediately after seeding, the entire area shall be firmed with a roller not exceeding 90 pounds for each foot of roller width. If seeding is performed with a cultipacker-type seeder or if seed is applied in combination with hydromulching, rolling will not be required.

2. Mulching (Straw and Asphalt):

- a. All seeded areas indicated or directed by the Engineer shall be mulched with a straw and asphalt mat. Mulching shall follow seeding operation not later than 48 hours. The asphalt mat will not be required on areas adjacent to buildings, sidewalks or concrete curbs.
- b. Straw and asphalt mat shall be applied at rate of two and one-half (2½) tons of straw per acre, and 200 gallons of asphalt per acre. Asphalt shall either be emulsified RS-1 grade or cutback RC-1 grade. Method of application may be:
 - 1) by spreading straw evenly over seeded area after which asphalt tie-down is sprayed over straw in a solid pattern, or
 - 2) by applying mat in one operation by a jet type mulch spreader in which straw and asphalt are sprayed in mixture evenly over area.

2.4 SEED PROTECTION ON SLOPES

- A. Cover seeded slopes where grade is 3:1 or greater with jute matting. Roll matting down over slopes without stretching or pulling.
- B. Lay matting smoothly on soil surface, boring top end of each section in narrow 6-inch trench. Leave 12 inches overlap from top roll over bottom roll. Leave 4 inches overlap over adjacent section.
- C. Staple outside edges and overlaps at 36-inch intervals.
- D. Lightly dress slopes with topsoil to ensure close contact between matting and soil.
- E. In ditches, unroll matting in direction of flow. Overlap ends of strips 6 inches with upstream section on top.

2.5 WATERING

- A. Immediately following seeding, the Contractor shall water areas thoroughly, including subgrade.
- B. The prepared area is to be watered a minimum of two times per week until it has been accepted. This will not be required if sufficient rain occurs during the week.

2.6 CLEAN-UP

- A. Soil, peat or similar material which has been brought onto paved areas within or outside construction limit by hauling operations or otherwise shall be removed promptly, keeping these areas clean at all times.
- B. Upon completion of seeding, all excess soil, stones and debris which have not previously been cleaned up shall be removed from site or disposed of as directed by the Engineer.
- C. All attended areas shall be prepared for final inspection.

2.7 MAINTENANCE

- A. Maintenance shall begin immediately following last operation of seeding and shall continue until turf is formally accepted.
- B. Maintenance shall include watering, weeding, cultivating, mulching, regular mowing or seeded areas, and removal of dead materials.

2.8 INSPECTION FOR ACCEPTANCE

- A. Inspection of work of this section to determine completion, exclusive of possible replacement of seed, will be made by the Engineer upon written notice requesting such inspection submitted at least ten (10) days prior to anticipated date of inspection and provided that an 80% minimum coverage per square foot for all seeded areas has been established. Contractor shall guarantee, at the time of compliance with the intent of this Specification described herein. This guarantee shall apply to all permanent seeding performed in conjunction with project, regardless of type protection used or season in which seeding performed.
- B. When seeding does not meet guarantee requirements at time of inspection, the Contractor will be advised of amount and location of corrective work deemed necessary. Additional work required may include preparation of a new seedbed, refertilizing, reseeding, remulching, or any erosion control items that were originally required. Contractor shall perform all corrective work as soon as favorable working conditions occur after being advised of corrective work required. Corrective work and materials required to fulfill guarantee requirements will not be paid for, except as hereinafter provided for unavoidable damage.
- C. When unavoidable damage occurs after date project is declared complete and before inspection previously described, then payment will be made at original contract unit prices for additional seeding and protection work ordered by the Engineer. Unavoidable damage may result from slides, vehicular traffic, fires, and deluges. Failure of seed to sprout and grow will not be considered unavoidable damage.
- D. From time seeding and protection work begins until date project is declared complete, keep all seeded areas in good condition at all times. Damage to seeded areas or to mulch materials shall be promptly repaired as directed. All

work and materials necessary to protect, maintain and restore seeded areas during life of contract shall be performed at no additional cost to Owner, except additional work caused by changes in project by the Engineer.

- E. When it becomes necessary to disturb previously seeded areas at direction of the Engineer, payment for a reasonable amount of additional work, as determined by the Engineer, will be made at original contract unit price. No payment will be made for additional work due to changes made for benefit of Contractor, nor will payment be made for corrective work required because Contractor has failed to properly coordinate his entire erosion control schedule thus causing previously seeded areas to be disturbed by operations that could have been performed prior to seeding.
- F. After inspection, Contractor will be notified in writing by Engineer or acceptance of all work of this Section and Contractor will be notified in writing if there are deficiencies of requirements for completion of work. Replacements, maintenance or repair work remaining to be done shall be subject to re-inspection before acceptance.

2.9 PLANT WARRANTY AND REPLACEMENT

- A. The Contractor shall warrant 80% coverage per square foot of established grass area for duration of one (1) growing season after final acceptance of seeding by Owner. Seed shall be alive and in satisfactory growth at end of warranty period.
- B. Owner will be responsible for all maintenance necessary to keep grass alive and healthy between time lawns are accepted and end of warranty period. Basic needs of lawn during this period are for adequate water and protection from insects and other similar pests.
- C. Should contractor find lawn is not receiving proper maintenance at any time prior to end of the warranty period, he shall advise Engineer and Owner immediately in writing so corrective measures may be initiated.

END OF SECTION

SECTION 02741

HOT-MIX ASPHALT PAVING

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes hot-mix asphalt paving, patching and paving overlay.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
- B. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
- C. Material certificates.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall be registered with and approved by authorities having jurisdiction or the DOT of the state in which Project is located.
- B. Regulatory Requirements: Comply with KYTC for asphalt paving work.
- C. Asphalt Paving Publication: Comply with AI MS-22, "Construction of Hot-Mix Asphalt Pavements," unless more stringent requirements are indicated.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:
 - 1. Tack Coat: Minimum surface temperature of 60 deg. F.
 - 2. Asphalt Base Course: Minimum surface temperature of 40 deg. F and rising at time of placement.
 - 3. Asphalt Surface Course: Minimum surface temperature of 60 deg. F at time of placement.
- B. Pavement Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg. F for oil based materials, 50 deg. F for water-based materials, and not exceeding 95 deg. F.

PART 2 – PRODUCTS

2.1 AGGREGATES

- A. Coarse Aggregate: ASTM D 692, sound; angular crushed stone, crushed gravel, or properly cured, crushed blast-furnace slag.
- B. Fine Aggregate: ASTM D 1073, sharp edged natural sand or sand prepared from stone, gravel, properly cured blast-furnace slag or combinations thereof.
- C. Mineral Filler: ASTM D 242, rock or slag dust, hydraulic cement or other inert material.

2.2 ASPHALT MATERIALS

- A. Asphalt Binder: AASHTO MP 1
- B. Tack Coat: ASTM D 977, emulsified asphalt or ASTM D 2397, cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

2.3 AUXILIARY MATERIALS

- A. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form.
- B. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, with drying time of less than 45 minutes.
 - 1. Color: White
- C. Wheel Stops: Precast, air-entrained concrete, 2500 psi minimum compressive strength, 4 ½ inches high by 9 inches wide by 72 inches long. Provide chamfered corners and drainage slots on underside and holes for anchoring to substrate.
 - 1. Dowels: Galvanized steel, ¾ inch diameter, 10 inch minimum length

2.4 MIXES

- A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction; designed according to procedures in AI MS-2, "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types," and complying with the following requirements:

1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
2. Base Course: As indicated on construction documents
3. Surface Course: As indicated on construction documents

PART 3 – EXECUTION

3.1 PATCHING

- A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.02 to 0.15 gal/sq. yd.
- C. Patching: Fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact flush with adjacent surface.

3.2 SURFACE PREPARATION

- A. Proof roll subbase using heavy, pneumatic-tired rollers to located areas that are unstable or that require further compaction.
- B. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
 1. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.
- C. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted aggregate base before applying paving materials.
- D. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal/sq. yd.
 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.3 HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevent segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
 - 1. Spread mix at minimum temperature of 250 deg. F
 - 2. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt paving mat.
- B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a less width are required.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.4 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.
 - 1. Complete compaction before mix temperature cools to 185 deg. F
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 - 1. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

- F. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.5 INSTALLATION TOLERANCES

- A. Thickness: Compact each course to produce the thickness indicated within the following tolerances:
 - 1. Base Course: Plus or minus $\frac{1}{2}$ inch
 - 2. Surface Course: Plus $\frac{1}{4}$ inch, no minus
- B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10 foot straightedge applied transversely or longitudinally to paved areas:
 - 1. Base Course: $\frac{1}{4}$ inch
 - 2. Surface Course: $\frac{1}{8}$ inch
 - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is $\frac{1}{4}$ inch.

3.6 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors and placement have been verified with Engineer
- B. Allow paving to age for 30 days before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
 - 1. Broadcast glass spheres uniformly into wet pavement marking at a rate of 6 lb/gal.

3.7 WHEEL STOPS

- A. Securely attach wheel stops into pavement with not less than two galvanized steel dowels embedded at one-quarter to one-third points. Securely install dowels into pavement and bond to wheel stop. Recess head of dowel beneath top of wheel stop.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.
- B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- C. Remove and replace or install additional hot-mix asphalt where test results or measurements indicated that it does not comply with specified requirements.

3.9 DISPOSAL

- A. Except for material to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA approved landfill.

END OF SECTION

SECTION 03100
CONCRETE FORMWORK

PART 1 - GENERAL

1.1. WORK INCLUDED

This Section shall cover Concrete Forms, Metal Forms, Form Ties and Form Release Agents

1.2. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN CONCRETE INSTITUTE (ACI)

ACI 347 (1978; R 1984) Concrete Formwork

AMERICAN HARDBOARD ASSN (AHA)

AHA A135.4 (1982) Basic Hardboard

DEPARTMENT OF COMMERCE (DOC)

DOC PS 1 (1983) Construction and Industrial Plywood

1.3. SUBMITTALS

NOT APPLICABLE

1.4. DESIGN

- A. **METHODOLOGY:** Formwork shall be designed in accordance with methodology of ACI 347 for anticipated loads, lateral pressures, and stresses. Forms shall be capable of producing a surface, which meets the requirements of the class of finish specified in Section 03300 CONCRETE FOR BUILDING CONSTRUCTION.
- B. **PRESSURES:** Forms shall be capable of withstanding the pressures resulting from placement and vibration of concrete.

PART 2 - PRODUCTS

2.1. FORM MATERIALS

- A. **FORMS FOR CLASS B FINISH:** Forms for Class B finished surfaces shall be plywood panels conforming to DOC PS 1, Grade B-B concrete form panels,

Class I or II. Other form materials or liners may be used provided the smoothness and appearance of concrete produced will be equivalent to that produced by the plywood concrete form panels. Forms for round columns shall be the prefabricated seamless type.

- B. FORMS FOR CLASS D FINISH: Forms for Class D finished surfaces, except where concrete is placed against earth, shall be wood or steel or other approved concrete form material.
- C. FORM TIES: Form ties shall be factory-fabricated metal ties, shall be of the removable or internal disconnecting or snap-off type, and shall be of a design that will not permit form deflection and will not spill concrete upon removal. Solid backing shall be provided for each tie. Except where removable tie rods are used, ties shall not leave holes in the concrete surface less than 1/4 inch nor more than 1 inch deep and not more than 1 inch in diameter. Removable tie rods shall be not more than 1-1/2 inches in diameter.
- D. FORM RELEASING AGENTS: Form releasing agents shall be commercial formulations that will not bond with, stain or adversely affect concrete surfaces. Agents shall not impair subsequent treatment of concrete surfaces depending upon bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compounds

PART 3 - EXECUTION

3.1. INSTALLATION

- A. Forms shall be mortar tight, properly aligned and adequately supported to produce concrete surfaces meeting the surface requirements specified in Section 03300 CONCRETE FOR BUILDING CONSTRUCTION and conforming to construction tolerance given in TABLE 1.
- B. Where concrete surfaces are to have a Class B finish, joints in form panels shall be arranged as approved.
- C. Where forms for continuous surfaces are placed in successive units, care shall be taken to fit the forms over the completed surface so as to obtain accurate alignment of the surface and to prevent leakage of mortar.
- D. Forms shall not be reused if there is any evidence of surface wear and tear or defects which would impair the quality of the surface.
- E. Surfaces of forms to be reused shall be cleaned of mortar from previous concreting and of all other foreign material before reuse.
- F. Form ties that are to be completely withdrawn shall be coated with a non-staining bond breaker.

3.2. CHAMFERING

Except as otherwise shown, external corners that will be exposed shall be chamfered,

beveled, or rounded by moldings placed in the forms

3.3. COATING

- A. Forms for Class B finished surfaces shall be coated with a form releasing agent before the form or reinforcement is placed in final position. The coating shall be used as recommended in the manufacturer's printed or written instructions.
- B. Forms for Class C and D finished surfaces may be wet with water in lieu of coating immediately before placing concrete, except that in cold weather with probable freezing temperatures coating shall be mandatory.
- C. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete.

3.4. REMOVAL OF FORMS

- A. Forms shall be removed in a manner that will prevent injury to the concrete and ensure the complete safety of the structure.
- B. Formwork for columns, walls, side of beams and other parts not supporting the weight of concrete may be removed when the concrete has attained sufficient strength to resist damage from the removal operation but not before at least 24 hours has elapsed since concrete placement.
- C. Supporting forms and shores shall not be removed from beams, floors and walls until the structural units are strong enough to carry their own weight and any other construction or natural loads.
- D. In no case will supporting forms or shores be removed before the concrete strength has reached 70 percent of design strengths as determined by field cured cylinders or other approved methods. This strength shall be demonstrated by job-cured test specimens, and by a structural analysis considering the proposed loads in relation to these test strengths and the strength of forming and shoring system.
- E. The job-cured test specimens for form removal purposes shall be provided in numbers as directed and shall be in addition to those required for concrete quality control. The specimens shall be removed from molds at the age of 24 hours and shall receive, insofar as possible, the same curing and protection as the structures they represent.

TABLE 1

TOLERANCES FOR FORMED SURFACES

- 1. Variations from the plumb: In any 10 feet of length - 1/4 inch
 - a. In the lines and surfaces:

Maximum for entire length - 1 inch of columns, piers, walls and in arises

- b. For exposed corner columns:
 - In any 20 feet of length - 1/4 inch control-joint grooves, maximum for entire length - 1/2 inch other conspicuous lines
- 2. Variation from the level or from the grades indicated on the drawings:
 - In any 10 feet of length - 1/4 inch
 - In any bay or in any 20 feet of length - 3/8 inch
- 3. Variation of the linear building lines from established position in plan:
 - In any 20 feet - 1/2 inch
 - Maximum - 1 inch
- 4. Variation of distance between walls, columns, partitions:
 - 1/4 inch per 10 feet of distance, but not more than 1/2 inch in any one bay and not more than 1 inch total variation
- 5. Variation in the sizes and locations of sleeves, floor openings, and wall opening:
 - Minus - 1/4 inch
 - Plus - 1/2 inch
- 6. Variation in cross-sectional dimensions of columns and beams and in the thickness of slabs and walls:
 - Minus - 1/4 inch
 - Plus - 1/2 inch
- 7. Footings:
 - a. Variation of dimensions in plan when formed or when placed against unformed excavation:
 - Minus - 1/2 inch
 - Plus - 2 inches or 3 inches
 - b. Misplacement of 2 percent of the footing width in eccentricity the direction of misplacement but not more than 2 inches
 - c. Reduction in thickness:
 - Minus - 5 percent of specified thickness

END OF SECTION

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN CONCRETE INSTITUTE (ACI)

ACI 318 (1999) Building Code Requirements for Reinforced Concrete

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 53 (1999) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless

ASTM A 82 (1997) Steel Wire, Plain, for Concrete Reinforcement

ASTM A 184 (1996) Fabricated Deformed Steel Bar Mats for Concrete Reinforcement

ASTM A 185 (1997) Steel Welded Wire Fabric, Plain, for Concrete Reinforcement

ASTM A 497 (1999) Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement

ASTM A 499 (1997) Steel Bars and Shapes, Carbon Rolled from "T" Rails

ASTM A 615 (2000) Deformed and Plain Billet Steel Bars for Concrete Reinforcement

ASTM A 675 (1995) Steel Bars, Carbon, Hot Wrought, Special Quality, Mechanical Properties

ASTM A 706 (2000) Low-Alloy Steel Deformed Bars for Concrete Reinforcement

AMERICAN WELDING SOCIETY (AWS)

AWS D1.4 (1998) Structural Welding Code - Reinforcing Steel

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

CRSI MSP-1 (1996) Manual of Standard Practice

1.2. SUBMITTALS

Submit shop drawings and product data under provisions of Section 01300.

1.3. QUALIFICATIONS

- A. Welders shall be qualified in accordance with AWS D1.4.
- B. Qualification test shall be performed at the worksite and the Contractor shall notify the Owner 24 hours prior to conducting tests. .
- C. Welding procedures qualified by others and welders qualified by another employer may be accepted as permitted by AWS D1.4.

1.4. DELIVERY AND STORAGE

Reinforcement and accessories shall be stored off the ground on platforms, skids, or other supports.

PART 2 - PRODUCTS

2.1. DOWELS

- A. Dowels shall conform to ASTM A 675, Grade 80, or ASTM A 499. Steel pipe conforming to ASTM A 53, Schedule 80, may be used as dowels provided the ends are closed with metal or plastic inserts or with mortar.

2.2. FABRICATED BAR MATS

Fabricated bar mats shall conform to ASTM A 184.

2.3. REINFORCING STEEL

- A. Reinforcing steel shall be deformed bars conforming to ASTM A 615 or ASTM A 706, grades and sizes as indicated.

2.4. WELDED WIRE FABRIC

Welded wire fabric shall conform to ASTM A 185 or ASTM A 497.

2.5. WIRE TIES

Wire ties shall be 16 gauge or heavier black annealed steel wire.

2.6. SUPPORTS

- A. Bar supports for formed surfaces shall be designed and fabricated in accordance with CRSI MSP-1 and shall be steel or precast concrete blocks.
- B. Precast concrete blocks shall be not less than 4 inches square when supporting reinforcement on ground. Precast concrete block shall have compressive strength equal to that of the surrounding concrete.
- C. Where concrete formed surfaces will be exposed to weather or where surfaces are to be painted, steel supports within 1/2 inch of concrete surface shall be plastic protected or of stainless steel.
- D. Concrete supports used in concrete exposed to view shall have the same color and texture as the finish surface.
- E. For slabs on grade, supports shall be precast concrete blocks, plastic coated steel fabricated with bearing plates, or specifically designed wire fabric supports fabricated of plastic.

PART 3 - EXECUTION

3.1. REINFORCEMENT

- A. Reinforcement shall be fabricated to shapes and dimensions shown and shall conform to the requirements of ACI 318.
- B. Reinforcement shall be cold bent unless otherwise authorized. Bending may be accomplished in the field or at the mill. Bars shall not be bent after embedment in concrete.
- C. Safety caps shall be placed on all exposed ends of vertical concrete reinforcement bars that pose a danger to life safety.
- D. PLACEMENT: Reinforcement shall be free from loose rust and scale, dirt, oil, or other deleterious coating that could reduce bond with the concrete. Reinforcement shall be placed in accordance with ACI 318 at locations shown plus or minus one bar diameter. Reinforcement shall not be continuous through expansion joints and shall be as indicated through construction or contraction joints. Concrete coverage shall be as indicated or as required by ACI 318. If bars are moved more than one bar diameter to avoid interference with other reinforcement, conduits or embedded items, the resulting arrangement of bars, including additional bars required to meet structural requirements, shall be approved before concrete is placed.
- E. SPLICING: Splices of reinforcement shall conform to ACI 318 and shall

be made only as required or indicated. Splicing shall be by lapping or by mechanical or welded butt connection; except that lap splices shall not be used for bars larger than No. 11 unless otherwise indicated. Welding shall conform to AWS D1.4. Welded butt splices shall be full penetration butt welds. Lapped bars shall be placed in contact and securely tied or spaced transversely apart to permit the embedment of the entire surface of each bar in concrete. Lapped bars shall not be spaced farther apart than one-fifth the required length of lap or 6-inches. Mechanical butt splices shall be in accordance with the recommendation of the manufacturer of the mechanical splicing device. Butt splices shall develop 125 percent of the specified minimum yield tensile strength of the spliced bars or of the smaller bar in transition splices. Bars shall be flame dried before butt splicing. Adequate jigs and clamps or other devices shall be provided to support, align, and hold the longitudinal centerline of the bars to be butt spliced in a straight line.

3.2. WELDED-WIRE FABRIC

- A. Welded-wire fabric shall be placed in slabs as indicated. Fabric placed in slabs on grade shall be continuous between expansion, construction, and contraction joints.
- B. Lap splices shall be made in such a way that the overlapped area equals the distance between the outermost crosswires plus 2 inches. Laps shall be staggered to avoid continuous laps in either direction.
- C. Fabric shall be wired or clipped together at laps at intervals not to exceed 4 feet.
- D. Fabric shall be positioned by the use of supports.

3.3. DOWELS

- A. Dowels shall be installed in slabs on grade at locations indicated and at right angles to joint being doweled.
- B. Dowels shall be accurately aligned parallel to the finished concrete surface and rigidly supported during concrete placement.
- C. One end of dowels shall be coated with a bond breaker.

END OF SECTION

SECTION 03210
REINFORCING STEEL

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. Section 03210 - Reinforcing steel.
- B. Section 01300 – Submittals.

1.2. RELATED WORK

- A. Section 03300 - Concrete.

1.3. REFERENCES

- A. ASTM A-615
- B. ASTM A-616
- C. ASTM A-617
- D. ACI 351
- E. ASTM A-120

PART 2 – PRODUCTS

2.1. SUBMITTALS

- A. The minimum yield strength of the reinforcement shall be 60,000 pounds per square inch. Bar reinforcement shall conform to the requirements of ASTM A-615, A-616, or A-617. All bar reinforcement shall be deformed.
- B. Smooth dowels shall be plain steel bars conforming to ASTM A-615, Grade 60, or steel pipe conforming to ASTM A-120, Schedule 80. Pipe, if used, shall be closed flush at each end with mortar or metal or plastic cap.
- C. Reinforcement supports and other accessories in contact with the forms for members which will be exposed to view in the finished work shall be of stainless steel or shall have approved high density polyethylene tips so that the metal portion shall be at least one quarter of an inch from the form or surface. Supports for reinforcement, when in contact with the ground or stone fill, shall be precast stone concrete blocks. Particular attention is directed to the requirements of paragraph 5.5.3 of ACE Standard 301. These requirements

apply to all reinforcement, whether in walls or other vertical elements, inclined elements or flatwork.

2.2. FABRICATION

- A. Reinforcement shall be bent cold. It shall be bent accurately to the dimensions and shapes shown on the plans and to within tolerances specified in the CRSI Manual of Standard Practice.
- B. Reinforcing shall be shipped with bars of the same size and shape, fastened securely with metal identification tags giving size and mark.

PART 3 - EXECUTION

3.1 PLACING AND FASTENING

- A. Before being placed in position, reinforcement shall be cleaned of loose mill and rust scale, dirt and other coatings that will interfere with development of proper bond.
- B. Reinforcement shall be accurately placed in positions shown on the drawings and firmly held in place during placement and hardening of concrete by using annealed wire ties. Bars shall be tied at all intersections except where spacing is less than one foot in both directions, then alternate intersections may be tied.
- C. Distance from the forms shall be maintained by means of stays, blocks, ties, hangers or other approved supports. Blocks for holding the reinforcement from contact with the forms shall be precast mortar blocks or approved metal chairs. Metal chairs which are in contact with the exterior surface of the concrete shall be galvanized. Layers of bars will be separated by precast mortar blocks or other equally suitable devices; the use of pebbles, pieces of broken stone or brick, metal pipe and other such blocks will not be permitted. If fabric reinforcement is shipped in rolls, it shall be straightened into flat sheets before being placed.
- D. Before any concrete is placed, the Engineer shall have inspected the placing of the steel reinforcement and given permission to deposit the concrete. Concrete placed in violation of this provision will be rejected and thereupon shall be removed.
- E. Unless otherwise specified, reinforcement shall be furnished in the full lengths indicated on the plans. Splicing of bars, except where shown on the plans, will not be permitted without the concurrence of the Engineer. Where splices are made, they shall be staggered insofar as possible.

END OF SECTION

SECTION 03250

EXPANSION JOINTS, CONTRACTION JOINTS, AND WATERSTOPS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Contraction-Joint Strips.
- B. Expansion Joint Filler
- C. Joint Sealant
- D. Waterstops

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A135.4 (1995) Basic Hardboard

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1751 (1999) Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)

ASTM D 1752 (1996) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

ASTM D 2628 (1998) Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements

ASTM D 2835 (1998) Lubricant for Installation of Preformed Compression Seals in Concrete Pavements

CORPS OF ENGINEERS HANDBOOK FOR CONCRETE AND CEMENT (USACE)

COE CRD-C513 (1974) Rubber Waterstops

COE CRD-C572 (1974) Polyvinylchloride Waterstops

FEDERAL SPECIFICATIONS (GSA)

- | | |
|--------------|---|
| FS SS-S-200 | (Rev. E; Am. 2) Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold-Applied, for Portland Cement Concrete Pavement |
| FS SS-S-1401 | (Rev. C: Am. 1; Notice 1) Sealant, Joint, Non-Jet-Fuel-Resistant, Hot-Applied, for Portland Cement and Asphalt Concrete Pavements |
| FS SS-S-1614 | (Rev. A; Am. 1; Notice 1) Sealants, Joint, Jet-Fuel-Resistant, Hot-Applied, for Portland Cement and Tar Concrete Pavements |

1.3 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.

1.4 DELIVERY AND STORAGE

- A. Material delivered and placed in storage shall be stored off the ground and protected from moisture, dirt, and other contaminants.
- B. Sealants shall be delivered in the manufacturer's original unopened containers. Sealants whose shelf life has expired shall be removed from the site.

PART 2 - PRODUCTS

- 2.01 Products listed herein shall apply to application of contract documents/drawings. Drawings list location and type of products to be used.

2.1 CONTRACTION-JOINT STRIPS

- A. Contraction-joint strips shall be 1/8-inch thick tempered hardboard conforming to ANSI A135.4, Class 1.
- B. In lieu of hardboard strips, rigid polyvinylchloride (PVC) insert strips specifically designed to induce controlled cracking in slabs on grade may be used. Such insert strips shall have removable top section.

2.2 EXPANSION-JOINT FILLER

- A. Expansion-joint filler shall be pre-molded material conforming to ASTM D 1751 or ASTM D 1752.
- B. Unless otherwise indicated, filler material shall be 3/8-inch thick and of a width applicable for the joint formed.

2.3 JOINT SEALANT

- A. Joint sealant shall conform to the following:
- B. Preformed Polychloroprene Elastomeric Joint Seals ASTM D 2628.
- C. Lubricant for Installation of Preformed Compression Seals ASTM D 2835.
- D. Hot-Poured Type FS SS-S-1401.
- E. Cold-Applied Jet-Fuel Resistant Type FS SS-S-200, Type M.
- F. Hot-Applied Jet-Fuel Resistant Type FS SS-S-1614.

2.4 WATERSTOPS

- A. Waterstops shall conform to COE CRED-C513 or COE CRD-C572.

PART 3 - EXECUTION

3.1. JOINTS

Joints shall be installed at locations indicated and as authorized.

- A. **Contraction Joints:** Contraction joints may be constructed by inserting tempered hardboard strips or rigid PVC insert strips into the plastic concrete or by cutting the concrete with a saw after concrete has set. Joints shall be approximately 1/8-inch wide and shall extend into the slab approximately one-fourth the slab thickness but not less than 1 inch.
 - 1. **Joint Strips:** Strips shall be of the required dimensions and as long as practicable. After the first floating, the concrete shall be grooved with a tool at the joint locations. The strips shall be inserted in the groove and depressed until the top edge of the vertical surface is flush with the surface of the slab. The slab shall be floated and finished as specified. Working of the concrete adjacent to the joint shall be the minimum necessary to fill voids and consolidate the concrete. Where indicated, the top portion of the strip shall be sawed out after the curing period to form a recess for sealer. The removable section of PVC strips shall be discarded and the insert left in place. Means shall be provided to insure true alignment of the strips is maintained during insertion.
 - 2. **Sawed Joints:** Joint sawing shall be early enough to prevent uncontrolled cracking in the slab, but late enough that this can be accomplished without appreciable spalling. Concrete-sawing machines shall be adequate in number and power, and with sufficient replacement blades to complete the sawing at the required rate. Joints shall be cut to true alignment and shall be cut in sequence of concrete placement. Sludge and cutting debris shall

be removed.

- B. Expansion Joints: Pre-molded expansion joint filler shall be used in expansion and isolation joints in slabs around columns and between slabs on grade and vertical surfaces where indicated. The filler shall extend the full slab depth, unless otherwise indicated. The edges of the joint shall be neatly finished with an edging tool of 1/8-inch radius, except where a resilient floor surface will be applied. Where the joint is to receive a sealant, the filler strips shall be installed at the proper level below the finished floor with a slightly tapered, dressed-and-oiled wood strip temporarily secured to the top thereof to form a recess 3/4-inch deep to be filled with sealant. The wood strip shall be removed after the concrete has set. In lieu of the wood strip a removable expansion filler cap designed and fabricated for this purpose may be used.
- C. Joint Sealant: Sawed contraction joints and expansion joints in slabs shall be filled with joint sealant, unless otherwise shown. Types and locations of sealants shall be as indicated. Joint surfaces shall be clean, dry, and free of oil or other foreign material which would adversely affect the bond between sealant and concrete. Joint sealant shall be applied as recommended by the manufacturer of the sealant. Joints sealed with field molded sealant shall be completely filled with sealant.

3.2. WATERSTOPS

- A. Waterstops shall be of the type indicated and shall be installed at the locations shown to form a continuous watertight diaphragm.
- B. Adequate provision shall be made to support and completely protect the waterstops during the progress of the work. Any waterstop punctured or damaged shall be repaired or replaced.
- C. Splices shall be made in conformance with the recommendations of the waterstop manufacturer. Continuity of cross sectional features shall be maintained across the splice. Splices showing evidence of separation after bending shall be remade.

END OF SECTION

SECTION 03300

CONCRETE

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Admixtures
- B. Cementitious Materials
- C. Aggregates
- D. Curing Materials
- E. Embedded Items
- F. Nonshrink Grout
- G. Nonslip Surfacing Material
- H. Floor Hardener
- I. Perimeter Insulation
- J. Vapor Barrier
- K. Water

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN CONCRETE INSTITUTE (ACI)

- | | |
|-----------|---|
| ACI 211.1 | (1981; Rev 1985) Selecting Proportions for Normal, Heavyweight, and Mass Concrete |
| ACI 211.2 | (1981) Selecting Proportions for Structural Lightweight Concrete |
| ACI 301 | (1984; Rev 1988) Structural Concrete for Buildings |
| ACI 305R | (1977; Rev 1982) Hot Weather Concreting |
| ACI 318 | (1983; Rev 1986) Building Code Requirements for Reinforced Concrete |

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- | | |
|-----------|--|
| ASTM C 31 | (1988) Making and Curing Concrete Test Specimens in the Field |
| ASTM C 33 | (1986) Concrete Aggregates |
| ASTM C 39 | (1986) Compressive Strength of Cylindrical Concrete Specimens |
| ASTM C 42 | (1987) Obtaining and Testing Drilled Cores and Sawed Beams of Concrete |

ASTM C 78	(1984) Flexural Strength of Concrete (Using Simple Beam With Third Point Loading)
ASTM C 94	(1986b) Ready Mixed Concrete
ASTM C 109	(1987) Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens)
ASTM C 143	(1978) Slump of Portland Cement Concrete
ASTM C 150	(1986) Portland Cement
ASTM C 171	(1969; R 1986) Sheet Materials for Curing Concrete
ASTM C 172	(1982) Sampling Freshly Mixed Concrete
ASTM C 173	(1978) Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C 192	(1988) Making and Curing Concrete Test Specimens in the Laboratory
ASTM C 231	(1982) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	(1986) Air-Entraining Admixtures for Concrete
ASTM C 309	(1981) Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 330	(1987) Lightweight Aggregates for Structural Concrete
ASTM C 494	(1986) Chemical Admixtures for Concrete
ASTM C 552	(1988) Cellular Glass Thermal Insulation
ASTM C 567	(1985) Unit Weight of Structural Lightweight Concrete
ASTM C 578	(1987a) Preformed, Cellular Polystyrene Thermal Insulation
ASTM C 595	(1986) Blended Hydraulic Cements
ASTM C 597	(1983) Pulse Velocity Through Concrete
ASTM C 618	(1987) Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
ASTM C 803	(1982) Penetration Resistance of Hardened Concrete

ASTM C 805	(1985) Rebound Number of Hardened Concrete
ASTM C 989	(1988) Ground Iron Blast Furnace Slag for Use in Concrete and Mortars
ASTM C 1017	(1985) Chemical Admixture for Use in Producing Flowing Concrete
ASTM D 98	(1987) Calcium Chloride
ASTM E 96	(1980) Water Vapor Transmission of Materials

FEDERAL SPECIFICATIONS (FS)

FS HH I-530	(Rev B; Int Am 1) Insulation Board, Thermal, Unfaced, Polyurethane or Polyisocyanurate
FS CCC-C-467	(Rev C) Cloth, Burlap, Jute (or Kenaf)

NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)

NRMCA 01	(Jan 1, 1984) Certification of Ready Mixed Concrete Production Facilities
NRMCA CPMB 100	(8th Rev 1986) Concrete Plant Standards &
NRMCA TMMB-01	(Jan 1, 1982; 11th Rev) Truck Mixer and Agitator Standards &

CORPS OF ENGINEERS (COE) &

COE CRD-C 621	(1989) Specification for Non-Shrink Grout
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1.3 SUBMITTALS

- A. Submit shop drawings and product data under provision of Section 01300.

1.4 GENERAL REQUIREMENTS

- A. **Strength Requirements**
Structural concrete for all work shall have a 28-day compressive strength of 4000 pounds per square inch. Concrete slabs on-grade as indicated shall have a 28-day flexural strength of 600 pounds per square inch. Concrete made with high-early strength cement shall have a 7-day strength equal to the specified 28-day strength for concrete made with Type I or II portland cement.
- B. **Air Entrainment**
Concrete may, at the option of the Contractor, be air entrained to produce concrete with 3 to 5 percent total air.
- C. **Special Properties**

Concrete may contain other admixtures, such as water reducers, superplasticizers, or set retarding agents to provide special properties to the concrete, if approved.

- D. Slump
Slump shall be within the following limits:

Structural Element	Slump in inches	
	Minimum	Maximum
Walls, columns and beams	2	4
Foundation walls, substructure walls, footings, pavement, and slabs	1	3
Any structural concrete approved for placement by pumping	None	6

*Where use of superplasticizers are approved to produce flowing concrete these slump requirements do not apply.

- E. Technical Service for Specialized Concrete
The service of a technical representative shall be obtained to oversee proportioning, batching, mixing, placing, consolidating and finishing of specialized structural concrete, such as lightweight or flowing concrete until field controls indicate concrete of specified quality is furnished.

1.5 PROPORTIONS OF MIX

- A. Mixture Proportioning, Normal Weight Concrete
Trial batches shall contain materials proposed to be used in the project. Trial mixtures having proportions, consistencies and air content suitable for the work shall be made based on methodology described in ACI 211.1, using at least three different water-cement ratios. Trial mixes shall be proportioned to produce concrete strengths specified. In the case where ground iron blast-furnace slag is used, the weight of the slag will be substituted in the equations for the term P which is used to denote the weight of pozzolan. Trial mixtures shall be designed for maximum permitted slump and air content. The temperature of concrete in each trial batch shall be reported. For each water-cement ratio at least three test cylinders for each test age shall be made and cured in accordance with ASTM C 192. They shall be tested at 7 and 28 days in accordance with ASTM C 39. From these test results a curve shall be plotted showing the relationship between water-cement ratio and strength.
- B. Average Strength
In meeting the strength requirements specified, the selected mixture proportion shall produce an average compressive strength exceeding the specified strength by the amount indicated below. Where a concrete production facility has test records, a standard deviation shall be established. Test records from which a standard deviation is calculated shall represent materials, quality control procedures, and conditions similar to those expected; shall represent concrete

produced to meet a specified strength or strengths within 1000 psi of that specified for proposed work; and shall consist of at least 30 consecutive tests. A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days or at other test age designated for determination of the specified strength.

1. **Test Records Exceeding 29**
Required average compressive strength used as the basis for selection of concrete proportions shall be the larger of the specified strength plus the standard deviation multiplied by 1.34 or the specified strength plus the standard deviation multiplied by 2.33 minus 500.
2. **Test Records Less Than 29**
Where a concrete production facility does not have test records meeting the above requirements but does have a record based on 15 to 29 consecutive tests, a standard deviation may be established as the product of the calculated standard deviation and a modification factor from the following table:

No. of tests (1)	Modification factor for standard deviation
less than 15	See Note
15	1.16
20	1.08
25	1.03
30 or more	1.00

(1) Interpolate for intermediate numbers of tests.

When a concrete production facility does not have field strength test records for calculation of standard deviation or the number of tests is less than 15, the required average strength shall be:

- a. The specified strength plus 1000 specified strength of less than 3000 psi.
- b. The specified strength plus 1200 for specified strengths of 3000 to 5000 psi.
- c. The specified strength plus 1400 for specified strengths greater than 5000 psi.

1.6 STORAGE OF MATERIALS

Cement and pozzolan shall be stored in weathertight buildings, bins, or silos which will exclude moisture and contaminants. Aggregate stockpiles shall be arranged and used in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of aggregates. Reinforcing bars and accessories shall be

stored above the ground on platforms, skids or other supports. Other materials shall be stored in such a manner as to avoid contamination and deterioration. Admixtures which have been in storage at the project site for longer than 6 months or which have been subjected to freezing shall not be used unless retested and proven to meet the specified requirements.

PART 2 PRODUCTS

2.1 ADMIXTURES

Admixtures shall conform to the following:

- A. Accelerating Admixture
ASTM C 494, Type C or E; or calcium chloride conforming to ASTM D 98.
- B. Air Entraining Admixture
ASTM C 260.
- C. Flowing Concrete Admixture
ASTM C 1017, Type 1 or 2.
- D. Water-Reducing or Retarding Admixture
ASTM C 494, Type A, B, D, F, or G.

2.2 CEMENTITIOUS MATERIALS

Cementitious materials shall each be of one type and from one source when used in concrete which will have surfaces exposed in the finished structure. Cementitious materials shall conform to one of the following:

- A. Cement
ASTM C 150, Type I or II low alkali.
- B. Portland Blast-Furnace-Slag Cement
ASTM C 595, Type IS.
- C. Portland-Pozzolan Cement
ASTM C 595, Type IP.
- D. Pozzolan
ASTM C 618, Class F.
- E. Ground Iron Blast-Furnace Slag
ASTM C 989, Grade 120.

2.3 AGGREGATES

Aggregates shall conform to the following:

- A. Lightweight Aggregate

ASTM C 330

- B. Normal Weight Aggregate
ASTM C 33.

2.4 CURING MATERIALS

- A. Burlap
FS CCC-C-467.
- B. Impervious Sheets
ASTM C 171, type optional, except that polyethylene film, if used, shall be white opaque.
- C. Membrane-Forming Compounds
ASTM C 309, Type 1-D, Class A or B.

2.5 EMBEDDED ITEMS

Embedded items shall be of the size and type indicated or as needed for the application.

2.6 NONSHRINK GROUT

Nonshrink grout shall conform to & COE CRD-C 621- & and shall be a formulation suitable for the application.

2.7 FLOOR HARDENER

Floor hardener shall be a colorless aqueous solution containing zinc silicofluoride, magnesium silicofluoride, or sodium silicofluoride. These silicofluoride can be used individually or in combination.

2.8 PERIMETER INSULATION

Perimeter insulation shall be 2-inch thick polystyrene conforming to ASTM C 578, Type II; polyurethane conforming to FS HH-I-530, Type II; or cellular glass conforming to ASTM C 552, Type I or IV.

2.9 VAPOR BARRIER

Vapor barrier shall be polyethylene sheeting with a minimum thickness of 6 mils or other equivalent material having a vapor permeance rating not exceeding 0.5 perms as determined in accordance with ASTM E 96.

2.10 WATER

Water shall be potable, except that nonpotable water may be used if it produces mortar cubes having 7- and 28-day strengths at least 90 percent of the strength of similar specimens made with water from a municipal supply. The strength comparison shall be made on mortars, identical except for mixing water, prepared and tested in accordance with ASTM C 109. Water for curing shall not contain any substance injurious to concrete, or which causes staining.

PART 3 EXECUTION

3.1 PREPARATION OF SURFACES

Surfaces to receive concrete shall be clean and free from frost, ice, mud, and water. Conduit and other similar items shall be in place and clean of any deleterious substance.

A. Foundations

Earthwork shall be as specified on Drawings. Flowing water shall be diverted without washing over freshly deposited concrete. Rock foundations shall be cleaned by high velocity air-water jets, sandblasting, or other approved methods. Debris and loose, semi-detached or unsound fragments shall be removed. Rock surfaces shall be moist but without free water when concrete is placed. Semiporous subgrades for foundations and footings shall be damp when concrete is placed. Pervious subgrades shall be sealed by blending impervious material with the top 6 inches of the in-place pervious material or by covering with an impervious membrane.

B. Perimeter Insulation

Perimeter insulation shall be installed at locations indicated. Adhesive shall be used where insulation is applied to the interior surface of foundation walls.

C. Vapor Barrier

Unless otherwise indicated, subgrades for slabs in buildings shall be covered with a vapor barrier. Vapor barrier edges shall be lapped at least 4 inches and ends shall be lapped not less than 6 inches. Patches and lapped joints shall be sealed with pressure-sensitive adhesive or tape not less than 2 inches wide and compatible with the membrane.

D. Preparation of Previously Placed Concrete

Concrete surfaces to which other concrete is to be bonded shall be roughened in an approved manner that will expose sound aggregate uniformly without damaging the concrete. Laitance and loose particles shall be removed. Surfaces shall be moist but without free water when concrete is placed.

3.2 INSTALLATION OF EMBEDDED ITEMS

Embedded items shall be free from oil, loose scale or rust, and paint. Embedded items shall be installed at the locations indicated and required to serve the intended purpose. Voids in sleeves, slots and inserts shall be filled with readily removable material to prevent the entry of concrete.

3.3 BATCHING, MIXING AND TRANSPORTING CONCRETE

Ready-mixed concrete shall be batched, mixed and transported in accordance with ASTM C 94, except as otherwise specified. Truck mixers, agitators, and nonagitating units shall comply with NRMCA TMMB-01. Ready-mix plant equipment and facilities shall be certified in accordance with NRMCA 01. Site-mixed concrete shall be mixed in accordance with ACI 301. On-site plant shall conform to the NRMCA CPMB-100.&

A. Admixtures

Admixtures shall be batched within an accuracy of 3 percent. Where two or more admixtures are used in the same batch, they shall be batched separately and must be compatible. Retarding admixture shall be added within one minute after addition of water is complete or in the first quarter of the required mixing time,

whichever is first. Superplasticizing admixtures shall be added as recommended by manufacturer. Concrete that shows evidence of total collapse or segregation caused by the use of admixture shall be removed from the site.

B. Control of Mixing Water

No water from the truck system or elsewhere shall be added after the initial introduction of mixing water for the batch except when on arrival at the jobsite, the slump of the concrete is less than that specified. Water added to bring the slump within the specified range shall not change the total water in the concrete to a point that the approved water-cement ratio is exceeded. The drum shall be turned an additional 30 revolutions, or more, if necessary, until the added water is uniformly mixed into the concrete. Water shall not be added to the batch at any later time.

C. Mixing of Lightweight Concrete

The mixing cycle shall be as recommended by the aggregate producer for the batching and mixing as required by the absorptivity of the aggregate. Typically, the mixer is charged with approximately 2/3 of the total mixing water and all of the aggregate. Ingredients are mixed for not less than 30 seconds in a stationary mixer nor less than 10 revolutions at mixing speed in a truck mixer. Cement, air entraining admixture, and the rest of the mixing water are added to obtain the required slump and mixing is continued for 30 revolutions at mixing speed.

3.4 SAMPLING AND TESTING

Sampling and Testing is the responsibility of the Contractor and shall be performed by an approved testing agency.

A. Aggregates

Aggregates for normal weight concrete shall be sampled and tested in accordance with ASTM C 33. Gradation tests shall be performed on the first day and every other day thereafter during concrete construction.

B. Sampling of Concrete

Samples of concrete for air, slump, unit weight, and strength tests shall be taken in accordance with ASTM C 172.

1. Air Content

Test for air content shall be performed in accordance with ASTM C 173 or ASTM C 231. A minimum of 1 test per day shall be conducted.

2. Slump

At least 2 slump tests shall be made on randomly selected batches of each mixture of concrete during each day's concrete placement. Tests shall be performed in accordance with ASTM C 143.

C. Evaluation and Acceptance of Concrete

1. Frequency of Testing

Samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 150

cubic yards of concrete, nor less than once for each 5000 square feet of surface area for slabs or walls. If this sampling frequency results in less than 5 strength tests for a given class of concrete, tests shall be made from at least 5 randomly selected trucks or from each truck if fewer than 5 truck loads are used. Field cured specimens for determining form removal time or when a structure may be put in service shall be made in numbers directed to check the adequacy of curing and protection of concrete in the structure. The specimens shall be removed from the molds at the age of 24 hours and shall be cured and protected, insofar as practicable, in the same manner as that given to the portion of the structure the samples represent.

2. Testing Procedures

Cylinders and beams for acceptance tests shall be molded and cured in accordance with ASTM C 31. Cylinders shall be tested in accordance with ASTM C 39 and beams shall be tested in accordance with ASTM C 78. A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days or at another specified test age.

3. Evaluation of Results

Concrete specified on the basis of compressive strength will be considered satisfactory if the averages of all sets of three consecutive strength test results equal or exceed the specified strength and no individual strength test result falls below the required strength by more than 500 pounds per square inch. For flexural strength concrete, the strength level of the concrete will be considered satisfactory if the averages of all sets of five consecutive strength test results equal or exceed the required flexural strength.

D. Investigation of Low-Strength Test Results

When any strength test of standard-cured test cylinder falls below the specified strength requirement by more than 500 pounds per square inch, or if tests of field-cured cylinders indicate deficiencies in protection and curing, steps shall be taken to assure that load-carrying capacity of the structure is not jeopardized. Non-destructive testing in accordance with ASTM C 597, ASTM C 803 or ASTM C 805 may be permitted by the Owner to determine the relative strengths at various locations in the structure as an aid in evaluating concrete strength in place or for selecting areas to be cored. Such tests, unless properly calibrated and correlated with other test data, shall not be used a basis for acceptance or rejection. When strength of concrete in place is considered potentially deficient, cores shall be obtained and tested in accordance with ASTM C 42. At least three representative cores shall be taken from each member or area of concrete in place that is considered potentially deficient. The location of cores shall be determined by the Owner to least impair the strength of the structure. If the concrete in the structure will be dry under service conditions, the cores shall be air-dried (temperature 60 to 80 degrees F, relative humidity less than 60 percent) for seven days before testing and shall be tested dry. If the concrete in the structure will be more than superficially wet under service conditions, the cores shall be tested after moisture conditioning in accordance with ASTM C 42.

Concrete in the area represented by the core testing will be considered adequate if the average strength of the cores is equal to or at least 85 percent of the specified strength requirement and if no single core is less than 75 percent of the specified strength requirement. If the core tests are inconclusive or impractical to obtain, or if structural analysis does not confirm the safety of the structure, load tests may be directed by the Owner in accordance with the requirements of ACI 318. Concrete work evaluated by structural analysis or by results of a load test and found deficient shall be corrected in a manner satisfactory to the Owner. All investigations, testing, load tests, and correction of deficiencies shall be performed, and approved by the Owner, at the expense of the Contractor.

3.5 CONVEYING CONCRETE

Concrete shall be conveyed from mixer to forms as rapidly as possible and within the time interval specified in paragraph "CONCRETE PLACEMENT" by methods which will prevent segregation or loss of ingredients.

- A. Chutes
When concrete can be placed directly from a truck mixer or other transporting equipment, chutes attached to this equipment may be used. Separate chutes will not be permitted except when specifically approved.
- B. Buckets
Bucket design shall be such that concrete of the required slump can be readily discharged. Bucket gates shall be essentially grout tight when closed. The bucket shall provide means for positive regulations of the amount and rate of deposit of concrete in each dumping position.
- C. Belt Conveyors
Belt conveyors may be used when approved. Belt conveyors shall be designed for conveying concrete and shall be operated to assure a uniform flow of concrete to the final place of deposit without segregation or loss of mortar. Conveyors shall be provided with positive means for preventing segregation of the concrete at transfer points and point of placement.
- D. Pumps
Concrete may be conveyed by positive displacement pumps when approved. Pump shall be the piston or squeeze pressure type. Pipeline shall be steel pipe or heavy duty flexible hose. Inside diameter of the pipe shall be at least three times the maximum size of the coarse aggregate. Distance to be pumped shall not exceed the limits recommended by the pump manufacturer. Concrete shall be supplied to the pump continuously. When pumping is completed, the concrete remaining in the pipeline shall be ejected without contaminating the concrete in place. After each use, the equipment shall be thoroughly cleaned. Flushing water shall be wasted outside the forms.

3.6 CONCRETE PLACEMENT

Mixed concrete which is transported in truck mixers or agitators or concrete which is truck mixed, shall be discharged within 1-1/2 hours or before the drum has revolved 300 revolutions, whichever comes first after the introduction of the mixing water to the

cement and aggregates or the introduction of the cement to the aggregates. These limitations may be waived by the Owner if the concrete is of such slump after the 1-1/2 hour time or 300 revolution limit has been reached that it can be placed, without the addition of water to the batch. When the concrete temperature exceeds 85 degrees F, the time shall be reduced to 45 minutes. Concrete shall be placed within 15 minutes after it has been discharged from the truck.

A. Placing Operation

Concrete shall be handled from mixer to forms in a continuous manner until the approved unit of operation is completed. Adequate scaffolding, ramps and walkways shall be provided so that personnel and equipment are not supported by in-place reinforcement. Placing will not be permitted when the sun, heat, wind, or limitations of facilities furnished by the Contractor prevent proper consolidation, finishing and curing. Concrete shall be deposited as close as possible to its final position in the forms, and there shall be no vertical drop greater than 8 feet except where suitable equipment is provided to prevent segregation and where specifically authorized. Depositing of the concrete shall be so regulated that it will be effectively consolidated in horizontal layers not more than 12 inches thick, except that all slabs shall be placed in a single layer. Concrete to receive other construction shall be screeded to the proper level to avoid excessive shimming or grouting.

B. Consolidation

Immediately after placing, each layer of concrete shall be consolidated by internal vibrators, except for slabs 4 inches or less. The vibrators shall at all times be adequate in effectiveness and number to properly consolidate the concrete; a spare vibrator shall be kept at the jobsite during all concrete placing operations. The vibrators shall have a frequency of not less than 8000 vibrations per minute, and the head diameter and amplitude shall be appropriate for the concrete mixture being placed. Vibrators shall be inserted vertically at uniform spacing over the area of placement. The distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator so that the area being vibrated will overlap the adjacent just-vibrated area by a few inches. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6 inches into the preceding layer if there is such. Vibrator shall be held stationary until the concrete is consolidated and then withdrawn slowly. The use of form vibrators must be specifically approved. Vibrators shall not be used to transport concrete within the forms. Slabs 4 inches and less in thickness shall be consolidated by properly designed vibrating screeds or other approved technique. Excessive vibration of lightweight concrete resulting in segregation and flotation of coarse aggregate shall be avoided.

C. Cold Weather Requirements

Special protection measures, approved by the Owner, shall be used if freezing temperatures are anticipated before the expiration of the specified curing period. The ambient temperature of the air where concrete is to be placed and the temperature of surfaces to receive concrete shall be not less than 40 degrees F. The temperature of the concrete when placed shall be not less than 50 degrees F nor more than 75 degrees F. Heating of the mixing water or aggregates will be required to regulate the concrete placing temperature. Materials entering the mixer shall be free from ice, snow, or frozen lumps. Salt, chemicals or other

materials shall not be incorporated in the concrete to prevent freezing. Upon written approval, calcium chloride or chemical admixture conforming to ASTM C 494 Type C or E may be used. The amount of calcium chloride shall not exceed 2 percent by weight of the cement, and it shall be batched in solution form. Calcium chloride shall not be used where concrete will be in contact with aluminum or zinc-coated items, or where sulfate resistant or prestressed concrete is specified.

D. Warm Weather Requirements

The temperature of the concrete placed during warm weather shall not exceed 85 degrees F except where an approved retarder is used. The mixing water and/or aggregates shall be cooled, if necessary, to maintain a satisfactory placing temperature. In no case shall the placing temperature exceed 95 degrees F.

3.7 CONSTRUCTION JOINTS

Construction joints shall be located as indicated or approved. Where concrete work is interrupted by weather, end of work shift or other similar type of delay, location and type of construction joint shall be subject to approval of the Owner. Unless otherwise indicated and except for slabs on grade, reinforcing steel shall extend through construction joints. Construction joints in slabs on grade shall be keyed or doweled as shown. Concrete columns, walls, or piers shall be in place at least 2 hours, or until the concrete is no longer plastic, before placing concrete for beams, girders, or slabs thereon. In walls having door window openings, lifts shall terminate at the top and bottom of the opening. Other lifts shall terminate at such levels as to conform to structural requirements or architectural details. Where horizontal construction joints are required, a strip of 1-inch square-edge lumber, bevelled and oiled to facilitate removal, shall be tacked to the inside of the forms at the construction joint. Concrete shall be placed to a point 1 inch above the underside of the strip. The strip shall be removed 1 hour after the concrete has been placed, and any irregularities in the joint line shall be leveled off with a wood float, and all laitance shall be removed. Prior to placing additional concrete, horizontal construction joints shall be prepared as specified in paragraph "PREPARATIONS OF SURFACES."

3.8 FINISHING CONCRETE

A. Formed Surfaces

1. Repair of Surface Defects

Surface defects shall be repaired within 24 hours after the removal of forms. Honeycombed and other defective areas shall be cut back to solid concrete or to a depth of not less than 1 inch, whichever is greater. Edges shall be cut perpendicular to the surface of the concrete. The prepared areas shall be dampened and brush-coated with neat cement grout. The repair shall be made using mortar consisting of not more than 1 part cement to 2-1/2 parts sand. The mixed mortar shall be allowed to stand to stiffen (approximately 45 minutes), during which time the mortar shall be intermittently remixed without the addition of water. After the mortar has attained the stiffest consistency that will permit placing, the patching mix shall be thoroughly tamped into place by means approved

by the Owner and finished slightly higher than the surrounding surface. For [Class A and] Class B finished surfaces the cement used in the patching mortar shall be a blend of job cement and white cement proportioned to produce a finished repair surface matching, after curing, the color of adjacent surfaces. Holes left after the removal of form ties shall be cleaned and filled with patching mortar. Holes left by the removal of tie rods shall be reamed and filled by dry packing. Repaired surfaces shall be cured as required for adjacent surfaces. The temperature of concrete, mortar patching material, and ambient air shall be above 50 degrees F while making repairs and during the curing period. Concrete with defects which affect the strength of the member or with excessive honeycombs will be rejected, or the defects shall be corrected as directed.

2. Class A Finish

Where a Class A finish is indicated, fins shall be removed. A mortar mix consisting of one part portland cement and two parts well-graded sand passing a No. 30 sieve, with water added to give the consistency of thick paint, shall be prepared. White cement shall be used to replace part of the job cement. After the surface has been thoroughly wetted and allowed to approach surface dryness, the mortar shall be vigorously applied to the area by clean burlap pads or by cork or wood-floating, to completely fill all surface voids. Excess grout shall be scraped off with a trowel. As soon as it can be accomplished without pulling the mortar from the voids, the area shall be rubbed with burlap pads until all visible grout film is removed. The rubbing pads shall have on their surfaces the same sand-cement mix specified above but without any mixing water. The finish of any area shall be completed in the same day, and the limits of a finished area shall be made at natural breaks in the surface. The surface shall be continuously moist cured for 48 hours. The temperature of the air adjacent to the surface shall be not less than 50 degrees F for 24 hours prior to, and 48 hours after, the application. In hot, dry weather the smooth finish shall be applied in shaded areas.

3. Class B Finish

Where a Class B finish is indicated, fins shall be removed. Concrete surface shall be smooth with a texture at least equal to that obtained through the use of Grade B-B plywood forms.

4. Class C Finish

Where a Class C finish is indicated, fins shall be removed. Concrete surfaces shall be relatively smooth with a texture imparted by the forms used.

5. Class D Finish

Where a Class D finish is indicated, fins exceeding 1/4 inch in height shall be chipped or rubbed off. Concrete surfaces shall be left with the texture imparted by the forms used.

B. Unformed Surfaces

In cold weather, the air temperature in areas where concrete is being finished shall not be less than 50 degrees F. In hot windy weather when the rate of evaporation of surface moisture, as determined by methodology presented in ACI 305R , may reasonably be expected to exceed 0.2 pounds per square foot per hour; coverings, windbreaks, or fog sprays shall be provided as necessary to prevent premature setting and drying of the surface. The dusting of surfaces with dry materials or the addition of water during finishing will not be permitted. Finished surfaces shall be plane, with no deviation greater than 1/4 inch when tested with a 10-foot straightedge. Surfaces shall be pitched to drains.

1. Trowel Finish

- a. Slabs shall be given a trowel finish immediately following floating. Surfaces shall be trowelled to produce smooth, dense slabs free from blemishes including trowel marks. In lieu of hand finishing, an approved power-finishing machine may be used in accordance with the directions of the machine manufacturer. A final hard steel troweling shall be done by hand.
- b. Trowel finish will be specified for most wearing surfaces and where a smooth finish is required.

2. Broom Finish (Concrete Stoops)

After floating, slabs shall be lightly trowelled, and then broomed with a fiber-bristle brush in a direction transverse to that of the main traffic.

3.9 CURING AND PROTECTION

A. General

1. All concrete shall be cured by an approved method for the period of time given below:

Concrete with Type III cement	3 days
Concrete with Type I, II, IP or IS cement	7 days
Concrete with Type I or Type II cement blended with pozzolan	7 days

2. Immediately after placement, concrete shall be protected from premature drying, extremes in temperatures, rapid temperature change, mechanical injury and injury from rain and flowing water. Air and forms in contact with concrete shall be maintained at a temperature above 50 degrees F for the first 3 days and at a temperature above 32 degrees F for the remainder of the specified curing period. Exhaust fumes from combustion heating units shall be vented to the outside of the enclosure and heaters and ducts shall be placed and directed so as not to cause areas of overheating and drying of concrete surfaces or to create fire hazards. All materials and equipment needed for adequate curing and protection shall be available and at the site prior to placing concrete. No fire or excessive heat shall be permitted near or in direct contact with the concrete at any time. Curing shall be accomplished by any of the following methods, or

combination thereof, as approved.

B. Moist Curing

Concrete to be moist-cured shall be maintained continuously wet for the entire curing period. If water or curing materials used stains or discolors concrete surfaces which are to be permanently exposed, the concrete surfaces shall be cleaned. When wooden forms are left in place during curing, they shall be kept wet at all times. If the forms are removed before the end of the curing period, curing shall be carried out as on unformed surfaces, using suitable materials. Horizontal surfaces shall be cured by ponding, by covering with a 2-inch minimum thickness of continuously saturated sand, or by covering with waterproof paper, polyethylene sheet, polyethylene-coated burlap or saturated burlap.

C. Membrane Curing

Membrane curing shall not be used on surfaces that are to receive any subsequent treatment depending on adhesion or bonding to the concrete; except a styrene acrylate or chlorinated rubber compound meeting ASTM C 309, Class B requirements may be used for surfaces which are to be painted or are to receive bituminous roofing or waterproofing, or floors that are to receive adhesive applications of resilient flooring. The curing compound selected shall be compatible with any subsequent paint, roofing, waterproofing or flooring specified. Membrane curing compound shall not be used on surfaces that are maintained at curing temperatures with free steam. Curing compound shall be applied to formed surfaces immediately after the forms are removed and prior to any patching or other surface treatment except the cleaning of loose sand, mortar, and debris from the surface. Surfaces shall be thoroughly moistened with water and the curing compound shall be applied to slab surfaces as soon as the bleeding water has disappeared, with the tops of joints being temporarily sealed to prevent entry of the compound and to prevent moisture loss during the curing period. Compound shall be applied in a one-coat continuous operation by mechanical spraying equipment, at a uniform coverage in accordance with the manufacturer's printed instructions. Concrete surfaces which have been subjected to rainfall within 3 hours after curing compound has been applied shall be resprayed by the method and at the coverage specified. On surfaces permanently exposed to view, the surface shall be shaded from direct rays of the sun for the duration of the curing period. Surfaces coated with curing compound shall be kept free of foot and vehicular traffic, and from other sources of abrasion and contamination during the curing period.

3.10 SETTING BASE PLATES AND BEARING PLATES

After being properly positioned, column base plates, bearing plates for beams and similar structural members, and machinery and equipment base plates shall be set to the proper line and elevation with damp-pack bedding mortar, except where non-shrink grout is indicated. The thickness of the mortar or grout shall be approximately 1/24 the width of the plate, but not less than 3/4 inch. Concrete and metal surfaces in contact with grout shall be clean and free of oil and grease, and concrete surfaces in contact with grout shall be damp and free of laitance when grout is placed.

A. Damp-Pack Bedding Mortar

Damp-pack bedding mortar shall consist of 1 part cement and 2-1/2 parts fine aggregate having water content such that a mass of mortar tightly squeezed in the hand will retain its shape but will crumble when disturbed. The space between the top of the concrete and bottom of the bearing plate or base shall be packed with the bedding mortar by tamping or ramming with a bar or rod until it is completely filled.

B. Nonshrink Grout

Nonshrink grout shall be mixed and placed in accordance with material manufacturer's written recommendations. Forms of wood or other suitable material shall be used to retain the grout. The grout shall be placed quickly and continuously, completely filling the space without segregation or bleeding of the mix.

C. Treatment of Exposed Surfaces

For metal-oxidizing nonshrink grout, exposed surfaces shall be cut back 1 inch and immediately covered with a parget coat of mortar consisting of 1 part portland cement and 2-1/2 parts fine aggregate by weight, with sufficient water to make a plastic mixture. The parge coat shall have a smooth finish. For other mortars or grouts, exposed surfaces shall be left untreated. Curing shall comply with paragraph "CURING AND PROTECTION."

END OF SECTION

SECTION 03410
STRUCTURAL PRECAST CONCRETE – PLANT CAST

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes structural precast concrete units, plant cast, including the following:
1. Hollow-core slab units.
 2. Solid slab units
 3. Steel header members.
 4. Steel connection plates and brackets.
 5. Grouting and anchor bolting and welding.
- B. Related Sections: The following sections contain requirements that relate to this section.
1. Division 1 Section "Structural Inspection."
 2. Division 3 Section "Cast-in-Place Concrete."

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Engineer, fabricate, and install structural precast concrete units to withstand design loadings indicated within limits and under conditions required.
1. The design of precast-prestressed hollow core slabs shall be in accordance with the latest recommendations of the PCI and ACI building code requirements.
 2. Manufacturer shall use contract drawing information indicating depth and loading of member to design precast-prestressed hollow core slabs.
 3. Design steel headers where required. Design shall comply with AISC specifications.
- B. Engineering Responsibility: Engage a fabricator who uses a qualified professional engineer to prepare design calculations, fire-resistance calculations, shop drawings, and other structural data.

1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data and instructions for manufactured materials and products.

1. Certification by paint and curing compound manufacturers that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
- C. Shop drawings detailing fabrication and installation of precast concrete units. Indicate member dimensions and cross-sections; locations, sizes, and types of reinforcement, including special reinforcement; estimated camber; and lifting devices necessary for handling and erection.
1. Include an erection plan indicating layout and dimensions, and identifying each precast concrete unit corresponding to sequence and procedure of installation. Indicate welded connections by AWS standard symbols. Detail loose, cast-in, and field hardware, inserts, connections, and joints, including accessories and construction at openings in precast units.
 2. Shop drawings shall be signed and sealed by the qualified professional engineer, registered in the State of Kentucky, responsible for their preparation.
 3. To the extent structural precast unit design considerations are indicated as fabricator's responsibility, include structural analysis data signed and sealed by the qualified professional engineer, registered in the State of Kentucky, responsible for their preparation. The calculations will be reviewed for design intent only. Engineering and detailing shall be solely the responsibility of the manufacturer and the professional engineer responsible for their preparation.
 4. Computer generated electronic structural construction document files (ACAD R14) will be made available to the Contractor. The Contractor will be required to sign the Engineer's standard release of liability form and pay a handling fee of \$50.00 per drawing prior to receiving the drawing files. Rules for use of said files shall be as defined in the CRSI "Code of Standard Practice" Sections 4.19 and 6.4.1.
 5. Shop drawing resubmittals are reviewed for conformance with review marks only. Any changes or questions originating on a resubmittal shall be clearly clouded.
- D. Design mixes for each concrete mix. Submit revised mix proportions when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
- E. Material test reports from a qualified independent testing agency evidencing compliance with requirements of the following based on comprehensive testing of current materials:
1. Concrete materials.
 2. Reinforcing materials.
 3. Prestressing strands.
 4. Admixtures.
 5. Bearing pads.
- F. Material certificates in lieu of agency test reports, when permitted by Architect, signed by fabricator certifying that each material item complies with requirements.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed structural precast concrete work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Fabricator Qualifications: Firm experienced in producing structural precast concrete units similar to those indicated for this Project and with a record of successful in-service performance as well as sufficient production capacity to produce required units without delaying the Work.
 - 1. Fabricator must participate in the Precast/Prestressed Concrete Institute's (PCI) Plant Certification Program and be designated a PCI Certified Plant.
- C. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in the State of Kentucky and who is experienced in providing engineering services of the kind indicated that have resulted in the installation and successful in-service performance of precast concrete units similar to this Project in material, design, and extent.
- D. Testing Agency: Owner may engage an independent testing agency to perform shop inspections and tests and to provide test reports. Manufacturer shall provide testing agency with access to places where structural precast concrete units are being fabricated so inspection and testing can be accomplished. Correction of deficiencies and additional testing to determine compliance of corrected work will be performed at Contractor's expense.
- E. PCI Design Standard: Comply with recommendations of PCI MNL-120 "PCI Design Handbook – Precast and Prestressed Concrete" applicable to types of structural precast concrete units indicated.
- F. PCI Quality-Control Standard: Comply with requirements of PCI MNL-116 "Manual for Quality Control Plants and Production of Precast and Prestressed Concrete Products," including manufacturing and testing procedures, quality-control recommendations, and camber and dimensional tolerances for types of units required.
- G. ACI Publications: Comply with the following ACI publications applicable to types of structural precast concrete units indicated:
 - 1. ACI 301 "Specifications for Structural Concrete for Buildings."
 - 2. ACI 318 (ACI 318M) "Building Code Requirements for Reinforced Concrete."
 - 3. ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures."
 - 4. ACI 525 "Minimum Requirements for Thin-Section Precast Concrete Construction."
- H. Welding Standards: Comply with applicable provisions of the following American Welding Society publications:
 - 1. AWS D1.1 "Structural Welding Code – Steel."
 - 2. AWS D1.4 "Structural Welding Code – Reinforcing Steel."

3. AWS D12.1 "Recommended Practices for Welding Reinforcing Steel, Metal Inserts, and Connections in Reinforced Concrete Construction."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver precast concrete units to Project site in such quantities and at such times to ensure continuity of installation. Store units at Project site to prevent cracking, distorting, warping, staining, or other physical damage, and so that markings are visible.
- B. Lift and support units only at designated lifting or supporting points as shown on final shop drawings.
- C. Deliver anchorage items that are to be embedded in other construction before starting such work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.
- D. Provide temporary lateral support during erection to prevent bowing and warping. Blocking and supports shall be clean, non-staining, and shall not prevent uniform curing of exposed surfaces.

PART 2 – PRODUCTS

2.1 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Steel-Welded Wire Fabric: ASTM A 185, welded steel wire fabric in sheets.
- C. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use supports complying with CRSI recommendations.
 1. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs that are protected with plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

2.2 PRESTRESSING TENDONS

- A. Prestressing Strand: ASTM A 416, Grade 250 or 270, uncoated, 7-wire, stress-relieved.

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type III.
 1. Use only one brand and type of cement throughout Project, unless otherwise acceptable to Architect.
- B. Fly Ash: ASTM C 618, Class C or F.

- C. Silica Fume: ASTM C 1240, amorphous silica.
- D. Normal-Weight Aggregates: ASTM C 33, Class 5S. Provide aggregates from a single source.
 - 1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling or surface discoloration due to oxidation.
- E. Water: Potable.
- F. Admixtures, General: Provide admixtures for concrete that contain not more than 0.05 percent chloride ions.
- G. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
- H. Water-Reducing Admixture: ASTM C 494, Type A.
- I. High-Range, Water-Reducing Admixture: ASTM C 494, Type F or Type G.
- J. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.
- K. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.
- L. Corrosion Inhibitor: ASTM C494, Type C.

2.4 CONNECTION MATERIALS AND FINISHES

- A. Steel Shapes and Plates: ASTM A 36.
- B. Accessories: Provide clips, hangers, shims, and other accessories required to install precast concrete units.
- C. Hot-Dip Galvanized Finish: For exterior steel items and items indicated for galvanizing, apply zinc coating by the hot-dip process, complying with the following requirements:
 - 1. ASTM A 123 for galvanizing rolled, pressed, and forged shapes, plates, bars, and strips.

2.5 BEARING PADS

- A. Provide bearing pads for precast concrete units as follows:
 - 1. High-Density Plastic: Multimonomer, nonleaching, plastic strip.

2.6 GROUT MATERIALS

- A. Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2 ½ parts sand, by volume, with minimum water required for placement and hydration. Compressive strength of 3500 psi: 28 day strength or greater.

2.7 CURING MATERIALS

- A. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type I, Class B.
 - 1. Provide material that has a maximum volatile organic compound (VOC) rating not to exceed those allowable by jurisdictional regulations.

2.8 CONCRETE MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Architect or qualified precast manufacturing plant personnel for preparing and reporting proposed mix designs. Trial batch and field experience tests shall have been performed within 12 months of submittal date.
 - 1. Limit use of fly ash to less than or equal to 25 percent of cement content by weight.
- B. Normal-Weight Concrete: Provide normal-weight concrete with the following properties:
 - 1. Compressive Strength (28-Day): 5000 psi (34.5 MPa).
 - 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.40.
- C. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:
 - 1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure.
 - a. 6.0 percent for 1-inch maximum aggregate.
 - b. 6.0 percent for 3/4-inch maximum aggregate.
 - c. 7.0 percent for 1/2-inch maximum aggregate.
 - d. 7.5 percent for 3/8-inch maximum aggregate.
 - 2. Other concrete not exposed to freezing, thawing, or hydraulic pressure, or to receive a surface hardener: 2 to 4 percent air.
- D. Other Admixtures: Use water-reducing, high-range water-reducing, water-reducing and accelerating, or water-reducing and retarding admixtures, as required, according to manufacturer's directions.
- E. Concrete-Mix Adjustments: Concrete-mix design adjustments may be requested by precaster when characteristics of materials, project conditions, weather, test results, or other circumstances warrant as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in the work.

2.9 FABRICATION

- A. Formwork: Accurately construct forms, mortar tight, of sufficient strength to withstand pressures due to concrete placing operations, temperature changes, and for pretensioning and detensioning operations. Maintain formwork to provide completed precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified in PCI MNL-116.
1. Coat surfaces of forms with bond-breaking compound before reinforcement is placed. Provide commercial-formula, form-coating compounds that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces requiring bond or adhesion. Apply in compliance with manufacturer's instructions.
 2. Unless forms for precast, prestressed concrete units are stripped prior to detensioning, design forms so that stresses are not induced in precast units due to deformation of concrete under prestress or movement during detensioning.
- B. Built-In Anchorages: Accurately position built-in anchorage devices and secure to formwork. Locate anchorages where they do not affect the position of the main reinforcement or placing of concrete. Do not relocate bearing plates in units, unless acceptable to Architect.
- C. Cast-in openings larger than 12 inches in diameter or 12 inches square according to final shop drawings. Other smaller holes may be field cut by trades requiring them, as acceptable to Architect. Trades field cutting holes shall locate holes so as to not cut prestressing tendons.
- D. Reinforcement: Comply with the recommendations of CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete.
 2. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcement by metal chairs, runners, bolsters, spacers and hangers, as required.
 3. Place reinforcement to obtain at least the minimum coverages for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
 4. Install welded wire fabric in lengths as long as practical. Lap adjoining pieces at least one full mesh and lace splices with wire.
- E. Pretensioning: Pretension tendons for precast, prestressed concrete either by single-strand tensioning method or multiple-strand tensioning method. Comply with PCI MNL-116 requirements.
- F. Concrete Mixing: Comply with requirements and with ASTM C 94. Following concrete batching, no additional water may be added.

- G. Concrete Placement: Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast units. Comply with requirements of ACI 304R for measuring, mixing, transporting, and placing concrete.
1. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items. Use equipment and procedures complying with ACI 309R.
 2. Comply with ACI 306R procedures for cold-weather concrete placement.
 3. Comply with ACI 305R procedures for hot-weather concrete placement.
- H. Identify pickup points of precast concrete units and orientation in structure with permanent markings, complying with markings indicated on final shop drawings. Imprint casting date on each precast unit on a surface that will not show in the finished structure.
- I. Cure concrete according to the requirements of PCI MNL-116 by moisture retention without heat or by accelerated heat curing, using low-pressure live steam or radiant heat and moisture.
- J. Delay detensioning prestressed concrete units until concrete has attained at least 70 percent of its compressive strength as established by test cylinders cured under the same conditions as the concrete.
1. If concrete has been heat cured, detension while concrete is still warm and moist to avoid dimensional changes that may cause cracking or undesirable stresses.
 2. Detension pretensioned tendons either by gradually releasing tensioning jacks or by heat-cutting tendons, using a sequence and pattern to prevent shock or unbalanced loading.
- K. Finish formed surfaces of precast concrete as indicated for each type of unit as follows:
1. Standard Finish: Normal plant-run finish produced in forms that impart a smooth finish to concrete. Small surface holes caused by air bubbles, normal color variations, and form joint marks, and minor chips and spalls will be tolerated. Major or unsightly imperfections, honeycombs, or structural defects are not permitted.
- L. Finish unformed surfaces by trowel, unless otherwise indicated. Consolidate concrete, bring to proper level with straightedge, float, and trowel to a smooth, uniform finish.
1. Apply scratch finish to precast concrete units that will receive concrete topping after installation. Following initial strike-off, transversely scarify surface to provide ridges approximately $\frac{1}{4}$ inch deep.
 2. Apply a nonslip broom finish to exterior precast concrete subject to pedestrian traffic. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route.
 3. Where used as roof members, provide smooth, float top finish to precast units.

2.10 HOLLOW-CORE AND SOLID SLAB UNITS

- A. Provide precast, prestressed concrete units with open, hollow cores running the full length of the slab units.
- B. Provide solid, monolithic, precast concrete slab units where shown on drawings. Design and fabricate solid units to dimensions and details indicated as required for hollow-core slab units.
- C. Furnish units free of voids or honeycombs.
- D. Reinforce units to resist transportation and erection stresses.
- E. Include cast-in weld plates where required.
- F. Coordinate with other trades for installation of cast-in items.
- G. Provide headers of cast-in-place concrete or structural steel shapes for openings larger than one slab width according to hollow-core slab unit fabricator's recommendations.

2.11 QUALITY CONTROL

- A. The Owner may employ an independent testing agency to evaluate precast fabricator's quality control and testing methods.
 - 1. Allow Owner's testing agency access to material storage areas, concrete production equipment, concrete placement, and curing facilities. Cooperate with Owner's testing agency and provide samples of materials and concrete mixes as may be requested for additional testing and evaluation.
- B. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL-116 requirements.
- C. Strength of precast concrete units will be considered potentially deficient when precast concrete units fail to comply with requirements, including the following:
 - 1. Fail to meet compressive-strength test requirements.
 - 2. Reinforcement, and pretensioning and detensioning tendons of prestressed concrete do not conform to fabrication requirements.
 - 3. Concrete curing and protection of precast units against extremes in temperature fail to meet requirements.
 - 4. Precast units are damaged during handling and erecting.
- D. Testing: When there is evidence that the strength of precast concrete units may be deficient or may not meet requirements, the Owner will employ an independent testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C 42.
 - 1. A minimum of 3 representative cores will be taken from precast concrete units of suspect strength, from locations directed by Architect.
 - 2. Cores will be tested in an air-dry condition per ACI 301 when precast concrete units will be dry under service conditions.

3. Strength of concrete for each series of 3 cores will be considered satisfactory if the average compressive strength is at least 85 percent of the 28-day design compressive strength and no core compressive strength is less than 75 percent of the 28-day design compressive strength.
 4. Test results will be made in writing on the same day that tests are made, with copies to Architect, Contractor, and precast fabricator. Test reports will include the Project identification name and number, date, name of precast concrete fabricator, name of concrete testing agency; identification letter, name, and type of precast concrete unit or units represented by core tests; design compressive strength, compressive strength at break and type of break, corrected for length-diameter ratio, and direction of applied load to core with respect to horizontal plane of concrete as placed.
- E. Patching: Where core test results are satisfactory and precast concrete units meet requirements, solidly fill core holes with patching mortar and finish to match adjacent concrete surfaces.
- F. Dimensional Tolerances: Units having dimensions smaller or greater than required and not meeting tolerance limits may be subject to additional testing.
1. Precast units having dimensions greater than required will be rejected if the appearance or function of the structure is adversely affected or if larger dimensions interfere with other construction. Repair or remove and replace rejected units, as required, to meet construction conditions.
- G. Defective Work: Precast concrete units that do not conform to requirements, including strength, manufacturing tolerances, and finishes, are unacceptable. Replace with precast concrete units that meet requirements.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements, including installation tolerances, true and level bearing surfaces, and other conditions affecting performance of precast concrete units. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Members shall bear the minimum length called for on contract or shop drawings. If no
- B. bearing length is specified, 3 ½ inches shall be considered the minimum.
- C. Set vertical units dry, without grout, attaining joint dimension with lead or plastic spacers. Grout pack base of unit.
- D. Bearing Pads: Install bearing pads as precast concrete units are being erected. Set pads on true, level, and uniform bearing surfaces and maintain in correct position until precast units are placed. Concrete masonry units supporting precast concrete units shall be solid or grout filled to 8" minimum depth below bearing.

- E. Fasteners: Do not use drilled or powder-actuated fasteners for attaching accessory items to precast, prestressed units, unless otherwise acceptable to Architect.
- F. Erection Tolerances: Install precast units level, plumb, square, and true, without exceeding the recommended erection tolerances of PCI MNL-127 "Recommended Practice for Erection of Precast Concrete."
- G. Shore and brace precast concrete units to maintain location, stability, and alignment until permanent connections are installed.
- H. Remove lifting hooks if necessary.
- I. Grouting Connections and Joints: After precast concrete units have been placed and secured, grout open spaces at keyways, connections, and joints with cement grout.
 - 1. Provide forms or other acceptable method to retain grout in place until hard enough to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled. Place grout to finish smooth, plumb, and level with adjacent concrete surfaces. Keep grouted joints damp for not less than 24 hours after initial set. Promptly remove grout material from exposed surfaces before it hardens.
 - 2. Level differential elevation of adjoining horizontal members with grout to maximum slope of 1:12.

3.3 CLEANING

- A. Clean exposed surfaces of precast concrete units after erection to remove weld marks, other markings, dirt, and stains.
 - 1. Wash and rinse according to precast concrete fabricator's recommendations. Protect other work from staining or damage due to cleaning operations.
 - 2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes.

END OF SECTION

SECTION 04200

MASONRY

PART 1 - GENERAL

1.01 WORK INCLUDED

Concrete Masonry Units

Precast Concrete Items

Mortar

Grout

Joint Reinforcement

Foam Insulation

Flashing

1.02 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 82	(1997) Steel Wire, Plain, for Concrete Reinforcement
ASTM A 153 Hardware	(1982; R 1987) Zinc Coating (Hot-Dip) on Iron and Steel
ASTM A 615	(2000) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM C 90	(2000) Hollow Load-Bearing Concrete Masonry Units
ASTM C 91	(1999) Masonry Cement
ASTM C 270	(2000) Mortar for Unit Masonry
ASTM C 476	(1999) Grout for Masonry
ASTM C 494	(1992) Chemical Admixtures for Concrete

ASTM C 780	(2000) Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
ASTM E 84	(2000a) Surface Burning Characteristics of Building Material
ASTM E96	(2000) Water Vapor transmission of material
ASTM E119	(2000) Fire Tests for Building Construction and Materials

1.03 SUBMITTALS

The following shall be submitted in accordance with Section 01300 SUBMITTALS:

A. *SD-50, Samples*

Samples are required for concrete masonry units. For CMU items, samples shall be in sets of two to show typical physical characteristics of the items.

B. *SD-76, Certificates of Compliance*

Certificates of compliance shall attest that concrete masonry units & cementations materials for mortar and grout, joint reinforcement, reinforcement bars for walls, expansion joint materials, and insulating materials meet the requirements specified.

1.04 DELIVERY, HANDLING, AND STORAGE

Materials shall be delivered, handled, and stored in a manner to avoid chipping, breakage, and contact with soil or contaminating material. Concrete masonry units shall conform to the moisture content as specified in ASTM C 90 when delivered to the jobsite. Units shall be stored off the ground and protected from inclement weather. Anchors, ties, and joint reinforcement shall be stored in a dry location. Reinforcing bars shall be kept free of loose scale and rust. Cementitious materials shall be delivered in unopened containers plainly marked and labeled with manufacturers' names and brands. Cementitious materials shall be stored in dry, weathertight enclosures or covers. Sand shall be stored in a manner to prevent contamination.

PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS

Concrete masonry units shall conform to ASTM C 90, Type I, Grade N-I normal weight for hollow-load-bearing units normal weight for solid load-bearing units. Units shall be modular in size and shall include closer, jamb header, and bond-beam units, and special shapes and sizes required to complete the work indicated.

2.02 MORTAR

Mortar shall conform to ASTM C 270, Type M, except as otherwise specified. Mortar mix shall be based on laboratory-proportioned and tested mix. Laboratory testing of mortar shall be in accordance with the preconstruction evaluation of mortar section of ASTM C 780. Mortar mix shall be such that the mortar will develop a minimum laboratory compressive strength of 2500 psi at 28 days. Laboratory proportioned mortar shall be mixed to an initial flow of 100 to 115 percent and shall retain a flow after suction of at least 70 percent when tested for water retention in accordance with ASTM C 91. Cement shall be of one brand. Aggregates shall be from one source. Accelerating admixture, if used, shall be non-corrosive and chloride free conforming to ASTM C 494, Type C.

2.03 GROUT

Grout unless otherwise specified, shall conform to the requirements of ASTM C 476. Grout shall be laboratory-proportioned for a 2000 psi mix when tested in accordance with design criteria. Test cylinders shall be made and tested accordingly. Grout shall be mixed when it is flowable with a slump of 9 to 11 inches. Fine grout as defined, shall be used to fill spaces when the smallest dimension is 2 inches or less. Course grout as defined, shall be used to fill spaces where the smallest dimension is 2 inches or greater.

2.04 ANCHORS AND TIES

Anchors and ties shall be fabricated without drips or crimps and shall be zinc-coated in accordance with ASTM A 153, Class B-1, B-2, or B-3, as applicable for the size of material coated.

A. Door Anchors

Rigid steel anchors shall be 1-1/4 inches wide by 1/8 or 3/16 inch thick, with ends turned in same directions not less than 3 inches and of length required for the application indicated; however, length between turned ends shall not be less than 24 inches.

2.05 REINFORCING BARS

Reinforcing bars shall be Grade 40 or 60 steel conforming to ASTM A 615. Size shall be as shown. Centering clips or caging devices shall be formed from not lighter than 9 gauge wire and shall be of a design that will prevent displacement of reinforcing steel during construction. Bending of bars shall be as shown.

2.06 INJECTED INSULATION

Foam-in place insulation shall be Tripolymer PRM16 or 105 as manufactured by C.P>

Chemical Company. Phone (914)428-2517. Both the "A" component (resin) and "B" component (catalyst) shall bear the manufacturing lot no., date and product description.

Material shall have the following physical properties:

- | | | |
|----|--------------------------|--|
| A. | Density | 0.8 – 1.3 lb./cubic foot |
| B. | Compression strength | 35 psi |
| C. | Fire Characteristics | ASTM E-84 |
| | 1. Flame spread | 5 |
| | 2. Smoke | 0 |
| | 3. Fuel | 0 |
| D. | Thermal Conductivity | C-177 @ 75°F K factor of 0.219 BTU in 1 hr-ft ² -°F |
| E. | Water vapor transmission | ASTM E-96 permeability. |
| F. | Fire hour rating | ASTM E-119 – 2 hrs. |

2.07 FLASHING

Flashing shall conform to the requirements in Section 07600 SHEET METALWORK, GENERAL.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

Wall sections, types of construction, and dimensions shall be as shown. Masonry shall be laid in running bond and vertical joints shall be kept plumb. Units being laid and surfaces to receive units shall be free of water film and frost. Units shall be laid in a non-furrowed full bed of mortar, beveled and sloped toward the center of the wythe on which the mortar was placed. Units shall be shoved into place so that the vertical joints are tight. Vertical joints of brick and the vertical face shells of concrete masonry units, except where indicated at control and expansion joints, shall be completely filled with mortar. Units that have been disturbed after the mortar has stiffened shall be removed, cleaned and relaid with fresh mortar. Chases and raked-out joints shall be kept free from mortar and other debris. Space around metal door frames and other built-in items shall be solidly filled with mortar as each course is laid. Faces of units in finished areas shall be free from chipped edges or other imperfections detracting from the appearance of the finish work.

A. Surface Preparation

Surfaces on which masonry is to be laid shall be cleaned of laitance and other foreign material and slightly roughened to provide a surface texture with a depth of at least 1/8 inch.

B. Hot Weather Masonry Construction

Masonry erected when the ambient air has a temperature of more than 99 degrees F in the shade and has a relative humidity of less than 50 percent shall be protected from direct exposure to wind and sun during installation and for 48 hours after installation.

C. Cold Weather Masonry Construction

Temperatures of masonry units shall not be less than 40°F when laid and the temperature of the mortar and grout used shall be between 40°F and 120°F. When the ambient temperature is 32°F or less, masonry work under construction shall be protected and maintained at a temperature greater than 32°F during installation and for a period of 24 hours after installation. The proposed method of maintaining the temperature within the specified range shall be submitted for approval prior to implementation.

D. Tolerances

Masonry units shall be laid plumb, level and true to line units within the tolerances specified in TABLE 2; and all corners shall be square unless otherwise indicated.

TABLE 2

Variation from plumb

In adjacent units 1/8 inch

In 10 feet 1/4 inch

In 20 feet 3/8 inch

In 40 feet or more 1/2 inch

Variation from level or grades

In 10 feet 1/8 inch

In 20 feet 1/4 inch

In 40 feet or more 1/2 inch

Variation from linear building lines

In 20 feet 3/8 inch

In 40 feet or more 1/2 inch

Variation from cross sectional dimensions
of columns and walls

Plus 1/2 inch to minus 1/4 inch

3.02 MIXING OF MORTAR

Mortar shall be mixed in a mechanically operated mortar mixer for at least 3 minutes but not more than 5 minutes. Measurement of ingredients for mortar shall be either by volume or weight. If ingredients are measured by volume, measurement of sand shall be accomplished by the use of a container of known capacity or shovel count based on a container of known capacity. If ingredients are measured by weight, measurement of sand shall be based on the dry weight of sand of 80 pounds per cubic foot. Water shall be mixed with the dry ingredients in sufficient amount to provide a workable mixture which will adhere to the vertical surfaces of masonry units. Mortar that has stiffened because of loss of water through evaporation shall be re-tempered by adding water to restore the proper consistency and workability; mortar that has reached its initial set or that has not been used within 2 hours shall be discarded.

3.03 CUTTING AND FITTING

Wherever possible, full units shall be used in lieu of cut units. Where cut units are required to accommodate the design, cutting shall be done by masonry mechanics using power masonry saws, except that cutting of units in unexposed work may be accomplished with masonry hammers and chisels. Wet-cut units shall be dried to the same surface-dry appearance as uncut units before being placed in the work. Cut edges shall be clean, true, and sharp. Openings to accommodate pipes, conduits, and other accessories shall be neatly formed so that framing or escutcheons required will completely conceal the cut edges. Cutting of webs of hollow units shall be kept to a minimum. Insofar as practicable, all cutting and fitting shall be accomplished while masonry work is being erected.

3.04 JOINTING

Joint widths shall be uniform and such that the specified widths are maintained throughout. Joints in concealed masonry surfaces and joints at top of electrical boxes in wet areas shall be cut flush with the masonry surfaces. All joints shall be tooled slightly

concave. Tooling shall be accomplished when mortar is thumbprint hard and in a manner that will compress and seal the mortar joint and produce joints of straight and true lines free of tool marks.

A. Concrete Masonry Unit Joints (Plain face) (Split face)

Joints in concrete masonry unit construction shall be 3/8 inch wide.

3.05 ANCHORAGE AND JOINT REINFORCEMENT

Spacing of joint reinforcement and type and spacing of anchors shall be as indicated. Joint reinforcement shall be continuous except at expansion or control joints. Splices in joint reinforcement shall be lapped at least 6 inches. Where walls or partitions intersect to form T-sections, the intersecting walls shall be anchored together with rigid steel anchors or joint reinforcement as indicated.

3.06 REINFORCING STEEL

Reinforcing steel shall be cleaned of loose or flaky rust and scale, grease, mortar, or other coating which would tend to reduce bonding of the grout to steel. Steel shall be in place at the time of grouting. The minimum clear distance between bars and masonry units shall be 1/2 inch; and between parallel bars, the minimum clear distance shall be one bar diameter. Reinforcement shall be held in place with centering clips or caging devices. Vertical bars shall be supported near each end and at intermediate intervals not exceeding 192 bar diameters. Horizontal reinforcement shall be set in a full bed of grout. Splices in adjacent bars shall be staggered. Reinforcing bars where spliced shall be lapped a minimum of 40 bar diameters. Welded or mechanical connections shall develop at least 125 percent of the strength of the reinforcement.

3.07 BOND BEAMS

Bond beams shall consist of concrete masonry bond beam units reinforced and filled with concrete as indicated. Bond beams shall be made discontinuous at control joints. Where splices are required, reinforcement shall be lapped a minimum of 40 bar diameters or 24 inches, whichever is greater. A minimum clearance of 1/2 inch shall be maintained between reinforcement and interior faces of units.

3.08 DISCONTINUOUS WORK

When necessary to temporarily discontinue the work, masonry units shall be stepped back for joining when work resumes. Tothing may be resorted to only when specifically approved. Before resuming work, loose mortar shall be removed and the exposed joint shall be thoroughly cleaned. Top of walls exposed to rain or snow shall be covered with nonstaining waterproof covering or membrane when work is not in process. Covering shall extend a minimum of 2 feet down on each side of the wall and be held securely in place.

3.09 FOAM INJECTED INSULATION

Installation of produce shall be through top holes on inside face of building. Material shall be installed by certified craftsmen specifically instructed by proper methods as directed by product manufacturer. Installers must be specifically certified as applicators by manufacturers.

3.10 CLEANING

Mortar daubs or splashings, before setting or hardening, shall be completely removed from masonry unit surfaces that will be exposed or painted. Before completion of the work, all defects in joints of masonry to be exposed or painted shall be raked out as necessary, filled with mortar, and tooled to match existing joints. Masonry surfaces shall not be cleaned, other than removing excess surface mortar, until mortar in joints has hardened. Cleaning shall be accomplished with the use of stiff bristle fiber brushes, wooden paddles, wooden scrapers, or other suitable nonmetallic tools. Masonry surfaces shall be left clean, free of mortar daubs, dirt, stain, and discoloration, including scum from cleaning operations, and with tight mortar joints throughout.

A. Concrete-Masonry-Unit

Concrete-masonry-unit surfaces shall be dry-brushed at the end of each day's work after any required pointing has been done.

END OF SECTION

SECTION 05500

MISCELLANEOUS METAL

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Aluminum Finishes
- B. Shop Painting
- C. Miscellaneous
- D. Steel Door Frames
- E. Handrails
- F. Grating
- G. Access Stair

1.2 REFERENCES

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

AA DAF-45 (Sep 1980, 7th Ed) Designation System
for Aluminum Finishes

AA SAA-46 (Oct 1978, 5th Ed) Standards for
Anodized Architectural Aluminum

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36 (1988c) Structural Steel

ASTM A 446 (1987) Steel Sheet, Zinc-Coated (Galvanized)
by the Hot-Dip Process, Structural
(Physical) Quality

ASTM A 475 (1978, R 1989) Zinc-Coated Steel Wire Strand

ASTM A 525 (1987) Steel Sheet, Zinc-Coated (Galvanized)

by the Hot-Dip Process

ASTM B 429

(1988) Aluminum-Alloy Extruded Structural
Pipe and Tube

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1

(1988) Structural Welding Code – Steel

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS
(NAAMM)

NAAMM-01

(1988) Metal Finishes Manual for Architectural
and Metal Products

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01300 SUBMITTALS:

1.4 GENERAL REQUIREMENTS

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

1.5 DISSIMILAR MATERIALS

Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of Tnemec Series 46-465.

1.6 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true

alignment. Work shall be accurately set to establish lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

1.7 ANCHORAGE

Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; and lag bolts and screws for wood.

PART 2 - PRODUCTS

2.1 ALUMINUM FINISHES

Unless otherwise specified, aluminum items shall have standard mill finish. The thickness of the coating shall be not less than that specified for protective and decorative type finishes for items used in interior locations or architectural Class I type finish for items used in exterior locations in AA DAF-45. Items to be anodized shall receive a polished-satin-finish pretreatment and a clear-lacquer overcoating.

2.2 SHOP PAINTING

Surfaces of ferrous metal, except galvanized surfaces, shall be cleaned and shop coated with the standard protective coating Tnemec Series 37H77 Chem Prime. Surfaces of items to be embedded in concrete shall not be painted. Items to be finish painted shall be prepared according to these Specifications.

2.3 MISCELLANEOUS

Miscellaneous plates and shapes for items that do not form a part of the structural steel framework, such as lintels, sill angles, miscellaneous mountings, and frames, shall be provided to complete the work.

2.4 STEEL DOOR FRAMES

Steel doorframes shall be neatly mitered and securely welded at the corners with all welds ground smooth. Jambs shall be provided with 2- by 1/4-by 12-inch bent metal anchors spaced not over 2 feet 6 inches on centers. Provision shall be made to stiffen the top member for all spans over 3 feet. Continuous doorstops shall be made of 1-1/2 by 5/8-inch bars.

2.5 HANDRAILS

Handrails shall conform to basic criteria as set forth in ADA, OSHA and Kentucky

Building Code.

Top rail shall be as noted on plans Set 42" above finished walking surface. Kick plate shall be as noted. Vertical post along with intermediate rails use to be as noted on plans.

2.6 ALUMINUM GRATING (NOT USED)

Grating shall be aluminum of thickness noted on plans – Material shall be designed to withstand a load of 125 PSF with an impact load of 300 PSF. Securing shall be clips. Acceptable manufacturer is Ohio Grating Model 19-SGF-4/19 SGF 2.

2.7 ACCESS STAIR

Aluminum stair and handrail assembly shall be by "LAPEYRE" Stair Inc. New Orleans, LA 70150. Phone 1-800-535-7631.

Stair shall have an inclined angle of 68° with a floor to platform distance of 10 feet.

Compliance of stair to follow the codes –

A. Federal OSHA – 29 CFR part 1910, Vol. 55, No. 69 (April 10, 1990).

2.8 ALUMINUM HANDRAIL (NOT USED)

A. Handrail shall be the product of a company normally engaged in the sole manufacture of pipe railing. Railing shall be shop assembled in lengths not to exceed 24 feet for field erection.

B. Handrails shall be designed to withstand a 200 lb. concentrated load applied in any direction at any point on the top rail. Railing shall also be designed to withstand a load of 50 lbs. per foot applied horizontally to the top rail. The 200-lbs. load will not be applied simultaneously with the 50 lbs. per foot load. In addition, the rails shall be designed to withstand a load of 100 lbs. per foot applied vertically (right angles) downward to top rail and simultaneously with the 50 lbs. per foot horizontal load.

C. The manufacturer shall submit shop drawings and calculations to the Engineer for approval.

D. Vertical post spacing shall not exceed a maximum of 6 feet. All posts and railings shall be 1 1/2 inches Schedule 40 aluminum pipe alloy 6105-T5, ASTM-B-429 or ASTM-B-221. Spacing of horizontal railing shall comply with Kentucky Building code Section 1021.3, exception No. 2.

E. Handrail shall be made of pipes joined together with component fittings. Samples of all components, bases, toe plate and pipe shall be submitted for approval. One

sample of each shall be retained by the Engineer whereas the additional sample shall be returned to the fabricator. Components that are either glued or pop riveted at joints or connectors are not acceptable. All components shall be mechanically fastened with stainless steel hardware.

- F. Posts shall not interrupt the continuation of the top rail at any point along the length of the railing including corners and end termination (OSHA 1910.23). The top surface of the top railing shall be smooth and shall not be interrupted by projecting fittings.
- G. The midrail at corner returns shall be able to withstand a 200-lbs. load without coming undone. The manufacturer is to determine this dimension of its system and provide tests results from a testing laboratory to confirm compliance.
- H. Expansion bolts shall be spaced 10d apart and 5d edge distance for no reduction in pullout strength. A safety factor of 4 shall be used on expansion bolt pullout values published by the manufacturer. Expansion bolts shall be stainless steel type 303 wedge bolts and shall be furnished by the handrail manufacturer.
- I. Toe plates shall conform to OSHA and Kentucky Building Code Standards. Toe plate shall be a minimum of 4 inches high and shall be an extrusion that attaches to the posts with clamps which will allow for expansion and contraction between posts. Toe plates shall be set 1/4 inch above the walking surface. Toe plates shall be provided on handrails as required by Code and/or as shown on documents. Toe plates shall be shipped loose in stock lengths with pre-manufactured corners for field installation.
- J. Openings in the railing shall be guarded by a self-closing gate (OSHA 1910.23). Safety chairs shall be only used for temporary closure of openings where workmen are moving material or items onto or off platform. Once complete safety chain to be unhooked and gate placed back in service.
- K. Finish shall be Aluminum Association M10-C22-A41 (215-R1). The pipe shall be plastic wrapped and remain in place until all work has been completed.
- L. Aluminum surfaces in contact with concrete, grout, concrete masonry units or dissimilar metals shall be protected with mylar isolators, rubber gaskets or other approved material. Use of bituminous paint is strictly prohibited. Material selected must be resistant to chlorine.
- M. Acceptable manufacturer of aluminum railings is Thompson Fabricating Company, Birmingham, Alabama. Contact person Spencer Turner, 1-800-824-6182, Fax - (205) 841-0822 or approved equal.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

All items shall be installed at the locations shown and according to the manufacturer's recommendations. Item listed below requires additional procedures as specified.

3.2 DOOR FRAMES

Doorframes shall be secured to the floor slab by means of angle clips and expansion bolts. Continuous door stops shall be welded to the frame or tap-screwed with countersunk screws at no more than 18-inch centers, assuring in either case full contact with the frame. Any necessary reinforcements shall be made and the frames shall be drilled and tapped as required for hardware.

3.3 ACCESS STAIR - NOT USED

- A. Install aluminum stair per manufacturer's criteria.
- B. Where dissimilar metals or concrete come in contact with aluminum surfaces the aluminum shall be protected with mylar isolators, rubber gaskets or other approved material. Material selected must be resistant to chlorine. Use of bituminous paint is strictly prohibited.

3.4 ALUMINUM HANDRAIL - NOT USED

- A. Install aluminum handrail per manufacturer's specification. Steel walkway channel shall be field drilled to receive side-mounting bracket. After holes punched and drilled the exposed metal shall be given a heavy brush coat of paint same as already applied to metal. Allow paint too completely dry before assembly of handrail.

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Lumber and Sheathing
- B. Preservative Treatment
- C. Accessories and Nails
- D. Manufactured Wood Trusses
- E. Insulation

1.2 REFERENCES

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN INSTITUTE OF TIMBER CONSTRUCTION (AITC)

AITC-TC Manual (1994) Timber Construction Manual

AMERICAN PLYWOOD ASSN (APA)

APA AFG-01 (Jun 1984) Adhesives for Field-Gluing Plywood to Wood Framing

APA-E-30 (1996) Design/Construction Guide, Residential and Commercial

APA-E-445 (1996) Performance Standards and Policies for Structural-Use Panels

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 307 (2000) Carbon Steel Bolts and Studs, 60000 PSI Tensile Strength

ASTM C 518 (1998) Steady-State Heat Flux Measurements and Thermal Transmission Properties By Means of the Heat Flow Meter Apparatus

ASTM C 578	(1995) Preformed, Cellular Polystyrene Thermal Insulation
ASTM D 226	(1997) Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
ASTM D 2103	(1997) Polyethylene Film and Sheeting

AMERICAN WOOD PRESERVERS' ASSN (AWPA)

AWPA M4	(1999) The Care of Preservative-Treated Wood Products
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AMERICAN WOOD PRESERVERS BUREAU (AWPB)

AWPA-C1	(2000) All timber products-preservative treatment by pressure process
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FEDERAL SPECIFICATIONS (FS)

FS FF-N-105	(Rev B; Am 3; Int Am 4) Nails, Brads, Staples and Spikes: Wire, Cut and Wrought
FS HH-I-521	(Rev. F) Insulation Blankets, Thermal (Mineral Fiber, for Ambient Temperatures)
FS HH-I-558	(Rev B; Am 3) Insulation, Blocks, Boards, Blankets, Felts, Sleeving (Pipe and Tube Covering), and Pipe Fitting Covering, Thermal (Mineral Fiber, Industrial Type)
FS UU-B-790	(Rev A; Int Am 1) Building Paper, Vegetable Fiber: (Kraft, Waterproofed, Water Repellent and Fire Resistant)

NATIONAL FOREST PRODUCTS ASSN (NFOPA)

NFOPA-01	(1986; Supple) National Design Specification for Wood Construction
NFOPA-02	(1988) Manual for Wood Frame Construction

NATIONAL HARDWOOD LUMBER ASSN (NHHLA)

NHLRM1HC	(1994) Rules for the Measurement and Inspection of Hardwood and Cypress Lumber
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TRUSS PLATE INSTITUTE (TPI)

ANSI/TPI-1 (1995) Design Specification for Metal Plate Connected Wood Trusses

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST PS 20 (1994 Addenda Jan. 1997) American Softwood Standards

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01300 SUBMITTALS:

A. Design Analysis and Calculations

Design analysis and calculations of structural laminated members, fabricated wood trusses, and other fabricated structural members shall show design criteria used to accomplish the applicable analysis.

B. Fabrication/Erection/Installation Drawings

Drawings of structural, fabricated wood trusses and other fabricated structural members shall indicate materials and shop and field erection details including methods of fastening.

C. Certificates of Compliance

Manufacturer's certificates attesting that lumber and material not normally grade marked or exempt from being grade marked meets the specified requirements are required.

1.4 DELIVERY AND STORAGE

Materials shall be delivered to the site in undamaged condition, stored off ground in fully covered, well ventilated areas, and protected from extreme changes in temperature and humidity.

PART 2 - PRODUCTS

2.1 LUMBER AND SHEATHING

A. Grading and Marking

Materials shall bear the grademark, stamp or other identifying marks indicating grades of material and rules or standards under which produced. Such identifying

marks on material shall be in accordance with the rule or standard under which the material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification. The inspection agency for lumber shall be certified by the Board of Review, American Lumber Standards Committee, to grade species used. Except for structural laminated members, plywood, and lumber; bundle marking will be permitted in lieu of marking each individual piece. Surfaces that are to be architecturally exposed to view shall not bear grademarks, stamps, or other types of identifying marks.

B. Sizes

Lumber and material sizes shall conform to requirements of rules or standards under which produced. Unless otherwise specified, lumber shall be surfaced on four sides. Size references, unless otherwise specified, are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the standard under which the product is produced.

C. Moisture Content

At the time lumber and other materials are delivered and when installed in the work their moisture content shall be as follows:

1. Treated and Untreated Lumber Except Roof Planking: 4 inches or less, nominal thickness 19 percent maximum
2. Roof Planking: 15 percent maximum.
3. Materials Other Than Lumber: In accordance with standard under which product is produced.

D. Structural and Miscellaneous Wood Members

1. Structural Members

Joists, rafters including trussed type, decking, and headers shall have design values of psi in bending for repetitive member uses. Design of members and fastenings shall conform to AITC-TC. Other stress graded or dimensioned items such as blocking; carriages, sleepers and studs shall be standard or No. 2 grade except that studs may be Stud grade.

2. Nonstress Graded Members

Members shall include bridging, corner bracing, furring, grounds, and nailing strips. Members shall be in accordance with TABLE I for the species used. Sizes shall be as follows unless otherwise shown:

Member	Size
Bridging	1 by 3 or 1 by 4 for use between members 2 by 12 and smaller; 2 by 4 for use between members larger than 2 by 12.
Nailing strips	1 by 3 or 1 by 4 when used as shingle base or interior finish, otherwise 2-inch stock.

E. Sheathing

Sheathing shall be plywood, structural-use panels, or wood for roof sheathing.

1. Plywood

Plywood shall conform to NIST PS 1, Grade C-D with exterior glue. Sheathing for roof framing shall have a span rating of 16/0 or greater for supports 16 inches on center and a span rating of 24/0 or greater for supports 24 inches on center.

2. Structural-Use Panels

Panels shall meet the qualification requirements of APA-E445 for rated sheathing, Exposure 1 or Structural I rated sheathing, Exposure 1. Sheathing for roofs or walls without corner bracing of framing shall have a span rating of 16/0 or greater for supports 16 inches on center and shall have a span rating of 24/0 or greater for supports 24 inches on center.

3. Wood

Species and grade shall be in accordance with TABLE I at the end of this section; center-matched, ship lapped, or square edge. Roof sheathing shall be 1-inch thick for supports 16 or 24 inches on center.

2.2 PRESERVATIVE TREATMENT

The treatment of lumber, timber, and plywood shall meet the requirements of AWPA-C1. All products shall bear the appropriate AWPA Quality Mark. The wood shall then be dried to the moisture content specified and marked with the word "Dry." Surfaces of lumber that will be exposed shall not be incised. Exposed areas of treated wood that are cut or drilled after treatment shall receive a field treatment in accordance with AWPA M4. Items of all-heart material of cedar, cypress, or redwood will not require preservative treatment, except when in direct contact with soil. Unless otherwise specified for all-heart material of the previous mentioned species, the following items will always be treated:

1. All wood members set into concrete regardless of location, including flush-with-deck wood nailers for roofs.
2. Nailing strips or nailers used in conjunction with roof systems.

2.3 ACCESSORIES AND NAILS

Accessories and nails shall conform to the following:

A. Adhesive

APA AFG-01

B. Anchor Bolts

ASTM A 307, size as indicated, complete with nuts and washers.

C. Bolts: Lag, Toggle, and Miscellaneous Bolts and Screws

Type, size, and finish best suited for intended use.

D. Clip Angles

Steel, 3/16 inch thick, size best suited for intended use; or zinc-coated steel or iron commercial clips designed for connecting wood members.

E. Expansion Shields

Type and size best suited for intended use.

F. Metal Bridging

Optional to wood bridging; zinc-coated steel, size and design to provide rigidity equivalent to specified wood bridging.

G. Nails and Staples

FS FF-N-105, size and type best suited for purpose. For sheathing and sub-flooring, length of nails shall be sufficient to extend 1 inch into supports. In general, 8-penny or larger nails shall be used for nailing through 1-inch thick lumber and for toe nailing 2-inch thick lumber; 16-penny or larger nails shall be used for nailing through 2-inch thick lumber. Nails used with treated lumber and sheathing shall be galvanized.

H. Timber Connectors

Unless otherwise specified, in accordance with NFOPA-01, TPI-01, or AITC-01.

2.4 PRE-ENGINEERED WOOD TRUSSES

- A. Provide all material equipment and labor necessary for the prefabrication, delivery and permanent placement of wood trusses. Provide all the miscellaneous bracing, related items of hardware, metal hangers, anchors and special metal shapes as necessary for proper prefabrication, erection, assembly, supporting and anchoring of the wood trusses.
- B. Materials:
1. All wood roof trusses shall be of configurations and spacing as shown on the Drawings and shall be designed to comply with load requirements noted within this section with no allowable increase for short term loading. Trusses shall be as designed by a company which has a minimum of five (5) years experience in truss design and shall be fabricated by a licensed fabricator. Structural wood chord members shall be of machine stress-rated lumber: fb' = 1700 psi (minimum).
 2. The design and fabrication criteria of all wood trusses shall meet with "National Design Specifications for Stress Grade Lumber and Fastenings" by National Forest Products Association (latest revision); "Timber Construction Manual" (latest revision), the same as if those specifications and all their references were set out in full herein. All additional loads such as plywood ceiling, light fixtures, insulation, etc. shall be included.
 3. All lumber used for truss members shall conform to the published stress ratings for the species and grades as set out in the official grading rules of the appropriate lumber association or as this specification, or notes on the plans or truss engineering designs shall be applicable, and information stated or shown in one shall be applicable, the same as if, in all of them. The moisture content of all lumber shall be within the proper limits, as stated in the referenced specifications, but shall not, in any case, exceed 19 percent nor be less than seven (7) percent at the time of fabrication.
 4. All truss connector plates shall be manufactured from only prime commercial quality galvanized sheet steel of not less than 20 gauge, minimum ultimate tensile strength of 48,000 psi. The corrosion resistant coating shall be 1.25 ounce per square foot commercial class hot dipped galvanized before stamping. The connectors shall have a series of nail-like projections which are design to separate the fibers of the wood into which they are pressed in accordance with accepted nailing practices.

C. Engineering and Shop Drawings:

1. All truss designs shall bear the name, seal, and registration number of a Professional Engineer licensed in Kentucky.
2. Engineering and shop drawings shall contain the following data for each truss type:
 - a. Design and fabrication data: Pitch, span, spacing of trusses.
 - b. Metal Connectors: Nominal sizes and locations of connectors at all joints.
 - c. Lumber Specifications: Species and stress grades of lumber to be used as members.
 - d. Design loading of trusses and allowable stress increase.
 - e. Force analysis or bar forces in each member.
 - f. Truss bearing supports: Sizes and location at each varying condition.
 - g. Camber.
 - h. Permanent bracing and/or bridging as required to prevent compression buckling of individual truss members only.
 - i. Handling and erection instructions.
3. Submit six (6) copies of each truss design and shop drawings to the Engineer for approval prior to the fabrication of any components.
4. Truss type configuration shown on the Drawings describe spans, slopes and general conditions only and do not relieve the fabricator of the responsibility of providing proper engineering and members of appropriate size to resist all imposed loads and stresses.

D. Fabrication

1. All trusses and other roof structural components shall be fabricated in a properly equipped manufacturing facility of a permanent nature. They shall be manufactured by experienced workmen, using precision cutting and truss fabricating equipment, under the direct supervision of a qualified foreman. All trusses shall be fabricated under strict rules of inspection and quality control as the local code may require, open to the inspection of the Engineer or his representatives at all times.
2. All truss members shall be accurately cut to length, angle and be true to line to assure tight joints for finished truss.
3. All truss members and connector plates shall be properly placed in special jigs and the members tightly clamped in place, remaining in that position until the connector plates have been pressed in the lumber simultaneously on both sides of the joints.
4. Camber shall be built into the trusses, as noted on the engineering truss designs, by properly positioning the members in the fabricating jig.

E. Handling and Erection

1. Fabricated trusses shall be handled with care so that they are not subject to damage. If the trusses are to be stockpiled or stored prior to erection, they shall be set in a vertical position, resting upon temporary bearing supports and braces so that they will be subjected to no unusual bending or tipping over. Any trusses damaged during handling or erection shall be removed from the job site and new replacement trusses shall be fabricated.
2. Contractor shall provide temporary and permanent bracing at three (3) locations on the trusses: bottom chord, web members, and top chord. Temporary bracing may remain in place as permanent bracing if these instructions are followed and if nailed so the nails are loaded laterally not in withdrawal.
 - a. Bottom Chord Plane: Install continuous lateral bracing across the entire width of the building and perpendicular to the trusses. The first brace shall be located at and parallel to the end line of the truss span. Additional bracing shall be located parallel to the first brace and at 8'-0" to 10'-0" intervals. These shall be nailed to the top side of the bottom chord and shall overlap at least two trusses where connected. One complete bay of diagonal bracing shall be applied at the front and the extreme rear. This bracing shall be at approximately 45 degrees to the lateral bracing and run between the bearing wall and nearest lateral brace.
 - b. Web Member Plane: Install bracing on all web members as shown on truss shop drawings. Additional braces shall be nailed to these web members and at approximately 45 degree angles to the web members. Diagonal braces shall be between 12'-0" and 16'-0" in length and shall be repeated at approximately 20'-0" intervals along the spacing of the trusses.
 - c. Top Chord Plane: Top chords will be sufficiently braced when plywood roof sheathing is properly installed. Temporary erection bracing shall be applied as required.
 - d. Minimum size for diagonal and lateral wood braces shall be 2 x 4, with a minimum of two (2) 16d at the junction of each brace and each truss member.
 - e. All wood truss bracing shall conform to the Truss Plate Institute BWT-76.
 - f. The erection and handling of wood trusses shall be in accordance with Truss Plate Institute HET-80.
 - g. Erection bracing shall be installed to hold the trusses true and plumb and in safe condition until permanent truss bracing and bridging can be solidly nailed in place to form a structurally sound roof framing system. All components to be permanently fastened before the application of any loads.

F. Loading

1. Live load for snow shall be 30 pounds per square foot with no increase for short term loading.
2. Wind loading for uplift design for 90 mph.

2.5 INSULATION

A. Thermal resistance of insulation shall be not less than the R-values shown. R-values shall be determined at 75 degrees F in accordance with ASTM C 518. Insulation shall be the standard product of a manufacturer and factory marked or identified with manufacturer's name or trademark and R-value. Identification shall be on individual pieces or individual packages. Use insulation of this type when specified on documents:

1. Batt or Blanket

Mineral fiber, FS HH-I-521, Type I, Type II, Class C, width as required for wood construction.

2. Rigid Insulation

Polystyrene, ASTM C 578.

Mineral fiber, FS HH-I-558, Form A, Class 1.

Polyurethane or polyisocyanurate, FS HH-I-1972/GEN ASTM C 726.

2.6 VAPOR RETARDER

Vapor retarder shall be building paper conforming to FS UU-B-790, Type I, Grade D, style optional; asphalt-saturated felt conforming to ASTM D 226, Type I; or polyethylene sheeting conforming to ASTM D 2103, 6 mil thick.

PART 3 - EXECUTION

3.1 INSTALLATION OF FRAMING AND MISCELLANEOUS WOOD MEMBERS

A. General

Members shall be closely fitted, accurately set to required lines and levels, and rigidly secured in place. Nailing shall be in accordance with the recommended Nailing Schedule as contained in NFOPA-02. Where detailed nailing requirements are not specified, nail size and nail spacing shall be sufficient to develop an adequate strength for the connection without splitting the members. Installation of timber connections shall conform to applicable requirements of NFOPA-01. Members shall be framed for passage of ducts and pipes shall be cut, notched, or bored in accordance with applicable requirements of NFOPA-02.

Rafters, purlins, and joists shall be set with crown edge up. Leveling of joists, beams, and girders on masonry or concrete shall be with slate or steel; on wood or metal leveling shall be without shims.

B. Structural Members

Members shall be adequately braced before erection. Members shall be aligned and all connections completed before removal of bracing.

C. Roof Truss Brg. Plate

Wood plates shall be anchored using A.B. as detailed on plans.

D. Roof Framing

Provide end gable trusses covered with one half inch thick plywood sheathing. Set truss where exterior edge of truss aligns with outside of masonry wall. Set infill trusses according to documents.

E. Bridging

Wood bridging shall have ends accurately bevel-cut to afford firm contact and shall be nailed at each end with two nails. Metal bridging shall be installed as recommended by the Engineer. The lower ends of bridging shall be driven up tight and secured before ceiling sheathing has been installed.

F. Blocking

Blocking shall be provided as necessary for application of roof, sheathing, and ceiling sheathing, and other materials or building items, and to provide fire stopping. Blocking shall be cut to fit between framing members and rigidly nailed thereto.

G. Nailers and Nailing Strips

Nailers and nailing strips shall be provided as necessary for the attachment of finish materials. Nailers used in conjunction with roof deck installation shall be installed flush with the roof deck system. Stacked nailers shall be assembled with spikes or nails spaced not more than 18 inches on center and staggered. Beginning and ending nails shall not be more than 6 inches for nailer end. Ends of stacked nailers shall be offset approximately 12 inches in long runs and alternated at corners. Anchors shall extend through the entire thickness of the nailer. Strips shall be run in lengths as long as practicable, butt jointed, cut into wood framing members when necessary, and rigidly secured in place.

3.2 INSTALLATION OF SHEATHING

A. Plywood and Structural-Use Panels

Sheathing shall be applied with edges 1/8 inch apart at side and end joints, and nailed at supported edges at 6 inches on center and at intermediate supports 12 inches on center. Nailing of edges shall be 3/8 inch from the edges. Roof sheathing shall be applied with long dimension at right angles to supports, end joints made over supports, and end joints staggered.

3.3 INSTALLATION OF INSULATION

Insulation shall be installed after construction has advanced to a point that the installed insulation will not be damaged by remaining work. For thermal insulation the actual installed thickness shall provide the R-values shown. For acoustical insulation the installed thickness shall be as shown. Insulation shall be installed on the weather side of such items as electrical boxes and water lines. Unless otherwise specified, installation shall be in accordance with the manufacturer's recommendation.

END OF SECTION

SECTION 07210

BUILDING INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Wall Insulation.
- B. Ceiling Insulation.

1.2 RELATED SECTIONS

- A. Section 06100 – Rough Carpentry

1.3 REFERENCES

- A. ASTM-C 518 (1991) Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- B. ASTM-C 578 (1995) Rigid, Cellular Polystyrene Thermal Insulation.
- C. ASTM-C 665 (1994) Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- D. ASTM-E 84 (1996a) Surface Burning Characteristics of Building Materials.
- E. ASTM-E 96 (1995) Water Vapor Transmission of Material.

1.4 SUBMITTALS FOR REVIEW

- A. Section 01300 – Submittals: Procedures for submittals.
- B. Include manufacturer's product brochures; component specifications of reinforced polyethylene vapor barrier fabric including a sample of a typical seam; specific drawings for the project showing purlin spacings, support strap spacings, liner fabric sizes and locations; insulation thickness', sizes and locations; installation instructions.

1.5 SUBMITTALS FOR INFORMATION

- A. Section 01300 – Submittals: Procedures for submittal.
- B. Manufacturer's Instruction: Indicate method of securing insulation in place.

1.6 WORK INCLUDED:

- A. Interior liner fabric of the color specified, support strapping of the appropriate color, fasteners of the appropriate type and color, sealants, thermal break materials and thermal insulation of the appropriate type to insulate the roof and wall areas to the full designed R-value of the building as specified.
- B. Warranty: Submit manufacturer's standard warranty for product.

1.7 SUBMITTALS AT PROJECT CLOSEOUT

- A. Section 01700 – Project Closeout.
- B. Warranty: Submit manufacturer's standard warrant for product.

1.8 QUALITY CONTROL

- A. Provide the materials in original manufacturer packages together with detailed instructions and shop drawings typical of the installation. Materials shall be inspected for damage, proper sizes, and quantities upon delivery and then stored in a dry, secure manner. Installation shall proceed with care to assure proper sealing of the liner fabric. Insulation shall be placed on (ceiling) or behind (walls) the liner fabric in the full-specified thickness without voids or compression. Notify Thermal Design Inc. immediately of any damages, improper sizes or shortages. No changes or substitutions will be allowed unless submitted at least 10 days prior to bid date. Substitutions of systems that do not have a continuous vapor barrier on the inside plane of the purlins or girts will not be allowed. Purlins, girts and insulation must be completely isolated from the inside conditioned air with the vapor barrier. Taping or stapling of vapor barrier lap joints in not acceptable. Sealing field joints with permanent vapor barrier lap sealant is required. All field seams shall be at a structural member.
- B. All exposed parts of the system shall have flame spread of 25 or less and smoke developed value of 50 or less based on ASTM E-84 standards. Vapor barrier fabric shall be opaque white or colored woven reinforced polyethylene with extrusion welded seams fabricated in one piece, to fit not less than the full by length by the width of the building. Buildings more than 100' wide may have field seams on the bottom of a ridge purlin or no less than 50' apart. All field seams must be sealed with vapor barrier lap sealant. Wall bay minimum fabric size shall be not less than one entire wall bay or end wall column space from

ceiling to floor. Perimeter edges of the vapor barrier fabric shall be trimmed and sealed to the adjoining steel or fabric with vapor barrier lap sealant. All edges of liner fabric shall be mechanically fastened with steel retaining straps the full perimeter unless noted otherwise in the installation instructions.

- C. Applicator of insulation system shall be experienced in the installation of the "Simple-Saver" Insulation system. Unqualified applicators will not be acceptable. Company specializing in the application of this system for a minimum of five (5) years is a basic requirement.

1.9 QUALITY ASSURANCE

- A. Manufacturing company listed as Thermal Design, Inc., Madison, Wisconsin. Phone: 1-800-255-0776. Suppliers of Insulation system "Simple Saver System".
- B. Other systems of exactly same type of system but not equal shall be considered.

1.10 DELIVERY, STORAGE AND PROTECTION

- A. Store material inside, off ground and out of weather.

1.11 WARRANTY

- A. Provide standard one-year warranty on products after final acceptance of job.

PART 2 - PRODUCTS

2.1 INSULATION - GENERAL

- A. Acceptable systems shall be the Simple Saver insulation system manufactured by Termal Design Inc. with a roof insulation R-value of 25 and a n installed thickness of 8 inches. Roof system shall be a double layer system. A thermal break shall be applied OR a thermal block shall be applied where there is no existing thermal break. The Thermal break shall be 1" Snap-R™ thermal block. Minimum "in-place" insulation R-value of wall insulation shall be R-25 and an installed thickness of 8 inches. System Components shall meet the following minimum specifications:
 1. STEEL TRAP: 316 SS painted the specified color on the exposed side. Minimum size shall be 0.015 x ¾" x continuous length. The strap color shall be: (selection by owner) white, sky blue, mauve, beige, pale yellow, mint green, silver aspen. Black, bronze, royal blue, and other colors are available in plain painted steel (not galvanized). NOTE: Stainless steel and woven polyester plastic strapping are available for special uses.

2. **FASTENERS:** #12 x 3/4" plated Tek 2 screws painted to match the specified color for light gauge steel (up to 12 GA purlins). #12 x 1-1/4" plated Tek 4 screws, painted to match the specified color for heavier gauge steel (up to 3/8" purlins/bar joist). All fasteners shall be 3/6 SS.
3. **SIMPLE SAVER LINER FABRIC:** Shall be woven reinforced high-density polyethylene yarns coated on both sides with a continuous white or colored polyethylene film. The fabric grade for the ceiling shall be: (Simple Saver Plus White. The fabric shall have a flame spread index of 25 or less and smoke density index of 50 or less based on ASTM E-84 test standards. Pieces shall be fabricated to substantially fit the large defined building areas with minimum practical sealing to be done on job site. Fabric shall be folded to allow for rapid pullout on the strap support system. Color for ceiling fabric shall be selected by Owner. Color for wall fabric shall be selected by Owner. Liner fabric perm rating shall be 0.025 grains/hr. sq. feet (based on ASTM E-96, procedure B, "non-inverted water method").
4. **SEALANTS:** Shall be extruded fast-tack solvent-based vapor barrier sealant, synthetic rubber adhesive for sealing vapor barrier laps and/or pressure sensitive 3/4" wide by 1/32" thick extruded vapor barrier sealant by Insulation System supplier.
5. **INSULATION:** Shall be fiberglass blanket or batt insulation meeting Federal specifications HH-1-588B, Form B, Type 1.
6. **INSULATION HANGERS:** Shall be by system supplier for supporting insulation between wall girts and roof purlins if roof pitch is over 4:12.
7. **THERMAL BREAK (BLOCK):** Thermal break shall be: 1" polystyrene Snap-R thermal block. The selection shall be provided as thermal break where there is no existing thermal break.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

- A. **SIMPLE SAVER ROOF SYSTEMS:** Cut to length and install painted steel straps in the pattern and spacings as shown on the project shop drawings. The straps are installed in tension and span immediately below the bottom plane of the purlins. Position the pre-folded vapor barrier fabric on the strap platform along one eave purlin. Clamp the two bottom corners at the eave and also centered on the bay. Pull the other end of the pleat folded fabric across the building width on the strap platform but below the purlins, pausing only at the ridge to fasten the straps and fabric in position where the plane of the roof changes and to release temporary fasteners on the opposite ridge purlin. Once positioned, the fasteners are installed

from the bottom side at each strap-purlin intersection and the edges are trimmed and sealed along the rafters. A similar method can be used starting at the ridge purlin space and pulling the fabric to each eave.

- B. **SIMPLE SAVER WALL SYSTEMS:** Sheet the building with just the thermal break (if specified) applied to the exterior of the girts. Insulation is cut to required lengths to fit vertically between the first and installed in the girt spaces by FAST-R hangers or other suitable means. Pre-cut insulation shall be neatly positioned in place and firmly pressed onto the FAST-R hangers. Fluff the insulation to exceed the specified thickness making sure there are no gaps or voids. Insulate the wall section and apply the wall vapor barrier fabric by clamping it in position over an eave strap. Once in position, the fasteners are installed through the wall strap, eave strap and onto each roof strap, permanently clamping the wall fabric between them. Seal the wall fabric to the roof fabric, to the base angle or cee and up the columns. Additional vertical straps are installed along each column and fastened at each girt to retain the system permanently in place.
- C. A complete set of installation instructions are to be kept at job site.

END OF SECTION

SECTION 07600

SHEET METAL WORK

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Downspouts.
- B. Guttering.

1.2 RELATED SECTIONS

- A. Section 13120 – Metal Roofings.
- B. Section 15870 – Power Ventilators.

1.3 REFERENCES

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 167	(1993) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
ASTM B 32	(1995) Solder Metal.
ASTM B 209	(1996) Aluminum and Aluminum-Alloy Sheet and Plate.
ASTM B 221	(1993) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
ASTM B 370	(1992) Copper Sheet and Strip for Building Construction.
ASTM D 226	(1994) Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
ASTM D 543	(1987) Resistance of Plastics to Chemical Reagents
ASTM D 822	(1989) Conducting Tests on Paint and Related Coatings and Materials Using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus

ASTM D 828	(1993) Tensile Breaking Strength of Paper and Paperboard
ASTM D 2822	(1991) Asphalt Roof Cement
ASTM D 4586	(1993) Asphalt Roof Cement, Asbestos Free
ASTM E 96	(1994) Water Vapor Transmission of Materials

SHEET METAL AND AIR CONDITIONING CONTRACTORS
NATIONAL ASSOCIATION
(SMACNA)

SMACNA-02	(1993) Architectural Sheet Metal Manual.
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1.4 SUBMITTALS

- A. Section 01300 - Submittals: Procedures for submittals.
- B. Product Data: Provide catalog illustrations by manufacturers indicating material, size, colors and related items to identify product.

1.5 SUBMITTALS FOR INFORMATION

- A. Section 01300 - Submittals: Procedures for submittals.
- B. Manufacturer's Instructions: Indicate method of installation and procedure.

1.6 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Section 01700 – Contract Closeout.
- B. Maintenance Data: Include cleaning procedures.
- C. Warranty: Submit manufacturer's warranty.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section for a period of five years.

1.8 QUALITY CONTROL

- A. Contractor's Qualification: Company specializing in installation of products specified in this section for a period of five years.

1.9 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01600 - Material and Equipment: Transport, handle, store, and protect products.
- B. Protect material being installed from damage.

PART 2 - PRODUCTS

2.1 MATERIALS

Lead, lead-coated metal, and galvanized steel shall not be used. Any metal listed by SMACNA-02 for a particular item may be used, unless otherwise specified or indicated. Materials shall conform to the requirements specified below and to the thicknesses and configurations established in SMACNA-02. Different items need not be of the same metal, except that if copper is selected for any exposed item, all exposed items shall be copper.

2.2 ACCESSORIES

Accessories and other items essential to complete the sheet metal installation, though not specifically indicated or specified, shall be provided.

2.3 ALUMINUM EXTRUSIONS

ASTM B 221, Alloy 6063, Temper T5.

2.4 BITUMINOUS CEMENT

Type I asphalt cement conforming to ASTM D 2822 or ASTM D 4586. For coal tar roofing; coal tar cement conforming to ASMT D 4022.

2.5 SEALANT

Unless otherwise specified, sealant shall be an elastomeric weather resistant sealant as specified.

2.6 FASTENERS

Fasteners shall be compatible with the fastened material and shall be the type best suited for the application.

PART 3 - EXECUTION

3.1 PROTECTION OF ALUMINUM

- A. Aluminum shall not be used where it will be in contact with copper or where it will contact water, which flows over copper surfaces. Aluminum that will be in contact with wet or pressure-treated wood, mortar, concrete, masonry, or ferrous metals shall be protected against galvanic or corrosive action by one of the following methods:

1. Paint

Aluminum surfaces to be protected shall be solvent cleaned and given a coat of zinc-molybdate primer and one coat of aluminum paint. Aluminum paint shall conform to Section 09900 PAINTING, General.

2. Non-absorptive Tape or Gasket

Non-absorption tape or gasket shall be placed between the adjoining surfaces and shall be cemented to the aluminum surface using cement compatible with aluminum.

3.2 SOLDERING, RIVETING, SEAMING AND SEALING

A. Soldering

Soldering shall apply to copper items. Edges of sheet metals shall be pre-tinned before soldering is begun. Soldering shall be done slowly with well-heated soldering irons so as to thoroughly heat the seams and completely sweat the solder through the full width of the seam. Edges of lead coated material to be soldered shall be scraped or wire-brushed to produce a bright surface, and seams shall have a liberal amount of flux brushed in before soldering is begun. Soldering shall follow immediately after application of the flux. Upon completion of soldering, the acid flux residue shall be thoroughly cleaned from the sheet metal with a solution of washing soda in water and rinsed with clean water.

B. Riveting and Sealing

Joints in aluminum sheets 1.0 mm (0.040 inch) or less in thickness shall be made mechanically and sealed with the sealant specified.

C. Seams

Flat-lock and soldered-lap seams shall finish not less than 25 mm (1-inch) wide. Unsoldered plain-lap seams shall lap not less than 75 mm (3 inches) unless otherwise specified. Flat seams shall be made in the direction of the flow.

3.3 COVERING ON MINOR FLAT, PITCHED OR CURVED SURFACES

- A. Unless otherwise specified or indicated, all minor flat, pitched or curved surfaces, such as crickets, bulkheads, dormers, and small decks, shall be covered or flashed with 18- by 24-inch metal sheets and secured with fasteners. One ply of felt covered with one ply of slip-sheet shall be applied as underlayment on wood surfaces. Fasteners shall be placed on the long side and one shall be placed on the short side.
- B. Seams in materials other than aluminum shall be locked and soldered. Seams in aluminum shall be locked and sealed with plastic hardsetting sealing material recommended by aluminum supplier.

3.4 DOWNSPOUTS

- A. Downspouts shall be set plumb and not less than 1 inch from the wall. Leaders shall connect gutters on overhanging eaves to downspouts. Leaders shall be set with a slope not less than 1/16-inch per foot. Leaders shall fit over the outlet tube in gutter bottom and shall fit into and be riveted to the downspout. Rivet spacing shall be not more than 2 inches. Strainers shall be set loosely in the eave tube opening in gutter. Joints between lengths of downspouts shall be made by telescoping the end of the upper lengths at least $\frac{3}{4}$ inch into the lower length. Downspouts terminating at splash blocks or splash pans shall be provided with stock elbow-type fittings. Downspout hangers shall be provided adjacent to the joint at the top of each section of downspout except that the bottom section shall have an additional strap adjacent to the bottom joint when splash blocks or splash pans are required. Hangers shall be 1/16-inch by 1-inch flat stock of the same material as the downspout.

3.5 FLASHINGS

- A. Flashing shall be installed at intersections of roof with vertical surfaces and at projections through roof, except that flashing for heating and plumbing, including piping, roof, and floor drains, and for electrical conduit projections through roof or walls is covered in appropriate sections for such work.

1. Lintel Flashing

Lintel flashing shall extend the full length of lintel. It shall extend through the wall one masonry course above the lintels and shall be bent down over the vertical leg of the outer steel lintel angle not less than 2 inches, or shall be applied over top of masonry and precast concrete lintels. Bedjoints of lintels at control joints shall be underlain with sheet metal bond breaker.

2. Sill Flashing

Sill flashing shall extend the full width of the sill and not less than 4 inches beyond ends of sill except at control joint where the flashing shall be terminated at the end of the sill.

3.6 GUTTERS

- A. Gutters shall terminate at least $\frac{1}{2}$ inch away from vertical surfaces. Supporting cleats shall be anchored to the structure at spacing not exceeding 16 inches. Gutter brackets and spacers shall be fastened to roof nailer by screws or deformed shank-type nails and shall interlock with or be fastened to the leading edge of gutter. Gutter spacers shall be $\frac{1}{16}$ inch by 1-inch flat stock of the same material as the gutter. Brackets and spacers shall be alternated at not more than 36 inches on centers. Gutters shall be hung with high points at ends or equidistant from downspouts and shall have a slope of not less than $\frac{1}{16}$ inch per foot.

3.7 METAL BUILDING DOWN SPOUTS AND GUTTERS

- A. Gutter and downspouts for building shall be supplied by building sheet metal fabricator.

END OF SECTION

SECTION 08000

DOORS & FRAMES

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Doors and frames.
- B. Metal thresholds.
- C. Weather-stripping.
- D. Hardware (including locksets).

PART 2 - PRODUCTS

2.1 MATERIALS AND INSTALLATION

- A. Metal doors and frames.
 - 1. Exterior metal doors shall be constructed of two, formed cold rolled, galvanized steel sheets, No. 18 U.S. Standard Gauge metal, rigidly connected and reinforced, 1-3/4" thick, manufacturers' standard flush type product. Mortise, reinforce and drill for hardware. Fill with insulating material held firmly in place. Allow clearance of all sides for weather-stripping and threshold. Apply shop coat of baked on metallic primer. Size as shown on drawings. Out swinging door to have top cap.
 - 2. Hollow metal door frames shall be standard product of door manufacturer. Cold rolled, 16 U.S. Standard Gauge steel; integral stops and rabbets, head and jamb mitered, welded and ground smooth. Provide wall anchors at each jamb; sill anchors; mortise, reinforce and drill for hardware. Apply shop coat of Tnemec Series 37H77 Chem Prime. Provide spreaders to insure proper alignment. Size according to drawings and install in accordance with manufacturer's instructions, plumb and true with all hardware in proper working order.
- B. Metal Thresholds.
 - 1. Non-ferrous metal, manufacturer's standard product suitable for use with type of weather-stripping approved for Engineer.
 - 2. Set in mastic. Attach to concrete sill.

C. Metal Weather-stripping on Doors.

1. For top and both sides; non-ferrous metal, spring or interlocking type, approved by the Engineer as suitable for installation in geographical location of building. Attach to doors and/or frames in accordance with manufacturer's directions.
2. For bottom of doors; non-ferrous metal, or neoprene or vinyl, designed specifically for use with threshold selected.

D. Hardware.

1. Hinges for exterior doors; full mortise 4½" x 4¼" template steel butts; two ball bearings; 2 pair, manufacturer's standard product.
2. Cylinder locksets for exterior doors; provided by Contractor. (Latch bolt operated by knobs each side. Dead bolt operated by key from outside and turn knob from inside) to be provided by Contractor.
3. Coordinate keying with Owner.
4. Door closures shall be surface mounted, liquid checking, rack and pinion type; cast iron or non-ferrous case; non-gumming, non-evaporative liquid unaffected by extreme temperatures; without hold-open feature; manufacturer's standard product suitable for use on a doors as indicated on drawings.
5. Provide door stops wherever necessary to prevent door or hardware from striking an adjacent partition or obstruction. Stops to match existing where possible.

E. Hardware Mounting Heights.

1. Mount hardware units at heights recommended in "Recommended Locations for Builders' Hardware" by NBHA, except as may be otherwise directed by the Engineer.
2. Installation: Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware into or onto surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes reinstall each item. Do not install surface mounted items until finishes have been completed on the substrate. Adjust and check each operating item of hardware and each door, to insure proper operation or function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite-type if not other recommended). Replace units which cannot be readjusted and lubricated to operate freely and smoothly as intended for the application made.

F. Manufacturer.

Numbers given in schedule are of the following manufacturers:

<u>Mfg. Product</u>	<u>Specified</u>	<u>Acceptable Substitutes</u>
Hinges	Hager	McKinney; Stanley
Locks	Yale	
Mortise Bolts	Trimco	Baldwin; Ives
Closers	LCN	Norton
Thresholds	National Guard	Reese, Rixon, Zero
Weather-stripping	National Guard	Reese, Stanley
Door Stops	Glynn Johnson	Ives, Trimco

G. Hardware Schedule

Set 1:

3 ea.	Hinge	BB1191NRP 4.5 x 4.5 26D
1 ea.	Lockset	CA 5407 x US26D
1 ea.	Closer	4114 - 1
1 ea.	Door Stop	GJFB 19
1 ea.	Threshold	883 x 36" x WS & PS
1 ea.	Weather-strip	PF181 x 17'

END OF SECTION

SECTION 08110

STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 WORK INCLUDED

General Requirements for Doors and Frames

Thermal Insulated Doors

1.2 REFERENCES

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 84 (2000) Surface Burning Characteristics of Building Materials

ASTM E 283 (1991) Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors

DOOR AND HARDWARE INSTITUTE (DHI)

DHI-A115.1G (1994) Installation Guide for Doors and Hardware

NATIONAL ASSN OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM HMMA 840 (1999) Hollow Metal Manual, Section: Installation and Storage of Hollow Metal Doors and Frames.

STEEL DOOR INSTITUTE (SDOI)

SDOI 100 (1991) Standard Steel Doors and Frames

SDOI 106 (1999) Recommended Door Type Nomenclature

SDOI 107 (1997) Hardware on Steel Doors

1.3 SUBMITTALS

A. The following shall be submitted in accordance with Section 01300 SUBMITTALS:

1. Detail Drawings

Detail drawings shall be submitted. Detail drawings shall use standard door type nomenclature in accordance with SDOI 106 and shall indicate the location of each door and frame, elevation of each model of door and frame, details of construction, method of assembling sections, location and extent of hardware reinforcement, hardware locations, type and location of struts and anchors for frames, and thickness of metal. Detail drawings shall include catalog cuts or descriptive data for the weather-stripping.

2. Certificates of Compliance

Certification of Sound and Thermal Insulating Rating: Certification or test report for sound rated and thermal insulated doors shall be submitted to show compliance with the specified requirements. The certification, or test report, shall list the parameters and the type of hardware and perimeter seals used to achieve the rating.

1.4 DELIVERY AND STORAGE

To provide protection during shipment, welded unit type frames shall be strapped together in pairs with heads at opposite ends or provided with temporary steel spreaders at the bottom of each frame; and knockdown type frames shall be securely strapped in bundles. Materials shall be delivered to the site in undamaged condition, and stored out of contact with the ground and under a weathertight covering permitting good air circulation. Doors and assembled frames shall be stored in an upright position. Whenever damage becomes evident, abraded, scarred, or rusty areas shall be cleaned and touched up with the paint used for the shop painting.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR DOORS AND FRAMES

Doors and frames shall be factory fabricated conforming to SDOI 100 and the additional requirements specified herein. Door grade shall be standard heavy duty unless otherwise indicated. Exterior doors and frames shall be galvanized. Doors and frames shall be prepared to receive hardware conforming to the templates and information provided under this Section. Rubber silencers shall be installed into factory pre-drilled holes in doorframes; adhesively applied silencers are not acceptable. Where frames are installed in masonry walls, plaster guards shall be provided on doorframes at hinges and strikes. The Contractor shall coordinate between the hardware and door suppliers to assure that reinforcing of door assemblies for closers and other required hardware shall conform to SDOI 100 and the conditions of listing when applicable. Exterior doors shall have top edges closed flush and sealed against water penetration.

1. Weatherstripping:

Unless otherwise noted, weather-stripping shall be as specified below. Weatherstripping for head and jamb protection shall be an elastomeric type of synthetic rubber, vinyl, or neoprene standard the manufacturer of the doorframe. The weatherstripping shall be installed at the factory or on the jobsite in accordance with the doorframe manufacturer's recommendations. Weatherstripping for bottom of doors shall be of the mounted sweep type consisting of 1/8-inch thick neoprene or spring tension type of bronze or corrosion resisting steel on an extruded aluminum or bronze bar. Spring bronze shall be not less than 0.008-inch thick and corrosion-resisting steel not less than 0.005-inch thick.

2.2 THERMAL INSULATED DOORS

Interior of thermal insulated doors shall be completely filled with rigid foamed-in-place polyurethane or precured polystyrene foamed board, permanently bonded to each face panel. The U-value through the door shall not exceed .24. The door assembly, consisting of door frame, and perimeter seals, shall have an air infiltration rate not greater than 0.20 cubic feet per minute per foot of crack length when tested in accordance with ASTM E 283. Doors with cellular plastic cores shall have a flame spread rating of not more than 75 and a smoke development factor of not more than 150 when tested in accordance with ASTM E 84.

2.3 HARDWARE

Hinges for exterior doors; full mortise 4½" x 4¼" template steel butts; ball bearings; 1-1/2 pair, manufacturer's standard product.

Cylinder locksets for exterior doors; provided by Contractor. (Latch bolt operated by knobs each side. Dead bolt operated by key from outside and turn knob from inside) to be provided by Contractor.

Coordinate keying with Owner.

Door closures shall be surface mounted, liquid checking, rack and pinion type; cast iron or non-ferrous case; non-gumming, non-evaporative liquid unaffected by extreme temperatures; without hold-open feature; manufacturer's standard product suitable for use on a doors as indicated on drawings.

Provide door stops wherever necessary to prevent door or hardware from striking an adjacent partition or obstruction. Stops to match existing where possible.

2.4 HARDWARE MOUNTING HEIGHTS

Mount hardware units at heights recommended in "Recommended Locations for Builders' Hardware" by NBHA, except as may be otherwise directed by the Engineer.

Installation: Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware into or onto surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes reinstall each item. Do not install surface mounted items until finishes have been completed on the substrate. Adjust and check each operating item of hardware and each door, to insure proper operation or function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite-type if not other recommended). Replace units which cannot be readjusted and lubricated to operate freely and smoothly as intended for the application made.

2.5 MANUFACTURER

Numbers given in schedule are of the following manufacturers:

<u>Mfg. Product</u>	<u>Specified</u>	<u>Acceptable Substitutes</u>
Hinges	Hager	McKinney; Stanley
Locks	Yale	
Mortise Bolts	Trimco	Baldwin; Ives
Closers	LCN	Norton
Thresholds	National Guard	Reese, Rixon, Zero
Weather-stripping	National Guard	Reese, Stanley
Door Stops	Glynn Johnson	Ives, Trimco

2.6 HARDWARE SCHEDULE

Set 1:

3 ea.	Hinge	BB1191NRP 4.5 x 4.5 26D
1 ea.	Lockset	CA 5407 x US26D
1 ea.	Closer	4114 - 1
1 ea.	Door Stop	GJFB 19
1 ea.	Threshold	883 x 36" x WS & PS
1 ea.	Weather-strip	PF181 x 17'

PART 3 - EXECUTION

3.1 INSTALLATION

Installation shall conform to DHI-A115.1G, The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames, and Builders Hardware. Steel doors and frames shall be reinforced, drilled, and tapped to receive mortised hinges, locks, latches, flush bolts, and closers as required. Preparation for hardware shall be in accordance with SDOI 107. Weather-stripping shall be installed at exterior door openings to provide a weather-tight installation.

3.2 THERMAL INSULATED DOORS

A. Hardware and perimeter seals shall be adjusted for proper operation.

END OF SECTION

SECTION 08700

HARDWARE; BUILDERS' (GENERAL PURPOSE)

PART 1 - GENERAL

1.1 WORK INCLUDED

Locks and Latches

Architectural Door Trim

Exit Devices and Exit Device Accessories

Door Controls - Overhead Holders

Auxiliary Hardware

Hinges

Miscellaneous

Finishes

Fastenings

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

BUILDERS HARDWARE MANUFACTURERS ASSN (BHMA)

BHMA-01	(Effective through Jun 1989) Directory of Certified Locks & Latches
BHMA-02	(Effective through Jul 1988) Directory of Certified Door Closers
BHMA A156.1	(1988) Butts and Hinges
BHMA A156.2	(1983) Bored and Preassembled Locks and Latches
BHMA A156.3	(1984) Exit Devices
BHMA A156.4	(1986) Door Controls - Closers

BHMA A156.5	(1984) Auxiliary Locks & Associated Products
BHMA A156.6	(1986) Architectural Door Trim
BHMA A156.7	(1988) Template Hinge Dimensions
BHMA A156.8	(1988) Door Controls - Overhead Holders
BHMA A156.13	(1987) Mortise Locks & Latches
BHMA A156.15	(1986) Closer Holder Release Devices
BHMA A156.16	(1989) Auxiliary Hardware
BHMA A156.17	(1987) Self-Closing Hinges and Pivots
BHMA A156.18	(1987) Materials and Finishes

DOOR AND HARDWARE INSTITUTE (DHI)

DHI 115.1	(1982) Standard Steel Door and Steel Frame Preparation for Mortise Locks for 1-3/8" and 1-3/4" Doors
DHI 115.2	(1980) Door and Frame Preparation for Bored Locks
DHI-02	(1986) Installation Guide for Doors and Hardware
DHI-03	(1978) Keying - Procedures, Systems and Nomenclature
DHI-04	(1976) Recommended Locations for Builders' Hardware for Custom Steel Door and Frames
DHI-05	(1975) Recommended Locations for Builders' Hardware for Standard Steel Doors and Frames

FEDERAL SPECIFICATIONS (FS)

FS FF-P-110	Padlocks
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NATIONAL FIRE PROTECTION ASSN (NFPA)

NFPA 80	(1986) Fire Doors and Windows
NFPA 101	(1988) Code for Safety to Life from Fire in Buildings and Structures

NFPA 105 (1989; Int Am 89-1) Installation of Smoke - and Draft-Control Door Assemblies

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01300 SUBMITTALS:

SD-55, Layout Schedules

A. Hardware schedule listing all items to be furnished shall be submitted for approval. The schedule shall include for each item: the quantities; manufacturer's name and catalog numbers; sizes; detail information or catalog cuts; finishes; door and frame size and materials; location and hardware set identification cross-references to drawings; corresponding reference standard type number or function number from manufacturer's catalog if not covered by ANSI or BHMA; and list of abbreviations and template numbers.

B. Keying schedule shall be developed in accordance with DHI-03 and shall be submitted for approval.

SD-76, Certificates of Compliance

Certificates of compliance attesting that hardware items conform to the standards under which the items are specified shall be submitted. A statement that the proposed hardware items appear in BHMA-01 and BHMA-02 directories of certified products may be submitted in lieu of certificates. A separate certificate of compliance attesting that hardware items conform to "The Buy American Act" shall be submitted.

SD-80, Operation and Maintenance Manuals

The Contractor shall furnish to the Owner six complete copies of maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. The instructions for electronic locking devices and electro-magnetic closer holder release devices shall include simplified diagrams as installed.

SD-92, Spare Parts Data

After approval of the detail drawings, and not later than 3 month(s) prior to the date of beneficial occupancy, the Contractor shall furnish spare parts data for locksets, exit devices, closers, electronic locking devices, and electro-magnetic closer holder release devices. The data shall include a complete list of parts and supplies, with current unit prices and source of supply.

1.4 GENERAL

Hardware shall conform to the requirements specified herein and the HARDWARE

SETS listing at the end of this section. Hardware set numbers correspond to the set numbers shown on the drawings.

1.5 PACKAGING, MARKING, AND LABELING

Hardware shall be delivered to the project site in the manufacturer's original packages. Each article of hardware shall be individually packaged in the manufacturer's standard commercial carton or container, and shall be properly marked or labeled to be readily identifiable with the approved hardware schedule. Each change key shall be tagged or otherwise identified with the door for which its cylinder is intended. Where double cylinder functions are used or where it is not obvious which is the key side of a door, appropriate instructions shall be included with the lock and on the hardware schedule.

1.6 TEMPLATES

Requirements for hardware to be mounted on metal doors or metal frames shall be coordinated between hardware manufacturer and door or frame manufacturer by use of templates and other information to establish location, reinforcement required, size of holes, and similar details. Templates of hinges shall conform to BHMA A156.7.

1.7 KEYING

Locks shall be keyed in sets or subsets as scheduled. Locks shall be furnished with the manufacturer's standard construction key system. Change keys for locks shall be stamped with change number and the inscription "U.S. Property - Do Not Duplicate." Keys shall be supplied as follows:

Locks:	2 change keys each lock.
Blank keys:	10 total

The keys shall be furnished to the Owner arranged in a container in sets or subsets as scheduled.

1.8 SPECIAL TOOLS

Special tools shall be provided, such as spanner and socket wrenches and dogging keys, required to adjust hardware items.

PART 2 - PRODUCTS

2.1 LOCKS AND LATCHES

To the maximum extent possible, locksets, latchsets and deadlocks shall be the products of a single manufacturer. Lock fronts for double-acting doors shall be rounded. Lock and latch set trim, knobs, handles, roses and escutcheons shall be of a simple design in accordance with manufacturers standard practice. Knob diameter shall be 2-1/8 to 2-1/4 inches.

A. Mortise Locks and Latchsets

Mortise lock and latchsets shall be series 1000 and shall conform to BHMA A156.13, Grade 1. Strikes for all mortise locks and latches, including deadlocks, shall conform to DHI 115.1. Mortise-type locks and latches for doors 1-3/4 inches thick and over shall have adjustable bevel fronts or otherwise conform to the shape of the door. Mortise locks shall have armored fronts.

B. Bored Lock and Latchsets

Bored lock and latchsets shall be series 4000 and shall conform to BHMA A156.2, Grade 1. Strikes for bored locks and latches shall conform to DHI 115.2. Bored-type locks and latches for doors 1-3/8 inches thick and over shall have adjustable bevel fronts or otherwise conform to the shape of the door.

C. Auxiliary Locks and Associated Products

Bored and mortise deadlocks and latchsets, narrow style locks, rim locks, electric strikes and exit alarms and/or locks shall conform to BHMA A156.5. Strike boxes shall be furnished with dead bolt and latch strikes for Grade 1.

D. Lock Cylinders (Mortise, Rim and Bored)

Lock cylinders shall comply with BHMA A156.5. Lock cylinder shall have not less than six pins. Disassembly of knob or lockset shall not be required to remove core from lockset.

E. Padlocks

Padlocks shall conform to FS FF-P-110.

F. Lock Trim

Lock trim shall be cast, forged, or heavy wrought construction of commercial plain design. In addition to meeting the test requirements of BHMA A156.2 or BHMA A156.13, knobs, roses, and escutcheons shall be 0.050 inch thick if unreinforced. If reinforced, the outer shell shall be 0.035 inch thick and the combined thickness shall be 0.070 inch, except that knob shanks shall be 0.060 inch thick.

2.2 ARCHITECTURAL DOOR TRIM

Architectural door trim shall conform to BHMA A156.6.

A. Armor Plates

Armor plates shall be category J100, stainless steel, 36 inches in height, and 2 inches less in width than the width of the door for single doors and 1 inch less for pairs of doors.

B. Combination Push-Pull Plates

Combination push-pull plates shall be Category J300, 1/8 inch minimum stainless steel beveled four edges.

C. Kick Plates

Kick plates shall be Category J100, stainless steel. Width of plates shall be 2 inches less than door width for single doors and 1 inch less for pairs of doors. Height shall be 10 inches except where the bottom rail is less than 10 inches, the plate shall extend to within 1/2 inch of the panel mold or glass bead.

2.3 EXIT DEVICES AND EXIT DEVICE ACCESSORIES

Exit devices and exit device accessories shall conform to BHMA A156.3

A. Exit Devices and Auxiliary Items

Trim shall be of wrought construction and commercial plain design with straight, beveled, or smoothly rounded sides, corners, and edges. Adjustable strikes shall be provided for rim type and vertical rod devices. Open back strikes shall be provided for pairs of doors with mortise and vertical rod devices; except open back strikes shall be used on labeled doors only where specifically provided for in the published listings. Touch bars shall be provided in lieu of conventional crossbars and arms. Escutcheons shall be provided not less than 7 by 2-1/4 inches. Escutcheons will be cut to suit cylinders and operating trim.

2.4 HINGES

Hinges shall conform to BHMA A156.1. Hinges used on metal doors and frames shall also conform to BHMA A156.7.

A. Hinges for Reverse Bevel Doors with Locks

Hinges for reverse bevel doors with locks shall have pins that are made non-removable by means such as a set screw in the barrel, or safety stud, when the door is in the closed position. Except as otherwise specified, hinge sizes shall conform to the hinge manufacturer's printed recommendations.

B. Contractor's Option

Hinges with antifriction bearings may be furnished in lieu of ball bearing hinges, except where prohibited for fire doors by the requirements of NFPA 80.

C. Pivot Hinges

Pivot hinges shall conform to BHMA A156.4.

2.5 DOOR CLOSING DEVICES

Door closing devices shall conform to BHMA A156.4, Grade 1. Closing devices shall be products of one manufacturer for each type specified.

A. Surface Type Closers

Surface type closures shall be Series C01000 with options PT-4C and PT-4D. Except as otherwise specified, sizes of the door closures furnished shall conform to the manufacturer's published recommendations. Closers for out swinging exterior doors shall have parallel arms or shall be top jamb mounted. Closers for doors close to a wall shall be of narrow projection so as not to strike the wall at the 90-degree open position.

2.6 MISCELLANEOUS

A. Metal Thresholds

Thresholds for exterior doors shall be extruded aluminum of the type as indicated and shall provide proper clearance and an effective seal with specified weather stripping.

B. Rain Drips

Extruded aluminum, not less than 0.07 inch thick, [mill finished] [clear anodized] [bronze anodized] [painted]. Door sill rain drips shall be 1-1/2 inches to 1-3/4 inches high by 5/8-inch projection. Overhead rain drips shall be approximately 1-1/2 inches high by 2-1/2 inches projection and shall extend 2 inches on either side of the door opening width.

C. Aluminum Housed Type Weatherseals

Weatherseals of the type as indicated shall consist of extruded aluminum retainers not less than 0.07 inch wall thickness with vinyl, neoprene, silicone rubber, polyurethane or vinyl brush inserts. Aluminum shall be [clear (natural)] [bronze] anodized. Weatherseal material shall be of an industrial/commercial grade. Seals shall remain functional through all weather and temperature conditions.

2.7 FINISHES

Unless otherwise specified, finishes shall conform to those identified in BHMA A156.18.

Where painting of primed surfaces is required, painting is specified in Section 09900 PAINTING, GENERAL.

2.8 FASTENINGS

Fastenings of proper type, size, quantity, and finish shall be supplied with each article of hardware. Machine screws and expansion shields shall be used for attaching hardware to concrete or masonry. Fastenings exposed to the weather in the finished work shall be of brass, bronze, or stainless steel. Sex bolts, through bolts, or machine screws and grommet nuts, where used on reverse-bevel exterior doors equipped with half-surface or full-surface hinges, shall employ one-way screws or other approved tamperproof screws. Screws for the jamb leaf of half-mortise and full-surface hinges attached to structural steel frames shall be one-way or other approved tamperproof type.

PART 3 - EXECUTION

3.1 APPLICATION

Hardware shall be located in accordance with DHI-04 and DHI-05. When approved, slight variations in locations or dimensions will be permitted. Application shall be in accordance with DHI-02. Door control devices for exterior doors such as closures and holders, shall normally attach to doors with through bolts such as sex bolts and nuts.

A. Door-Closing Devices

Door-closing devices shall be installed and adjusted in accordance with the templates and printed instructions supplied by the manufacturer of the devices. Insofar as practicable, doors opening to or from halls and corridors shall have the closer mounted on the room side of the door.

B. Kick Plates

Kick plates shall be installed on the push side of single-acting doors

C. Thresholds

Exterior thresholds shall be installed in a bed of sealant with stainless steel screws and expansion shields. Minimum screw size shall be No. 10, length dependent on job conditions.

D. Rain Drips

Door sill rain drips shall align with the bottom edge of the door. Overhead rain drips shall align with bottom edge of door frame rabbit. Drips shall be set in sealant and fastened with stainless steel screws.

E. Weatherseals

Weatherseals shall be located as indicated snug to door face and fastened in place with color matched metal screws after door and frames have been finish painted. Screw spacing shall be as recommended by manufacturer.

END OF SECTION

SECTION 08800

GLASS AND GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Extent of glass and glazing work is indicated on Drawings and schedules.

1.2 SYSTEM DESCRIPTION

- A. Provide glass and glazing that has been produced, fabricated and installed to withstand normal temperature changes, wind loading and impact loading, without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials and other defects in the work.
- B. Glazing installed in manufactured windows.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each glazing material and fabricated glass product required, including installation and maintenance instructions.
- B. Samples: Submit, for verification purposes, 12" square samples of insulating glass units indicated.
- C. Certificate: Submit certificates from respective manufacturers attesting that glass and glazing materials furnished for project comply with requirements.

1.4 QUALITY ASSURANCE

- A. Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.
- B. Safety Glazing Standard: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials.
- C. Single Source Responsibility for Glass: Provide materials obtained from one source for each type of glass and glazing product indicated.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Protect glass and glazing materials during delivery, storage and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and lazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.

1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes. Install glazing sealants only when temperatures are in middle third of manufacturer's recommended installation temperature range.

1.7 WARRANTY

- A. General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

- A. Sizes: Fabricate glass to sizes required for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer. Provide thickness indicated.

2.2 PRIMARY GLASS PRODUCTS

- A. Wire glass installed in doors.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Require Glazier to inspect work of glass framing erector for compliance with manufacturing and installation tolerances. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrates.

3.3 GLAZING, GENERAL

- A. Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.
- B. Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners.

3.4 GLAZING

- A. Install setting blocks of proper size in sill rabbet.
- B. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.
- C. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.

3.5 PROTECTION AND CLEANING

- A. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.

END OF SECTION

SECTION 09900

PROTECTIVE COATINGS AND PAINTING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The work of this section shall include the furnishing of all materials, labor, equipment and incidentals required to perform all the painting necessary to complete this Contract in its entirety.
- B. It is the intent of these Specifications to paint all exposed structural and miscellaneous steel, doors, frames, mechanical equipment, operators, posts, pipe, fittings, valves, and walls, as specified in the attached painting schedules and all other work obviously required to be painted unless otherwise specified. Minor items not mentioned in the schedule of work shall be included in the work of this Section where they come within the general intent of the Specifications as stated herein.
- C. The following items will not be painted, except as is the normal procedure of a manufacturer furnishing a finished product:
 - 1. Concrete not exposed to sight and concrete floors (unless otherwise specified in the painting schedules).
 - 2. Finish hardware unless specifically noted otherwise.
 - 3. Non-ferrous metals, or galvanized metals unless specifically noted otherwise.
 - 4. Grating.
 - 5. Packing glands and other adjustable parts and name plates of mechanical equipment.
 - 6. Factory pre-finished architectural components.
 - 7. Parts of buildings not exposed to sight, unless specifically noted otherwise.
- D. Definitions
 - 1. Definitions of Painting Terms: ASTM D 16, unless otherwise specified.
 - 2. Dry Film Thickness (DFT): Thickness of a coat of cured paint measured in mils (1/1000 inch).

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. General submittal requirements are including in Section 01300.
- C. Special provisions for material and equipment is including in Section 01600.

1.3 REFERENCE SPECIFICATIONS

- A. ASTM D 16 - Terminology Relating to Paint, Varnish, Lacquer, and Related Products.
- B. ASTM D 4263 - Indicating Moisture in Concrete by the Plastic Sheet Method.
- C. ASTM F 1869 - Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- D. International Concrete Repair Institute (ICRI) Guideline No. 03732 - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.
- E. NACE RP0188 - Standard Recommended Practice, Discontinuity (Holiday) Testing of Protective Coatings.
- F. NAPF 500-03-04 Abrasive Blast Cleaning.
- G. NAPF 500-03-03 Power Tool Cleaning.
- H. SSPC-SP 1 - Solvent Cleaning.
- I. SSPC-SP 3 - Power Tool Cleaning
- J. SPPC-SP 5/NACE 1 - White Metal Blast Cleaning.
- K. SSPC-SP 6/NACE 3 - Commercial Blast Cleaning.
- L. SSPC-SP 10/NACE 2 - Near-White Metal Blast Cleaning.
- M. SSPC-SP 13/NACE 6 - Surface Preparation of Concrete.

1.4 CONTRACTOR SUBMITTALS

- A. The CONTRACTOR shall comply with the provisions of the Specifications regarding submittals (See Section 01300).

- B. Product Data: The CONTRACTOR shall submit manufacturer's product data for each coating, including generic description, complete technical data, surface preparation, and application instructions.
- C. Color Samples: The CONTRACTOR shall submit manufacturer's color samples showing full range of standard colors.
- D. Manufacturer's Quality Assurance: The CONTRACTOR shall submit manufacturer's certification that coatings comply with specified requirements and are suitable for intended application.
- E. Applicator's Quality Assurance: The CONTRACTOR shall submit list of completed projects of similar size and complexity to this Work. The submission shall include for each project:
 - 1. Project name and location.
 - 2. Name of OWNER.
 - 3. Name of CONTRACTOR.
 - 4. Name of ENGINEER.
 - 5. Name of coating manufacturer.
 - 6. Approximate area of coatings applied.
 - 7. Date of completion.
- F. Warranty: The CONTRACTOR shall submit manufacturer's standard warranty.

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

- 1. The manufacturer shall specialize in manufacture of coatings with experience.
- 2. The manufacturer shall be able to demonstrate successful performance on comparable projects.
- 3. Single Source Responsibility: Coatings and coating application accessories shall be products of a single manufacturer.

B. Applicator's Qualifications:

- 1. The applicator shall be experienced in application of specified coatings on projects of similar size and complexity to this Work.
- 2. Applicator's Personnel: The applicator shall employ persons trained for application of specified coatings.

C. Preapplication Meeting: Convene a preapplication meeting two [2] weeks before start of application of coating systems. Require attendance of parties directly affecting work of this section, including CONTRACTOR, ENGINEER, applicator, and manufacturer's representative. Review the following:

1. Environmental requirements.
2. Protection of surfaces not scheduled to be coated.
3. Surface preparation.
4. Application.
5. Repair.
6. Field quality control.
7. Cleaning.
8. Protection of coating systems.
9. One-year inspection.
10. Coordination with other work.

1.6 MANUFACTURER'S SERVICE REPRESENTATIVE

- A. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for surface preparation and application of coating systems.
- B. The CONTRACTOR shall comply with Section 01600.

1.7 CLEANUP

- A. The CONTRACTOR shall remove temporary coverings and protection of surrounding areas and surfaces.

1.8 SPECIAL MAINTENANCE AND REPAIR; GUARANTEES; WARRANTIES

- A. Repair:
 1. Materials and Surfaces Not Scheduled To Be Coated: The CONTRACTOR shall repair or replace damaged materials and surfaces not scheduled to be coated.
 2. Damaged Coatings: The CONTRACTOR shall touch-up or repair damaged coatings. Touch-up of minor damage shall be acceptable where result is not visibly different from adjacent surfaces. The CONTRACTOR shall recoat

entire surface where touch-up result is visibly different, either in sheen, texture, or color.

3. Coating Defects: The CONTRACTOR shall repair in accordance with manufacturer's instructions coatings that exhibit film characteristics or defects that would adversely affect performance or appearance of coating systems.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Manufacturer: All painting materials shall be equal to those manufactured by the Tnemec Company, Inc., or approved equal. The painting schedule has been prepared on the basis of Tnemec products (unless otherwise noted) and Tnemec recommendations for application. No brand other than those named will be considered for approval unless the brand and type of paint proposed for each item in the following schedule together with sufficient data substantiated by certified tests conducted at no expense to the OWNER to demonstrate its equality to the paints named, is submitted to the ENGINEER in writing for approval within 30 days after the signing of the Contract Agreement. The type and number of tests performed shall be subject to the ENGINEER's approval.
- B. All painting materials shall be delivered to the mixing room in unbroken packages, bearing the manufacturer's brand and name. They shall be used without adulteration and mixed, thinned, and applied in strict accordance with manufacturer's directions for the applicable materials and surface and with the ENGINEER's approval before using.
- C. Shop priming shall be done with primers that are guaranteed by the manufacturer to be compatible with the finish paints to be used.
- D. No paint containing lead will be allowed. Oil shall be pure boiled linseed oil.
- E. Work areas will be designated by the ENGINEER for storage and mixing of all painting materials. Materials shall be in full compliance with the requirements of pertinent codes and fire regulations. Proper containers outside of the buildings shall be provided and used for painting wastes, and no plumbing fixture shall be used for this purpose.
- F. Color Coding for Pipes and Equipment

To facilitate identification of piping in plants and pumping stations, the following color scheme shall be utilized:

Water Lines

Raw

Olive Green

Settled or Clarified

Aqua

Finished or Potable	Blue
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Chemical Lines

Alum or Primary Coagulant	Orange
Ammonia	White
Carbon Slurry	Black
Caustic	Yellow with Green Bands
Chlorine (Gas and Solution)	Yellow
Fluoride	Light Blue with Red bands
Lime Slurry	Light Green
Ozone	Yellow with Orange Bands
Phosphate Compounds	Light Green with Red Bands
Polymers or Coagulant Aids	Purple
Potassium Permanganate	Violet
Soda Ash	Light Green with Orange Bands
Sulfuric Acid	Light Green with Red Bands
Sulfur Dioxide	Yellow with Red Bands

Waste Lines

Backwash Waste	Light Brown
Sludge	Dark Brown
Sewer (Sanitary or Other)	Gray
Raw Sludge Line	Brown with Black Bands
Sludge Recirculation Suction Line	Brown with Yellow Bands
Sludge Draw Off Line	Brown with Orange Bands
Sludge Recirculation Discharge Line	Brown
Sludge Gas Line	Orange (or red)

Natural Gas Line	Orange (or red) with Black Bands
Non-potable Water Line	Blue with Black Bands
Water Lines for Heating Digesters or buildings	Blue with 6-inch Red Bands Spaced 30 inches apart
Plumbing Drains and Vents	Black
<u>Other</u>	
Compressed Air	Dark Green
Fuel Oil/Diesel	Red
Other Lines	Light Gray

G. Lettering of Titles

1. The name of the materials in each pipeline and alongside this an arrow indicating the direction of flow of liquids, shall be indicated on each pipe system. Titles shall not be located more than twenty six (26) linear feet apart and shall also appear directly adjacent to each side of any wall the pipeline breaches, adjacent cleanout, and all pieces of equipment.
2. Titles shall identify the contents by complete name. Identification title locations shall be determined by the ENGINEER but in general they shall be placed where the view is unobstructed and on the two lower quarters of pipe or covering where they are overhead. Title should be clearly visible from operating positions especially those adjacent to control valves.
3. Numbers and letters shall be die-cut from 3.5 mil vinyl film and pre-spaced on carrier tape. Adhesive and finish surface shall be protected with one piece removable liners. Color shall be white.
4. Letter size shall be as indicated in the following table.

<u>OUTSIDE DIAMETER OF PIPE</u>	<u>SIZE OF LEGEND OR LETTERS</u>
3/4-in to 1-1/4-in	1/2-in
1-1/2-in to 2-in	3/4-in
2-1/2-in to 6-in	1-1/2-in
8-in to 10-in	2-1/2-in
Over 10-in	3-in

5. The system for preparation and application of letters shall be ASI/LTV Series by Architectural Signing Inc., Marina Del Rey, CA, Architectural Graphics Inc., Norfolk VA or equal. Letter type shall be Helvetica Medium, upper case. Grid 2 spacing shall be employed. Arrows shall be standard Helvetica Medium. Arrow shall match type size. The instructions of the manufacturer shall be followed in respect to storage, surface preparation and applications of letters.

H. Titles for Equipment

1. Titles shall be provided on all equipment, including pumps, using 1-in high Helvetica Medium upper case, Grid 2 spacing, white in color except as otherwise noted on the drawings in these specifications. Titles shall include both the equipment tag number and name, as shown in the Drawings or as otherwise indicated by the ENGINEER. Titles shall be mounted at eye level on machines where possible or at the upper most broad vertical surface of low equipment. Where more than one piece of the equipment item to be titled exists, the items shall be numbered consecutively as indicated on the mechanical drawings or as directed by the ENGINEER; for example Pump No. 1, Pump No. 2, etc.
2. Titles shall be sized, proportioned, arranged and located to be easily readable. It may be required by the ENGINEER that some equipment be labeled in two or more places, in which cases, the CONTRACTOR shall comply with no additional cost to the OWNER.
3. The CONTRACTOR shall submit for ENGINEER's approval in accordance with Section 01300 a listing of all equipment titles he proposes to provide, including for each equipment's labeling.
 - a. Size and color of letters to be used.
 - b. Locations of labels.
 - c. Formation of label, e.g.: Blower No. 1
 - d. It is the intent of these Specifications that all equipment items be labeled and that such labeling allow easy identification of the item of equipment from the direction(s) it will most normally be viewed. To satisfy this intent, all equipment shall be labeled, whether included in the CONTRACTOR's listing, or not.
4. Metal Tags: For pipelines smaller than 3/4-in in diameter, securely fasten metal tags, 2-1/2-in x 1/2-in, of 316 ss construction with lettering etched and filled with enamel. Tags shall be approved by the ENGINEER.

2.2 BASIC MATERIALS

A. General

1. The name of the liquid or gas shall also be on the pipe. Provide arrows indicating the direction of flow. In situations where two colors do not have sufficient contrast to easily differentiate between them, a six-inch band of contrasting color shall be on one of the pipes at approximately 30 inch intervals.
2. All hangers and pipe support floor stands shall be painted the same color with the same paint as used to paint the pipe it supports. The system shall be painted up to but not including the flanges attached to the mechanical equipment nor the flexible conduit connected to electrical motors.
3. All systems which are an integral part of the equipment, that is originating from the equipment and returning to the same piece of equipment, shall be painted between and up to but not including the fixed flanges or connections on the equipment.
4. The color code shall establish, define and assign a definite color for each category of pipe.
5. All pipes and equipment shall be painted unless otherwise approved by the ENGINEER.

B. Coating Systems for Steel - Tanks, Pipe, Equipment, And Miscellaneous

1. Exterior Exposed:

- A. System Type: MCU/epoxy/urethane.
- B. Surface Preparation: SSPC-SP 6.
- C. Primer: Series 1 Omnithane. DFT 2.5 to 3.5 mils.
- D. Intermediate Coat: Series N69 Hi-Build Epoxoline II. DFT 2.0 to 3.0 mils.
- E. Finish Coat: Series 1074 Endura-Shield. DFT 2.0 to 3.0 mils.
- F. Total DFT: 6.5 to 9.5 mils.

2. Interior Exposed:

- A. System Type: MCU/epoxy.

- B. Surface Preparation: SSPC-SP 6.
- C. Primer: Series 1 Omnithane. DFT 2.5 to 3.5 mils.
- D. Finish Coat: Series N69 Hi-Build Epoxoline II. DFT 4.0 to 6.0 mils. [May require two coats if brush or roller applied].
- E. Total DFT: 6.5 to 9.5 mils.

3. H2S Gas Exposed:

- A. System Type: MCU/Perma-Glaze.
- B. Surface Preparation: SSPC-SP 5.
- C. Primer: Series 435 Perma-Glaze. DFT 15.0 to 20.0 mils.
- D. Finish Coat: Series 435 Perma-Glaze. DFT 15.0 to 20.0 mils.
- E. Total DFT: 30.0 to 40.0 mils.

4. Immersion:

- A. System Type: MCU/epoxy.
- B. Surface Preparation: SSPC-SP 10.
- C. Primer: Series 1 Omnithane. DFT 2.5 to 3.5 mils.
- D. Intermediate Coat: Series N69 Hi-Build Epoxoline II. DFT 4.0 to 6.0 mils.
- E. Finish Coat: Series N69 Hi-Build Epoxoline II. DFT 4.0 to 6.0 mils.
- F. Total DFT: 10.5 to 15.5 mils.

C. Interior Structural Steel

- 1. System Type: MCU/Epoxy\
- 2. Surface Preparation: SSPC-SP3 to all areas with rust or flaking, peeling paint. All surfaces must be clean of all contaminants.
- 3. Prime: Series 1 Omnithane. DFT 2.5-3.5 mils applied to all bare metal.
- 4. Finish: Series 27WB Typoxy applied at a DFT of 6.0-8.0 mils.

D. Coating Systems for Galvanized Steel And Nonferrous Metal - Pipe And Miscellaneous Fabrications

1. Exterior Exposed:

- a. System Type: Epoxy/urethane.
- b. Surface Preparation: SSPC-SP 1 - Solvent Cleaning and etch.
- c. Primer: Series N69 Hi-Build Epoxoline II. DFT 2.0 to 3.0 mils.
- d. Finish Coat: Series 1074. DFT 2.0 to 3.0 mils.
- e. Total DFT: 4.0 to 6.0 mils.

2. Interior Exposed:

- a. System Type: Epoxy.
- b. Surface Preparation: SSPC-SP 1 - Solvent Cleaning and etch.
- c. Primer: Series N69 Hi-Build Epoxoline II. DFT 2.0 to 3.0 mils.
- d. Finish Coat: Series N69 Hi-Build Epoxoline II. DFT 2.0 to 3.0 mils.
- e. Total DFT: 4.0 to 6.0 mils.

3. H2S Gas Exposed:

- a. System Type: MCU/Perma-Glaze.
- b. Surface Preparation: SSPC-SP 1 - Solvent Cleaning and severely etch.
- c. Primer: Series 435 Perma-Glaze. DFT 15.0 to 20.0 mils.
- d. Finish Coat: Series 435 Perma-Glaze. DFT 15.0 to 20.0 mils.
- b. Total DFT: 30.0 to 40.0 mils.

4. Immersion:

- a. System Type: Epoxy.
- b. Surface Preparation: SSPC-SP 1 followed by abrasive blast.
- c. Primer Coat: Series N69 Hi-Build Epoxoline II. DFT 3.0 to 5.0 mils.
- d. Finish Coat: Series N69 Hi-Build Epoxoline II. DFT 4.0 to 6.0 mils.
- e. Total DFT: 7.0 to 11.0 mils.

E. Coating Systems for Ductile Or Cast Iron - Pipe, Pumps, And Valves

1. Exterior Exposed:

- a. System Type: MCU/epoxy/urethane.
- b. Surface Preparation: NAPF 500-03-03 Power Tool Cleaning.
- c. Primer: Series 1 Omnithane. DFT 2.5 to 3.5 mils.
- d. Intermediate Coat: Series N69 Hi-Build Epoxoline II. DFT 2.0 to 3.0 mils.
- e. Finish Coat: Series 1074 Endura-Shield. DFT 2.0 to 3.0 mils.
- f. Total DFT: 6.5 to 9.5 mils.

2. Below Ground:

- a. System Type: Coal tar epoxy.
- b. Surface Preparation: NAPF 500-03-04 Abrasive Blast Cleaning.
- c. Finish Coat: Series 46H-413 Hi-Build Tneme-Tar. DFT 14.0 to 20.0 mils.
- d. Total DFT: 14.0 to 20.0 mils.

3. Interior Exposed:

- a. System Type: MCU/Epoxy.
- b. Surface Preparation: NAPF 500-03-03 Power Tool Cleaning.
- c. Primer: Series 1 Omnithane. DFT 2.5 to 3.5 mils.
- d. Finish Coat: Series N69 Hi-Build Epoxoline II. DFT 4.0 to 6.0 mils. [May require two coats if brush or roller applied].
- e. Total DFT: 6.5 to 9.5 mils.

4. H2S Gas Exposed:

- a. System Type: MCU/Perma-Glaze.
- b. Surface Preparation: Surface Preparation: NAPF 500-03-04 Abrasive Blast Cleaning.
- c. Primer: Series 435 Perma-Glaze. DFT 15.0 to 20.0 mils.
- d. Finish Coat: Series 435 Perma-Glaze. DFT 15.0 to 20.0 mils.

- e. Total DFT: 30.0 to 40.0 mils.

5. Immersion:

- a. System Type: MCU/Epoxy.
- b. Surface Preparation: NAPF 500-03-04 Abrasive Blast Cleaning.
- c. Primer: Series 1 Omnithane. DFT 2.5 to 3.5 mils.
- d. Intermediate Coat: Series N69 Hi-Build Epoxoline II. DFT 4.0 to 6.0 mils.
- e. Finish Coat: Series N69 Hi-Build Epoxoline II. DFT 4.0 to 6.0 mils.
- f. Total DFT: 10.5 to 15.5 mils.

F. Coating Systems for PVC

1. Exterior Exposed:

- a. System Type: Epoxy/urethane.
- b. Surface Preparation: Scarify.
- c. Primer: Series N69 Hi-Build Epoxoline II. DFT 2.0 to 3.0 mils.
- d. Finish Coat: Series 1074 Endura-Shield. DFT 2.0 to 3.0 mils.
- e. Total DFT: 4.0 to 6.0 mils.

2. Interior Exposed:

- a. System Type: Epoxy.
- b. Surface Preparation: Scarify.
- c. Primer: Series N69 Hi-Build Epoxoline II. DFT 2.0 to 3.0 mils.
- d. Finish Coat: Series N69 Hi-Build Epoxoline II. DFT 2.0 to 3.0 mils.
- e. Total DFT: 4.0 to 6.0 mils.

G. Coating Systems for Insulated Pipe

1. Interior/Exterior Exposed:

- a. System Type: Acrylic.
- b. Surface Preparation: Clean and dry.

- c. Primer: Series 28 Tufcryn. DFT 1.5 to 2.0 mils.
- d. Finish Coat: Series 28 Tufcryn. DFT 1.5 to 2.0 mils.
- e. Total DFT: 2.0 to 3.0 mils.

H. Coating Systems for Precast Concrete, Cast-In-Place Concrete, and Dense Concrete Masonry Units (Not Required for this Contract)

1. Exterior Exposed:

- a. System Type: Acrylate.
- b. Surface Preparation: SSPC-SP 13/NACE 6. Clean and dry.
- c. Primer: Series 156 Enviro-Crete. Spreading Rate 125 sf/gal.
- d. Finish Coat: Series 156 Enviro-Crete. Spreading Rate 200 sf/gal.

2. Below Grade:

- a. System Type: Coal tar epoxy.
- b. Surface Preparation: SSPC-SP 13/NACE 6. Clean and dry.
- c. Primer: None.
- d. Finish Coat: 46H-413 Hi-Build Tneme-Tar. DFT 14.0 to 20.0 mils.
- e. Total DFT: 14.0 to 20.0 mils.

3. H2S Gas Exposed and Severe Immersion:

- a. System Type: Perma-Shield H2S/Perma-Glaze.
- b. Surface Preparation: SSPC-SP 13/NACE 6 and ICRI Guideline 03732, CSP-5
- c. Surfacer: Series 218 MortarClad and/or Series 219 MortarCast.
- d. First Coat: Series 434 Perma-Shield H2S. Nominal DFT 125 mils.
- e. Finish Coat: Series 435 Perma-Glaze. DFT 15.0 to 20.0 mils.
- f. Total DFT: Over 140 mils.

4. Immersion:

- a. System Type: Epoxy.

- b. Surface Preparation: SSPC-SP 13/NACE 6 and ICRI Guideline 03732, CSP-3.
- c. Primer: Series N69 Hi-Build Epoxoline II. DFT 3.0 to 5.0 mils.
- d. Intermediate Coat: Series N69 Hi-Build Epoxoline II. DFT 4.0 to 6.0 mils.
- e. Finish Series N69 Hi-Build Epoxoline II. DFT 4.0 to 6.0 mils.
- f. Total DFT: 11.0 to 17.0 mils.

5. Interior Exposed:

- a. System Type: Epoxy [Spray apply, or addition coats may be required].
- b. Surface Preparation: SSPC-SP 13/NACE 6 and ICRI Guideline 03732, CSP-3.
- c. Primer: Series N69 Hi-Build Epoxoline II. DFT 4.0 to 6.0 mils.
- d. Finish Coat: Series N69 Hi-Build Epoxoline II. DFT 4.0 to 6.0 mils.
- e. Total DFT: 8.0 to 12.0 mils.

I. Coating Systems for Concrete Floors (Not Required For This Contract)

1. Light Traffic/Low Impact Exposure:

- a. System Type: High-solids epoxy/Urethane.
- b. Surface Preparation: SSPC-SP 13/NACE 6 and ICRI Guideline 03732, CSP-3.
- c. Primer: Series 201 Epoxoprime. DFT 8.0 to 10.0 mils.
- d. Intermediate Coat: Series 280 Tneme-Glaze. DFT 10.0 to 12.0 mils.
 - 1. [Series 281 Tneme-Glaze shall be used for a smoother finish].
 - 2. Slip resistant additive shall be used as required by the ENGINEER.
- e. Finish Coat: Series 290 CRU. DFT 2.0 to 3.0 mils.
- f. Total DFT: 20.0 to 25.0 mils.

2. Heavy Traffic and Chemical Exposure :

- a. System Type: Aggregate-filled epoxy/urethane.

- b. Surface Preparation: SSPC-SP 13/NACE 6 and ICRI Guideline 03732, CSP-5.
- c. First Coats: Series 237 Power-Tread, double broadcast. DFT 1/8 inch.
- d. Intermediate Coat: Series 280 Tneme-Glaze. DFT 6.0 to 8.0 mils.
- e. Finish Coat: Series 290 CRU. DFT 2.0 to 3.0 mils.
- f. Total DFT: Greater than 1/8 inch.

3. H2S Gas Exposed:

- a. System Type: Perma-Shield H2S/Perma-Glaze.
- b. Surface Preparation: SSPC-SP 13/NACE 6 and ICRI Guideline 03732, CSP-5
- c. Surfacer: Series 218 MortarClad and/or Series 219 MortarCast.
- d. First Coat: Series 434 Perma-Shield H2S. Nominal DFT 125 mils.
- e. Finish Coat: Series 435 Perma-Glaze. DFT 15.0 to 20.0 mils.
- f. Total DFT: Over 140 mils.

4. Decorative:

- a. System Type: Ceramic-filled epoxy.
- b. Surface Preparation: SSPC-SP 13/NACE 6 and ICRI Guideline 03732, CSP-5.
- c. First Coats: Series 222 Deco-Tread, double broadcast. DFT 1/8 inch.
- d. Finish Coat: Series 284 Deco-Clear. DFT 8.0 to 10.0 mils.
- e. Total DFT: Greater than 1/8 inch.

J. Coating Systems for Secondary Containment

1. Chemical Storage Containment Area

- a. System Type: High-solids epoxy.
- b. Surface Preparation: SSPC-SP 13/NACE 6 and ICRI Guideline 03732, CSP-5.
- c. Primer: Series 201 Epoxoprime. DFT 6.0 to 8.0 mils.

- d. Intermediate Coat: Series 275 Stranlock. DFT 25.0 to 40.0 mils.
- e. Finish Coat: Series 282 Tneme-Glaze. DFT 8.0 to 12.0 mils.
- f. Total DFT: 39.0 to 60 mils.

2. Floors, Severe Chemical, Abrasion, and Traffic Exposure:

- a. System Type: Aggregate-filled epoxy novalac.
- g. Surface Preparation: SSPC-SP 13/NACE 6 and ICRI Guideline 03732, CSP-5.
- b. First Coats: Series 239 Chemtread, double broadcast. DFT 1/8 inch.
- c. Finish Coat: Series 282 Tneme-Glaze. DFT 6.0 to 8.0 mils.
- d. Total DFT: Greater than 1/8 inch (125 mils).

K. Coating Systems for Porous Concrete Masonry Units

1. Exterior Exposed:

- a. System Type: Acrylate.
- b. Surface Preparation: SSPC-SP 13/NACE 6. Clean and dry.
- c. Primer: Series 156 Enviro-Crete. Spreading rate 80 to 100 sq. ft/gal.
- d. Finish Coat: Series 156 Enviro-Crete. Spreading rate 125 sq. ft/gal.

2. Interior Exposed:

- a. System Type: Cementious Acrylic/epoxy.
- b. Surface Preparation: SSPC-SP 13/NACE 6. Clean and dry.
- c. Primer: Series 130 Masonry Filler. Spreading rate 80 to 100 sq. ft/gal.
- d. Intermediate Coat: Series N69 Hi-Build Epoxoline II. DFT 2.0 to 3.0 mils.
- e. Finish Coat: Series N69 Hi-Build Epoxoline II. DFT 2.0 to 3.0 mils.
- f. Total DFT: 4.0 to 6.0 mils plus filler.

3. H2S Gas Exposed:

- a. System Type: Perma-Shield H2S/Perma-Glaze.
- b. Surface Preparation: SSPC-SP 13/NACE 6. Clean and dry.

- c. Primer: Series 130 Masonry Filler. Spreading rate 80 to 100 sq. ft/gal.
- d. First Coat: Series 435 Perma-Glaze. DFT 15.0 to 20.0 mils.
- e. Finish Coat: Series 435 Perma-Glaze. DFT 15.0 to 20.0 mils.
- f. Total DFT: 30.0 to 40.0 mils plus filler.

L. Coating Systems for Plaster, Gypsum Board, And Wood

- 1. Interior Exposed:
 - a. System Type: Epoxy/acrylic-epoxy.
 - b. Surface Preparation: Clean and dry.
 - c. Primer: Series 151-1051 Elasto-Grip FC. DFT 1.0 to 1.5 mils.
 - d. Intermediate Coat: Series 113 H.B. Tneme-Tufcoat. DFT 2.0 to 3.0 mils.
 - e. Finish Coat: Series 113 H.B. Tneme-Tufcoat. DFT 2.0 to 3.0 mils.
 - f. Total DFT: 5.0 to 7.5 mils.

M. Accessories

- 1. Coating Application Accessories:
 - a. Accessories required for application of specified coatings in accordance with manufacturer's instructions, including thinners.
 - b. Products of coating manufacturer.

2.3 TOOLS AND SPARE PARTS

- A. The CONTRACTOR shall adhere to the tools and spare parts requirements in Section 01600.
- B. The CONTRACTOR shall furnish to the OWNER one unopened gallon can of each type and each color of paint used.
- C. A listing shall be provided, indicating for each surface painted, the paint used, keyed to the extra paint provided.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Delivery and Handling

1. Delivery: The CONTRACTOR shall deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying:
 - a. Project name and location.
 - b. Coating or material name.
 - c. Name of OWNER.
 - d. Name of CONTRACTOR.
 - e. Name of ENGINEER.
 - f. Name of coating manufacturer.
 - g. Approximate area of coating applied.
 - h. Date of completion.
2. Storage:
 - a. Materials shall be stored in a clean dry area and within temperature range in accordance with manufacturer's instructions.
 - b. Containers shall be sealed until ready for use.
 - c. The CONTRACTOR shall not use materials beyond manufacturer's shelf life limits.
3. Handling: The CONTRACTOR shall protect materials during handling and application to prevent damage or contamination.

B. Protection of Coating Systems

1. The CONTRACTOR shall protect surfaces of coating systems from damage during construction.

C. Protection of surfaces not scheduled to be coated

1. The CONTRACTOR shall protect surrounding areas and surfaces not scheduled to be coated from damage during surface preparation and application of coatings.
2. The CONTRACTOR shall immediately remove coatings that fall on surrounding areas and surfaces not scheduled to be coated.

3.2 WORKMANSHIP

A. Field Quality Control

1. Required Inspections and Documentation:

- a. The CONTRACTOR shall verify coatings and other materials are as specified.
- b. The CONTRACTOR shall verify surface preparation and application are as specified.
- c. The CONTRACTOR shall verify DFT of each coat and total DFT of each coating system are as specified using wet film and dry film gauges.
- d. Coating Defects: The CONTRACTOR shall check coatings for film characteristics or defects that would adversely affect performance or appearance of coating systems.
 - 1) The CONTRACTOR shall check for holidays on interior steel immersion surfaces using holiday detector.
- e. Report:
 - 1) The CONTRACTOR shall submit written reports describing inspections made and actions taken to correct nonconforming work.
 - 2) The CONTRACTOR shall report nonconforming work not corrected.
 - 3) Copies of report to shall be submitted to ENGINEER.

3.3 INSTALLATION; CONSTRUCTION; ERECTION; APPLICATION

A. Environmental Requirements

1. Weather:

- a. Air and Surface Temperatures: The CONTRACTOR shall prepare surfaces and apply and cure coatings within air and surface temperature range in accordance with manufacturer's instructions.
- b. Surface Temperature: Minimum of 5 degrees F (3 degrees C) above dew point.
- c. Relative Humidity: The CONTRACTOR shall prepare surfaces and apply and cure coatings within relative humidity range in accordance with manufacturer's instructions.

- d. Precipitation: The CONTRACTOR shall not prepare surfaces or apply coatings in rain, snow, fog, or mist.
2. Wind: The CONTRACTOR shall not spray coatings if wind velocity is above manufacturer's limit.
3. Ventilation: The CONTRACTOR shall provide ventilation during coating evaporation stage in confined or enclosed areas in accordance with AWWA D 102.
4. Dust and Contaminants:
 - a. The CONTRACTOR shall schedule coating work to avoid excessive dust and airborne contaminants.
 - b. The CONTRACTOR shall protect work areas from excessive dust and airborne contaminants during coating application and curing.

B. Surface Preparation of Steel

1. Steel surfaces shall be prepared in accordance with manufacturer's instructions.
2. Fabrication Defects:
 - a. Steel and fabrication defects revealed by surface preparation shall be corrected.
 - b. Weld spatter and slag shall be removed.
 - c. Sharp edges and corners of welds shall be rounded to a smooth contour.
 - d. The CONTRACTOR shall smooth weld undercuts and recesses.
 - e. The CONTRACTOR shall grind down porous welds to pinhole-free metal.
 - f. Weld flux shall be removed from surface.
3. The CONTRACTOR shall ensure surfaces are dry.
4. Immersion or Below Grade Surfaces: Visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter shall be removed in accordance with SSPC-SP 10/NACE 2. Create a blast profile of 1.5 to 2.5 mils.
5. Exterior Exposed or Interior Exposed Surfaces: Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and

other foreign matter in accordance with SSPC-SP 6/NACE 3. Create a blast profile of 1.5 to 2.5 mils.

6. H₂S Gas Exposed: Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter in accordance with SSPC-SP 10/NACE 1. Create a blast profile of at least 3.0 mils.
7. Abrasive Blast-Cleaned Surfaces: Coat abrasive blast-cleaned surfaces with primer before visible rust forms on surface. Do not leave blast-cleaned surfaces uncoated for more than 8 hours.
8. Shop Primer: The CONTRACTOR shall prepare shop primer to receive field coat in accordance with manufacturer's instructions. Removal all unknown shop primers and re-prime in accordance with this specification.

C. Surface Preparation of Galvanized Steel and Nonferrous Metal

1. Galvanized steel and nonferrous metal surfaces shall be prepared in accordance with this specification and the coating manufacturer's instructions.
2. The CONTRACTOR shall ensure surfaces are dry.
3. Immersion Service: Surfaces shall be cleaned by abrasive blasting.
4. Rust shall be removed from Galvanized Steel:
 - a. White rust shall be removed from galvanized steel by hand or power brushing.
 - b. The CONTRACTOR shall not damage or remove galvanizing.
5. The CONTRACTOR shall increase mechanical adhesion under moderate to severe conditions, such as exterior exposure or chemical environments, by abrasive blast and/or chemical cleaning.

D. Surface Preparation of Ductile or Cast Iron

1. The CONTRACTOR shall prepare ductile or cast iron surfaces in accordance with NAPF 500-03-04 Abrasive Blast Cleaning or NAPF 500-03-03 Power Tool Cleaning and the coating manufacturer's instructions.
2. The CONTRACTOR shall ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.

E. Surface Preparation of PVC

1. PVC surfaces shall be prepared in accordance with manufacturer's instructions.

2. The CONTRACTOR shall ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
3. PVC surfaces shall be scarified.

F. Surface Preparation of Insulated Pipe

1. Insulated pipe surfaces shall be prepared in accordance with manufacturer's instructions.
2. The CONTRACTOR shall ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.

G. Surface Preparation of Concrete (Painting Not Required for This Contract)

1. The CONTRACTOR shall prepare concrete surfaces in accordance with manufacturer's instructions, SSPC-SP 13/NACE 6, and ICRI 03732.
2. Concrete shall be allowed to cure for a minimum of 28 days.
3. Concrete shall be tested for moisture in accordance with ASTM D 4263 and, if necessary, F 1869.
4. The CONTRACTOR shall abrasive blast surface to remove laitance and solid contaminants and to provide clean, sound substrate with uniform anchor profile.
5. The CONTRACTOR shall verify that the pH of the cleaned concrete surfaces to be coated is within the range of to 8 to 11. Application of coating materials outside this range will not be permitted without written approval from the ENGINEER.
6. The CONTRACTOR shall fill holes, pits, voids, and cracks with manufacturer approved surfacer.
7. The CONTRACTOR shall ensure surfaces are clean, dry, and free of oil, grease, chalk, form release agents, and other contaminants.
8. Exterior and Interior Dry:
 - a. The CONTRACTOR shall prepare surfaces in accordance with manufacturer's instructions, SSPC-SP 13/NACE 6, and ICRI 03732.
 - b. Concrete shall be allowed to cure for a minimum of 14 days.
 - c. Concrete shall be tested for moisture in accordance with ASTM D 4263 and, if necessary, F 1869.
 - d. The CONTRACTOR shall Level concrete protrusions and mortar spatter.

- e. The CONTRACTOR shall verify that the pH of the cleaned concrete surfaces to be coated is within the range of 8 to 11. Application of coating materials outside this range will not be permitted without written approval from the ENGINEER.
 - f. The CONTRACTOR shall fill hairline cracks less than 1/64 inch (0.4 mm) in accordance with manufacturer's instructions.
 - g. The CONTRACTOR shall prepare cracks wider than 1/64 inch (0.4 mm), moving cracks, gaps, and expansion joints in accordance with manufacturer's instructions.
 - h. The CONTRACTOR shall ensure surfaces are clean, dry, and free of oil, grease, chalk, form release agents, and other contaminants.
- H. Surface Preparation of Concrete Floors (Painting Not Required For This Contract)
- 1. The CONTRACTOR shall prepare concrete surfaces in accordance with manufacturer's instructions, SSPC-SP 13/NACE 6, and ICRI 03732.
 - 2. The CONTRACTOR shall ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
 - 3. Concrete shall be allowed to cure for a minimum of 28 days before coating.
 - 4. Concrete shall be tested for moisture in accordance with ASTM D 4263 and, if necessary, F 1869.
 - 5. The CONTRACTOR shall verify that the pH of the cleaned concrete surfaces to be coated is within the range of 8 to 11. Application of coating materials outside this range will not be permitted without written approval from the ENGINEER.
- I. Surface Preparation of Secondary Containment (Not Required For This Contract)
- 1. The CONTRACTOR shall prepare secondary containment surfaces in accordance with manufacturer's instructions.
 - 2. The CONTRACTOR shall prepare concrete surfaces in accordance with manufacturer's instructions, SSPC-SP 13/NACE 6, and ICRI 03732.
 - 3. The CONTRACTOR shall ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
 - 4. Concrete shall be allowed to cure for a minimum of 28 days before coating.
 - 5. Concrete shall be tested for moisture in accordance with ASTM D 4263 and, if necessary, F 1869.

6. The CONTRACTOR shall verify that the pH of the cleaned concrete surfaces to be coated is within the range of 8 to 11. Application of coating materials outside this range will not be permitted without written approval from the ENGINEER.

J. Surface Preparation of Porous Masonry Units

1. The CONTRACTOR shall prepare porous concrete masonry unit surfaces in accordance with manufacturer's instructions and SSPC-SP 13/NACE 6.
2. The CONTRACTOR shall ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
3. The CONTRACTOR shall allow mortar to cure for a minimum of 28 days before coating.
4. The CONTRACTOR shall level protrusions and mortar spatter.

K. Surface Preparation of Plaster

1. The CONTRACTOR shall prepare plaster surfaces in accordance with manufacturer's instructions.
2. The CONTRACTOR shall ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
3. The CONTRACTOR shall allow plaster to cure and dry out for a minimum of 28 days before coating.
4. The CONTRACTOR shall not coat over plaster containing free water, lime, or other soluble alkaline salts.
5. Plaster nibs and other protrusions shall be removed.
6. Voids and cracks shall be patched with approved materials and dried and sand flushed with surface.

L. Surface Preparation of Gypsum Board

1. Gypsum board surfaces shall be prepared in accordance with manufacturer's instructions.
2. The CONTRACTOR shall ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
3. The CONTRACTOR shall sand joint compound smooth and feather edge.
4. The CONTRACTOR shall avoid heavy sanding of adjacent gypsum board surfaces, which will raise nap of paper covering.

5. The CONTRACTOR shall not apply putty, patching pencils, caulking, or masking tape to drywall surfaces to be painted.
6. The CONTRACTOR shall lightly scuff-sand tape joints after priming to remove raised paper nap. The CONTRACTOR shall not sand through primer.

M. Surface Preparation of Wood

1. Wood surfaces shall be prepared in accordance with manufacturer's instructions.
2. The CONTRACTOR shall ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, surface deposits of sap or pitch, and other contaminants.
3. The CONTRACTOR shall seal knots and pitch pockets.
4. Rough spots shall be sanded with the grain.
5. The CONTRACTOR shall fill cracks and holes with approved materials after primer is dry and sand flush with surface when filler is hard.
6. The wood surface shall be lightly sanded between coats.

N. Application

1. Coatings shall be applied in accordance with manufacturer's instructions.
2. The CONTRACTOR shall mix and thin coatings, including multi-component materials, in accordance with manufacturer's instructions.
3. Containers shall be kept closed when not in use to avoid contamination.
4. The CONTRACTOR shall not use mixed coatings beyond pot life limits.
5. Application equipment, tools, pressure settings, and techniques shall be used in accordance with manufacturer's instructions.
6. Coatings shall be uniformly applied at spreading rate required to achieve specified DFT.
7. The CONTRACTOR shall apply coatings to be free of film characteristics or defects that would adversely affect performance or appearance of coating systems.
8. The CONTRACTOR shall stripe paint with brush critical locations on steel such as welds, corners, and edges using specified primer. Apply and additional strip coat of the intermediate coating material in immersion areas.

3.4 EXECUTION OF TEST PROCEDURES; VALIDATION

- A. The CONTRACTOR shall examine areas and conditions under which coating systems are to be applied and notify ENGINEER of areas or conditions not acceptable. The CONTRACTOR shall not begin surface preparation or application until unacceptable areas or conditions have been corrected.
- B. One-Year Inspection
 - 1. OWNER will set date for one-year inspection of coating systems.
 - 2. Inspection shall be attended by OWNER, CONTRACTOR, ENGINEER, and manufacturer's representative.
 - 3. Repair deficiencies in coating systems as determined by ENGINEER in accordance with manufacturer's instructions.

END OF SECTION

SECTION 10100
DEDICATION PLAQUE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Dedication plaque as shown on the PLANS.

1.2 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01300.
- B. Submit manufacturer's technical data and installation instructions.
- C. Submit rubbing of cast aluminum plaque.

PART 2 - PRODUCTS

2.2 MANUFACTURES

- A. Provide products equal to A.R.K. Ramos Manufacturing Company, Inc. 1-800-725-7266.
 - 1. Size: 2' - 0" x 2' - 0"
 - 2. Model No: I-99 Aluminum plaque with standard AL-200 finish.
 - 3. Mounting: Rosettes/Expansion bolts for masonry.
 - 4. Lettering: Times Roman

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Locate plaque as directed by Engineer. Mount in compliance with manufacturer's instructions.
- B. Upon completion of installation, clean plaque in accordance with the manufacturer's instructions.

END OF SECTION

SECTION 11034

SERVICE AND TELLER WINDOW UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. ComCo Bullet Resistant Window
2. ComCo Transaction Drawer
3. Audio Authority Two-Way Audio Communication System

1.2 REFERENCES

- A. The publications listed below form part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.
- B. Underwriters Laboratories (UL):
 1. UL 752 – Bullet Resisting Equipment

1.3 DELIVERY, STORAGE AND HANDLING

- A. Transport, handle, store, and protect in compliance with the requirements of the manufacturer's recommendations.

Part 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Subject to specified requirements, provide products by the following manufacturer:
 1. ComCo Systems, Inc Lake Dallas, Texas Contact: Caryssa Heath 800-533-3794 ext. 219
or cheath@comcosystems.com

2.2 REGULATORY REQUIREMENTS

- A. Drive-thru window shall be approved and labeled in compliance with UL 752.

2.3 DRIVE THRU WINDOW SYSTEM

- A. Subject to specified requirements, provide the following products:
 1. ComCo Model BR3636 36" X 36" Window
 - a. Glazing: UL 752 Level 1 laminated bullet resistant glass
 - b. Window Frame: Welded stainless-steel frame with brushed finish
 - c. Transaction Drawer: ComCo DD1000
 - 1) Stainless Steel with Brushed Finish
 - 2) 300lb capacity
 - 3) Power Requirements: One dedicated 110V 15 amp duplex outlet
 - 4) Heater
 - 5) Send and Call buttons on Drawer

2.4 AUDIO AUDION AUTHORITY TWO-WAY AUDION COMMUNICATION SYSTEM

- A. Subject to specified requirements, provide one of the following products:
 1. Model 1500A by Audio Authority
 - a. System Includes:
 - 1520 Lane Card
 - 1500A Console

Speaker, Call Button, and Mic pre-wired and ready to plug and play

- B. Power requirements: One dedicated 110V 20amp duplex Outlet

Part 3 – EXECUTION

3.1 EXAMINATION

- A. Verify wall openings are ready to receive work of this section. Verify dimensions, tolerances, and method of attachment with other work.

3.2 INSTALLATION

- A. Install systems specified herein in accordance with manufacturer's instructions and as indicated on Drawings.
- B. Provide rough opening in wall per architectural details.
- C. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work
- D. Pull and connect wiring between drive-thru audio system with remote console stations

3.3 FIELD QUALITY CONTROL

- A. Initial Inspection: Initial inspection by window manufacturer's representative shall verify site conditions and are acceptable for equipment installation and openings and elevations are proper and ready for installation
- B. Installation Inspection: Inspection during installation by window manufacturer's representative shall observe and verify installation is in accordance with the window manufacturer's requirements.
- C. Final Inspection: Final inspection by window manufacturer's representative shall final hook-up of equipment and operational test of the complete system through full cycle of operation

3.4 DEMONSTRATION

- A. Provide training by window manufacturer's representative on operation and use of equipment at time of final hook-up and operation test.

END OF SECTION

SECTION 12352

CASEWORK

1 PART 1 GENERAL

1.1 WORK DESCRIPTION

- A. This section of the specification pertains to casework and related equipment for front office.

1.2 WORK INCLUDED

- A. Casework and equipment, covered by this specification and accompanying drawings, are manufactured or supplied by one manufacturer to avoid divided responsibility.
- B. Equipment contractor will:
 - 1. Furnish equipment as listed in specifications, equipment schedule and drawings. This includes delivery to the building, setting in place, leveling and scribing to walls and floors.
 - 2. Furnish plumbing and electrical fixtures as specified, including nipples and lock nuts needed to secure each fixture to the equipment. Fixtures are furnished unassembled and loose in cartons for installation by other trades.
 - 3. Furnish sinks and sink outlets.
 - 4. Remove debris, dirt and rubbish accumulated as a result of this installation; leaving premises clean and orderly.
 - 5. Furnish and cover installed casework with 4 mil. polyethylene film to protect from soiling until other trades have completed their work.

1.3 RELATED WORK NOT INCLUDED

- A. Division 1 - General:
 - 1. Furnish materials generally classified as maintenance or supply items.
 - 2. Provide hoisting or elevator service at no charge.
 - 3. Furnish security and protection during and after laboratory equipment installation.
- B. Division 6 - Wood and Plastics:
 - 1. Furnish and install necessary framing, or reinforcement, of walls, floors or ceiling, to support equipment.
- C. Division 9 - Finishes:
 - 1. Furnish and install 4 inch high, cove base.

D. Division 15 - Mechanical:

1. Furnish, install and connect drainlines, service piping, vents, revents, in-line vacuum breakers, special plumbing fixtures, traps and tailpieces. Work to be completed through, under or along backs of working surfaces as required. Complete final connection of services.
2. Assemble, install and make final connections of service fixtures furnished by casework contractor, including service fixtures in fume hoods.
3. Furnish, install and connect fume hood blowers, motors and all related duct work.
4. Furnish, install and connect service piping within fume hoods, including final connection of services.

E. Division 16 - Electrical:

1. Furnish, install and connect electrical service lines, wire and conduit within the equipment, including reagent racks and fume hoods. Work to be completed through, under or along backs of working surfaces as required. Complete final connection of services.
2. Install and make final connections of electrical fixtures provided by casework contractor, including electrical fixtures in fume hoods.

1.4 SUBMITTALS

- A. Samples and certifications are to be submitted in order that the casework contractor demonstrate his ability to provide casework and furnishings, according to the Engineer's specifications. Samples and certification literature will be received by the Engineer according to Section 01300. All questions will be answered in detail to remove confusion or doubt over what is being provided. Failure to meet submittal requirements is sufficient reason to reject the bid.

1. Samples:

Supplier is permitted only one submittal of samples. Approved sample units may be held until completion of work. Samples will be removed when Engineer requests. Submit, as required by the Engineer:

- a. Base cabinet with drawer and cupboard with full-depth, adjustable shelf, hinged door and applicable hardware.
- b. Wall case with full-depth, adjustable shelf, hinged door and applicable hardware.
- c. Tall case with full-depth, adjustable shelf, hinged door and applicable hardware, including a 3-point latching system.
- d. One set of samples for countertop(s) specified.
- e. One set of plastic laminate samples and one set of wood finish samples.

2. Test Reports - Certifications:

Submit:

- a. Test reports certifying that the wood finish complies with chemical and other resistance requirements of the specifications.
- b. Test reports certifying that the casework plastic laminates comply with the requirements of NEMA-LD3, and other resistance requirements of the specifications
- c. Performance test reports from an independent testing lab on each specified top material.

1.5 QUALITY ASSURANCE

- A. The intent of this specification is to establish minimum standards for materials, hardware, finish, construction, design, function, and workmanship of casework, furniture and equipment; and, to exclude inadequate or inferior products.
- B. Qualified casework and equipment manufacturer's bids must comply with these specifications. A bid proposing a change, modification, or substitution must clearly state variances to the minimum standard. Alterations are subject to the Engineer's approval; the decisions to accept, or reject, is final and not subject to further debate.
- C. No later than ten days prior to bid opening, bidders must provide the following information as proof of their ability to perform. Failure to meet these requirements is sufficient reason to reject the bid. Provide:
 1. Proof of five years of experience in the manufacturing of casework and furnishings.
 2. Proof of five completed installations, equal in size and educational requirements, which are available for inspection prior to the awarding of the contract.
 3. Evidence of sufficient financial and technical resources to avoid delays in completion of the work, and to assure prompt and satisfactory production, delivery and installation of laboratory casework and equipment.
- D. Owner reserves the right of refusal, and can award the contract to other than the lowest bidder; if, in his opinion, it will ensure a higher level of performance, function, quality, or value.
- E. General Contractor will not award subcontract to a casework supplier who is not on the approved list, unless the Engineer has approved that supplier's samples, certificates, individual product drawings, and proof of ability to perform.

1.6 BUILDING CONDITIONS

- A. For delivery and installation of casework and equipment, building conditions shall be as follows:

1. Building is secure and weather tight, with windows and doors installed, heat and air conditioning systems functional. Walls and openings are plumb, straight and square.
2. Concrete floors must be level within acceptable trade tolerances. Specifically, the floor must be within 1/8" of level per 10 foot run, non-accumulative, when tested with a straight edge in any one direction. Flooring required to be placed under casework and equipment must be installed.
3. Wood or metal blocking (wall grounds) must be installed within partitions prior to delivery of casework and furnishings to allow for immediate installation on delivery.
4. Heat and air-conditioning systems providing consistent temperature and humidity conditions as required by Architectural Woodworking Institute (AWI). Relative humidity must be maintained at not less than 25%, nor more than 55%. Temperatures must not range lower than 65° F, nor exceed 80° F in areas of material installation.
5. All overhead mechanical, electrical or plumbing rough-in work is completed. Any "wet" operations performed by other trades must be complete prior to delivery.
6. Ceiling grids (with or without ceiling tiles), overhead soffits, ductwork and lighting are installed.
7. Painting is completed.
8. A secure storage area must be provided within the building that is clean, dry, well ventilated protected from direct sunlight, and broom clean.

1.7 DRAWINGS

- A. The successful bidder will prepare and submit shop drawings per Section 01300 and 15010. Shop drawings to include floor plans, rough-ins, elevations, and other details necessary to fully illustrate and describe the casework and equipment being furnished. Shop drawings will be coordinated with other trades.

1.8 WARRANTY

- A. Contractor warrants the casework to be free from defects in materials and workmanship, under normal use and service, for three years from date of delivery. Within the warranty period, Contractor, shall, at its option, repair, replace, or refund the purchase price of defective casework. Contractor shall be notified immediately of defective products, and be given a reasonable opportunity to inspect the goods prior to return. Contractor will not assume responsibility, or compensation, for unauthorized repairs or labor. Contractor makes no other warranty, expressed or implied, to the merchantability, fitness for a particular purpose, design, sale, installation, or use, of its casework; and, shall not be liable for incidental or consequential damages, losses or expenses, resulting from the use of its products.
- B. The warranty with respect to products of another manufacturer sold by Contractor is limited to the warranty extended by that manufacturer to Contractor.

2 PART 2 PRODUCTS

2.1 MATERIALS

A. Plastic Laminate

1. High pressure plastic laminate, vertical grade, is melamine impregnated decorative surface papers, superimposed over kraft phenolic core sheets, then bonded at pressures exceeding 1/2 ton per square inch while maintaining temperatures in excess of 280 degrees, F. After pressing, edges and ends are trimmed and the backside is sanded to facilitate bonding. Vertical grade, high pressure, plastic laminate has a nominal thickness of .030 inch.
2. Phenolic cabinet liner is composed of layers of paper saturated with synthetic resins and bonded together under heat and a pressure of 1/2 ton per square inch. The decorative side is of alpha papers and melamine resin. NEMA type designation is CL20 and nominal thickness is .020 inch.
3. Thermo-fused melamine is melamine resin impregnated decorative paper, thermally fused to industrial grade particleboard or to medium density fiberboard (MDF). Thermal fusion under heat and pressure, permanently bonds the resin-impregnated paper to the substrate, and produces a permanent bond between the melamine surface and the substrate.

B. Medium Density Fiberboard (MDF)

1. MDF is 1/4-inch thick, highly compressed wood fibers in a homogeneous sheet, using the fiber's natural resins and other added binders. Physical properties: Average modulus of rupture is 4,500-lbs./sq. inch; elasticity is 450,000-lbs./sq. inch; density is 46-lbs./cu. ft. MDF meets or exceeds ANSI standard A208.2-1994; meets the regulation (24CFR3280.308) when tested in accordance with ASTM E1333-90 for low formaldehyde emissions: 0.20 ppm when tested at a 0.08 ft.²/ft.¹ loading ration, which is 50% lower than normally acceptable commercial levels. MDF has a flame spread rating of Class C or Class III.

C. Particleboard

1. Particleboard is industrial grade, with the following physical properties: Density, 46 to 50 lbs./cu. ft.; modulus of rupture, minimum, 2,200 psi; modulus of elasticity, minimum, 450,000 psi.

D. Edgebanding

1. PVC edgebanding on casework components is 1mm thick, black. Edgebanding applied to door and drawer face edges is 3mm, black PVC. If specified, edgebanding can be color coordinated with specified high-pressure laminate selection.

E. Glass

1. DSB glass is double strength, grade "B", and 1/8 inch thick.
2. Float glass is poured, clear glass, 1/4 inch thick, with a minimum of 88 percent clarity.
3. Laminated safety glass consists of two outer plies of glass with a vinyl interlayer, and is either 7/32 inch or 1/4 inch thick.
4. Tempered safety glass is specially heat-treated glass, 1/4 inch thick with a minimum of 88 percent clarity.

2.2 CONSTRUCTION

A. Drawers:

1. Components:
 - a. Drawer front: particleboard core, overlaid with a .030 inch vertical grade, high pressure, plastic laminate face, and a cabinet liner back.
 - b. Drawer front edges: black 3-mm PVC edging.
 - c. Drawer box: front, sides and back; 1/2 inch, thermo-fused melamine
 - d. Drawer bottom: 1/4 inch, thermo-fused melamine
2. Construction:
 - a. Drawer front has a particleboard core with a plastic laminate face, and a cabinet liner back. Drawer front is 3/4 inch thick and overlaps opening 1/4 inch on all sides. Squared edges of the drawer front have black 3 mm PVC edging applied. Drawers are box type with an applied drawer front securely screwed to the box. The top edge of the drawer box front, sides and back are doweled and glued. The bottom is let into the box on four sides, and securely glued underneath with a continuous bead of glue around the perimeter of the drawer bottom. In cabinets 24 inches or less in width, drawers have one, black finished aluminum rod pull which is surface mounted with 2 screws, 4 inches on centers. In cabinets over 24 inches wide, drawers have two pulls. Drawers are supported on slides which are side mounted, heavy duty, electrostatically epoxy powder coated, cold rolled steel, and have a 150lb. load capacity. Slides are equipped with heavy-duty, ball bearing nylon rollers for smooth effortless operation. Slides have automatic, positive stop levers to prevent drawer's accidental removal, but allow for quick removal without tools. File drawers are supported on side mounted, full extension steel slides. File drawers have an interior, screw mounted, metal bottom track and an adjustable metal file follower. Lock is furnished when indicated.

B. Doors, Hinged:

1. Hinged solid doors, 48 inches or less in height:
 - a. Components:
 - 1) Core ply: Particleboard with squared edges.

- 2) Plastic laminate: Face plys; two, one applied to each face of the core ply. Face plys are .030 inch thick, vertical grade, high pressure, plastic laminate.
- 3) Edges: Black 3 mm PVC edging applied to squared edges of core ply.

b. Construction:

- 1) Hinged solid doors, 48 inches or less in height, are 3/4 inch thick, and overlap the opening 1/4-inch on all sides. Doors have one black finished aluminum rod pull which is surface mounted with 2 screws, 4 inches on centers. Doors have two, black powder coated mild steel, heavy duty, institutional type, 5-knuckle hospital tipped hinges; each attached with 5 twinfast particleboard screws into the door, and 4 Euro screws into the end panel. Doors are secured by zinc plated steel, friction roller catches, with positive action, spring cushioned, polyethylene rollers, and metal strike plates. Catch and steel strike plate are attached with screws. On lockable double door cabinets, the left door is secured with a steel, spring loaded, elbow catch that releases with finger pressure. The catch and the strike plate are attached with screws. Strike plate screw holes are slotted for adjustability. Lock is furnished when indicated.

C. Hinged glazed doors, 48 inches or less in height:

1. Components:

- a. Frame: Particleboard with squared edges.
- b. Plastic laminate: Face plys; two, one applied to each face of the core ply. Face plys are .030 inch thick, vertical grade, high pressure, plastic laminate.
- c. Edges: Black 3 mm PVC edging applied to squared edges of core ply.
- d. Glass: 1/8-inch thick DSB glass.

2. Construction:

- a. Hinged glazed doors, 48 inches or less in height, are 3/4 inch thick and have the opening for the glass cut out of the solid panel leaving 4 inch stiles. The door overlaps the opening 1/4-inch on all sides. The balance of the door is glass. Doors have one black finished aluminum rod pull which is surface mounted with 2 screws, 4 inches on centers. Door has two, black powder coated mild steel, heavy duty, institutional type, 5-knuckle hospital tipped hinges; each attached with 5 twinfast particleboard screws into the door, and 4 Euro screws into the end panel. All doors are secured by zinc plated steel, friction roller catches, with positive action, spring cushioned, polyethylene rollers, and metal strike plates. Catch and steel strike plate are attached with screws. On lockable double door cabinets, the left door is secured with a steel, spring loaded, elbow catch that releases with finger pressure. The catch and the strike plate are attached with screws. Strike plate screw holes

are slotted for adjustability and a pinhole is provided to help anchor plate's position. Lock is furnished when indicated.

D. Base Cabinets

1. Components:

a. Rails:

- 1) Horizontal front top rail: 1 inch by 4 inch, thermo-fused melamine on particleboard.
- 2) Horizontal rear top rail: 1 inch by 4 inch, thermo-fused melamine, particleboard.
- 3) Front intermediate rails: 3/4 inch by 4 inch, thermo-fused melamine, particleboard.
- 4) Back intermediate rails as required: 3/4 inch by 4 inch, thermo-fused melamine on particleboard.

b. Backs:

- 1) Exposed exterior: exterior surface is high-pressure plastic laminate, 3/4-inch particleboard; interior surface is phenolic cabinet liner.
- 2) Cabinets with unexposed exteriors: 1/4-inch thermo-fused melamine on MDF.

c. End panels:

- 1) Cabinets with exposed exterior end panel: 3/4-inch particleboard with exterior surface high pressure plastic laminate, and interior surface of phenolic cabinet liner.
- 2) Cabinets with unexposed end panel: interior and exterior surfaces of 3/4-inch particleboard are thermo-fused melamine.

d. Bottom and shelves: Thermo-fused melamine on 3/4-inch particleboard.

e. Exposed edges are edged with 1mm black PVC, applied after lamination. 1 mm PVC, color coordinated to specified exterior high-pressure plastic laminate, is available at an additional charge.

f. Drawer separators, furnished only when specified, are 1/4 inch, thermo-fused melamine on MDF.

2. Construction:

- a. All base cabinets are rigidly constructed, integral units with the strongest most advanced joinery methods utilized of bored, doweled, dadoed, glued and screwed construction. Each base cabinet is completely enclosed without the use of common partitions, and has flush construction with overlapping doors and drawers, which provide a dust resistant interior. Horizontal top rails, intermediate front rails and the bottom are bored, doweled and glued into end panels. Rear horizontal parting rails and separators are provided as required. Separators where indicated, are let into routed intermediate rails. Backs are recessed and encapsulated into dadoed end panels, screwed to the top back rail and further secured with glue blocks on each side, except where they need to be removable for access to plumbing. An enclosed toe space, 2-1/4 inches by 4

inches, is provided, with the toe rail bored, doweled and glued to end panels. Adjustable shelves are supported on heavy-duty, plastic coated, brass plated steel shelf clips, which fit into holes drilled 32 mm on centers, in the cabinet end panels.

E. Wall and Upper Cases:

1. Components:

- a. Top panel, bottom panel: 1-inch particleboard both surfaces are thermo-fused melamine.
- b. Adjustable shelves: 3/4 inch thermo-fused melamine on particleboard
- c. Backs:
 - 1) Exposed exterior: 3/4 inch particleboard, exterior surface is high pressure plastic laminate, interior surface is phenolic cabinet liner
 - 2) Unexposed exterior: 1/4 inch, thermo-fused Melamine on MDF.
- d. End panels:
 - 1) Exposed exterior: 3/4-inch particleboard, exterior surface high-pressure plastic laminate, interior surface phenolic cabinet liner.
 - 2) Unexposed end panel surfaces: 3/4-inch particleboard with both surfaces thermo-fused melamine.
- e. Exposed edges have 1mm black PVC, applied after lamination. 1 mm PVC, color coordinated to specified exterior high-pressure plastic laminate, is available at an additional charge.
- f. Exterior hanger rails: 3 inch by 3/4-inch hardwood veneer core plywood.

2. Construction:

- a. All wall and upper cases are rigidly constructed, integral units with the strongest most advanced joinery methods utilizing bored, doweled, dadoed, glued and screwed construction. Each case is completely enclosed without the use of common partitions, and has flush construction with overlapping doors, which provides a dust resistant interior. Top panel is bored, doweled and glued into end panels. Bottom panel is bored, doweled and glued into end panels; and glued and screwed to the back. Backs are recessed and encapsulated into dadoed end panels, and further secured with glue blocks on each side. An exterior hanger rail, at the top of the back, is glued to the back and then screwed to the top panel and bored, doweled and glued into end panels. An exterior hanger rail, at the bottom of the back, is glued to the back and then screwed to the bottom panel and bored, doweled and glued into end panels. Adjustable shelves are supported on heavy-duty, plastic coated, brass plated steel shelf clips, which fit into holes drilled 32 mm on centers, in the case end panel.

F. Tall Cases:

1. Components:
 - a. Top panel: 1-inch particleboard thermo-fused melamine, both surfaces
 - b. Bottom panel: 3/4 inch particleboard thermo-fused melamine, both surfaces
 - c. Adjustable shelves: 3/4 inch particleboard thermo-fused melamine, both surfaces
 - d. Backs:
 - 1) Exposed backs: 3/4-inch particleboard, exposed surface is high-pressure plastic laminated and interior surface is phenolic cabinet liner.
 - 2) Unexposed back: 1/4-inch thermo-fused melamine, MDF.
 - e. End panels:
 - 1) Exposed exterior end panel: 3/4-inch particleboard, exposed surface is high-pressure plastic laminate, interior surface is phenolic cabinet liner.
 - 2) Unexposed exterior end panel: 3/4 inch particleboard both surfaces thermo-fused melamine.
 - f. Exposed edges have 1mm black PVC, applied after lamination. 1 mm PVC, color coordinated to specified exterior high-pressure plastic laminate, is available at an additional charge.
 - g. Exterior back cross rails: 4inches by 3/4 inch hardwood veneer core plywood
2. Construction:
 - a. All tall cases are rigidly constructed, integral units with the strongest most advanced joinery methods utilized of bored, doweled, dadoed, glued and screwed construction. Each case is completely enclosed without the use of common partitions, and has flush construction with overlapping doors, which provides a dust resistant interior. Top panel is bored, doweled and glued into end panels. Bottom panel is bored, doweled and glued into end panels and glued and screwed to the back. An exterior hanger rail, at the top of the back, is glued to the back and then screwed to the top panel and bored, doweled and glued into end panels. An exterior hanger rail, at the bottom of the back, is glued to the back and then screwed to the bottom panel and bored, doweled and glued into end panels. Backs are recessed, let into dadoed end panels, and further secured with glue blocks at the sides. An enclosed toe space, 2-1/4 inches by 4 inches high, is provided with toe rail securely bored, doweled and glued to end panels and bottom panel. Adjustable shelves are supported on heavy-duty, plastic coated, brass plated steel shelf clips, which fit into holes drilled 32 mm on centers, in the case end panels.

2.3 HARDWARE AND ACCESSORIES

A. Pulls

1. Pull is powder coated black, extruded aluminum rod, 3/8 inch in diameter. Pull is mounted with two screws, 4 inches on center and projects 1-5/16 inches from the surface.

B. Handles

1. Latching handle is die cast zinc alloys, 4-1/4 inches long, streamline in design, and has a black finish. Handle operates with 1/4 turn. Double door cases have latching handles on the right door and dummy handles on the left door. A three point latching system provides a positive engagement at the top and bottom of the door with tapered aluminum rods, which pull the door snugs when they engage plastic strikes. The rods are 5/16 inch in diameter and move in nylon guides attached to the back of the door. The middle of the door is secured by a latch plate, which engages the side of the case, or latches behind the left door on cases with double doors.

C. Locks

1. Lock is a laboratory grade, cylinder cam lock, with a 5-disc tumbler mechanism, and a black face. Tumblers and keys are brass, while plug and cylinder are die cast zinc alloy. A 180-degree turn of the key moves the lock cam into, or out of, a slot cut to receive it. There are 500 key changes standard. Locks are keyed differently, master keyed and furnished with 2 keys per lock. Locks and corresponding keys are alpha-numerically coded for a quick match. Lock is equipped with RemovaCore™ keying control. If needed, with the use of a control key, the key core of the lock assembly can be removed and a new key core inserted, changing the entire locking system in a matter of minutes. Key cores can be held out of the lock assembly until the project is completed, removing the security risk of lost or stolen keys during installation and construction. Casework manufacturer can provide control keys and replacement cores as required. Locks are furnished only when indicated.

D. Hinges

1. Hinge is heavy duty, institutional type, 5-knuckle hospital tipped, and made from .095 inch thick, black powder coated mild steel. Hinge is wrap around style, and 2-3/4 inches high. The wing for mounting to end panel has 4 holes, two of which are slotted for adjustability; wing for door has 5 holes, two of which are slotted for adjustability.

E. Catches

1. Friction roller catch is a zinc plated steel catch with a positive action, spring cushioned, polyethylene roller, and a metal strike plate. The catch

and steel strike plate mount with screws. Catch screw holes are slotted for adjustability.

F. Drawer Slides

1. Drawer slides are electrostatically epoxy powder coated; cold rolled steel, heavy-duty, side mounted, and have a 150lb. load capacity. They are equipped with heavy-duty, ball bearing nylon rollers for smooth effortless operation. Slides have automatic positive stop levers to prevent accidental drawer removal, but allow quick removal without tools.
2. File drawer slides are zinc plated, cold rolled steel, heavy-duty, side mounted, and have a 100 lb. load capacity. They are equipped with heavy-duty, ball bearing nylon rollers for smooth effortless operation. Slides are full extension with a positive stop, and a lift out disconnect.

G. Sliding Door Track Assemblies

1. Sliding door track assembly has an overhead aluminum track and adjustable, nylon roller hangers. The lipped edge of the upper aluminum track prevents rollers from jumping track. Two hard plastic guides are mounted on the bottom interior of the door, and operate in recessed aluminum channels.
2. Sliding glass door track assembly has an aluminum bottom track, and an aluminum channel mounted at the top of the cabinet. The glass rests in aluminum shoes with nylon rollers, which operate in the bottom track. The top swiped edge of the glass is fitted with plastic glide clips to assure smooth movement in the channel.

H. Shelf Clips

1. Shelf clips are made from steel, then brass plated after fabrication. Clips are angle type with a 1/4-inch diameter; 3/8-inch long stud, which fits into holes, drilled 32 mm on centers. The 3/4 inch long ledge is dipped in a non-slip plastic coating, and has a predrilled hole to anchor shelf to the clip, if desired.

I. Leg Shoes

1. Leg shoes are closed-bottom style; 2-1/4 inches square, and molded of 1/8 inch black polyethylene.

J. Crossbars and Greenlaw Arms

1. Crossbars and Greenlaw Arms are 3/4-inch diameter, anodized aluminum rods, with ends rounded.

K. Upright Rods

1. Upright Rods are 3/4-inch diameter, anodized aluminum, 36 inches long with a rounded top and a tapered bottom to fit rod sockets.

L. Clamps

1. Clamps are 1-inch square aluminum stock, with two, 3/4-inch diameter openings, at right angles to each other, bored through sides. Openings are for upright rods and crossbars, or Greenlaw Arms. Thumb screws into each end of the clamp, tighten against the rods to hold positions.

M. Burette Rods

1. Burette rods are 1/2-inch diameter, anodized aluminum, and either 18 or 24 inches long. Rods are furnished with a tapered aluminum adapter to fit rod socket.

N. Rod Sockets

1. Rod sockets are mushroom type, machined from a solid aluminum rod. Sockets are secured to the top by heavy aluminum lock nut and washer.

2.4 Mechanical Service Fixtures

A. Service Fixtures

1. Fixtures for water, gas, steam, or other services, are triple chrome plated, have heavy-duty construction and are specifically designed for laboratory use.
 - a. Water Faucets - Hot and Cold: Faucets are cast from red brass, and have four-arm type handles with color-coded indexes. Faucets have serrated hose nozzles, unless specified otherwise. Faucets have patented REX unit ceramic disc cartridges, and replaceable seats. The stem is brass, with full Acme threads, and has a brass cap nut. Goosenecks are swing type. Fixture outlets are tapped 3/8 inch I.P.S. for aerators, vacuum breakers, hose connections, or other accessories. Faucets with an integral vacuum breaker are furnished per Code.
 - b. Vacuum Breakers: Watts NLF-9, or comparable, vacuum breakers are brass with polished chrome plating, screw-in type with stainless steel working parts, and durable rubber diaphragm and disc. Vacuum breaker is for hot or cold faucet and has a primary valve with a soft disc that seats against mating part. The secondary check valve utilizes a soft disc to metal seating. Breaker is tapped 3/8 inch N.P.T. Vacuum breaker is not intended for constant high pressures.

B. Electrical Fixtures

1. Receptacles are 3-wire grounded, 20 A, 125V AC, with stainless steel cover plates and cadmium-plated steel boxes. Pedestal boxes are brushed, cast aluminum with conduit nipples and lock nuts. G.F.I., ground fault

circuit interrupter are 20 A, 125V AC, with a brown nylon face and a LED indicator light. G.F.I. fixtures conform to UL Standard 943 Class A, have hospital grade high abuse receptacle construction, and certified corrosion resistance with cupronickel exposed metal parts. G.F.I. fixtures have terminal screw wiring connections and a trip time of 0.025 seconds.

C. Sinks and Sink Outlets

1. Epoxy resin sinks are non-glaring black, specially modified epoxy resins, molded in one solid piece for optimum physical and chemical resistance. Inside corners are coved and the bottom is dished to the outlet. Outlets are epoxy resin, specially compounded and cured for optimum physical and chemical resistance, and 1-1/4 inches in diameter, unless otherwise specified.

2.5 LABORATORY TOPS

A. Epoxy Resin

1. Top is one inch thick, molded from a modified epoxy resin & has optimum physical and chemical resistance. The specially compounded and cured uniform mixture, throughout the thickness of the top, is not dependent on a surface coating for chemical, or stain, resistance. Standard color is non-glaring black; however, other colors are available. Exposed edges and corners are radiused, and a drip groove is provided on under surface, when specified. The curb is four inches high.

2.6 FUME HOODS - **PROVIDE ONE (1) IN FOOD PREP AREA - vented to roof**

A. General:

1. Each fume hood superstructure shall provide for safe efficient removal of all fumes, both heavy and light, with the least amount of disturbance as the air enters the hood. Hood shall be a "picture frame" airfoil design and construction.

B. Construction:

1. Fume hoods shall be a double wall construction consisting of an outer shell of steel and an inner liner of corrosion resistant material as specified.
2. The exterior side panels of the superstructure are constructed of 18-gage steel and are removable for access into the interior housing. Access may also be gained through removable panels in the interior liner where specified. Attachment of the interior lining material to the steel-framing members is made through non-metallic fasteners. The double wall shall house and conceal steel framing members; attaching brackets and remote operating service fixture valves.

3. Each superstructure shall have an internal baffle system of the same material as the interior liner. This system shall provide for safe removal of fumes when it is connected to a properly installed exhaust system. A manual adjustment shall be provided on the upper part of the baffle to allow the operator to set the fume hood for heavy or light fumes. All baffles must be removable for cleaning.
4. The superstructure shall be provided with an air bypass feature. The bypass located at the upper front interior of the hood shall open as the sash is lowered, providing for a relativity constant exhaust volume of the Fume Hood superstructure.
5. The upper front exterior panel of the superstructure shall be furnished with louvers. The louvers provide for proper operation of the bypass feature when the top of the superstructure is closed off to the ceiling.
6. A two tube, rapid start, vapor sealed florescent light fixture of maximum length shall be provided on each superstructure. Each fixture will include two soft white fluorescent tubes. Light fixtures shall be relamped from the top front of the superstructure.
7. Exhaust outlets shall be rectangular, 18 gage stainless steel. Hoods with stainless steel interior liners shall have 18 gage stainless steel exhaust collars welded in place.
8. Fume Hoods shall have a full view, vertical rising, laminated safety glass sash framed with a solid black PVC edging. The Sash shall have a full width finger lift with a 16-gage internal support tube. The sash shall not require the use of a center mullion. Sash guides shall be extruded, black PVC.
9. The sash shall be counterbalanced with a single weight located in the center rear of the superstructure. Two 1/8" diameter stainless steel cables connect the sash to the weight. The use of the two cables acts as a safety mechanism keeping the sash from falling in the event that one cable would fall. The cables ride on a 2" diameter nylon ball bearing pulleys. The cable/pulley assembly shall have an adjustment located on the top of the superstructure for proper alignment of the sash.
10. A lower airfoil of 14-gage steel, coated with a black baked-on chemical resistant finish, shall act as the sash stop. A one-inch space shall be provided in the closed position, and on the work surface to provide continuous sweep of fumes from the work surface.
11. The following Fume Hood provide specific specifications as indicated:
 - a. Airfoil Bypass Fume Hoods: The super structure as specified with a white Resin-Chem interior lining.

2.7 CASEWORK FINISH

- A. High pressure, phenolic cabinet liner and thermo-fused melamine laminates meet or exceed the NEMA LD3-1991-GP28 and ALA minimum requirements for applications used. Laminates conform to relevant sections of standards set by Woodworkers Institute of California (WIC) for exposed, semi-exposed and unexposed surfaces. Laminates meet the ASTM-E-84 and ULC burn test standards; and, in accordance with FTM-2 show formaldehyde emissions of less than 0.3ppm

2.8 FABRICATION

- A. Factory assembly of casework in the largest components possible aids in the installation. Bored, doweled and glued construction is used for maximum strength; and the use of precision jigs and clamps ensures square corners and plumb vertical surfaces.
- B. Fabrication of laboratory casework and equipment is completed to dimensions in the final, approved copy of shop drawings.

3 PART 3 EXECUTION

3.1 COORDINATION

- A. The General Contractor and Engineer shall cooperate with the laboratory casework and equipment contractor to coordinate delivery and installation of the product.

3.2 INSTALLATION AND ADJUSTMENTS

- A. Installation of casework must be plumb, level, true and straight, with no distortions. Use concealed shims as required. When laboratory casework or equipment butts against other finished work, scribe and cut for an accurate fit.
- B. Adjustments to casework and hardware may be needed for smooth operation of doors and drawers, without warp or bind. Lubricate operating hardware as recommended by the manufacturer.

3.3 CLEANING AND PROTECTION

- A. Inspect casework for damaged or soiled areas; remove, refinish, and touch-up as necessary. Leave area clean.
- B. Cover installed casework and equipment with 4-mil polyethylene film as protection against soiling. Advise General Contractor of procedures to protect installed casework and equipment from potential damage by other trades.
- C. Required temperature and humidity conditions, consistent with those to be maintained by Owner, must be established for installed casework. Advise General Contractor of these requirements.

3.4 DEMONSTRATION

- A. A qualified representative will demonstrate operation procedures and maintenance of the installed equipment to the Owner's personnel. This demonstration may be set at Owner's convenience; however, it must be conducted within 60 days of final installation of casework.

END OF SECTION

SECTION 13120

METAL ROOFING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Metal roofing as shown on the documents shall be equal to slope, height and configuration as noted on documents,
- B. Metal roofing shall be of type and configuration as noted on drawings.
- C. Insulation shall be blanket type, with minimum thickness of 6" and 8" respectively. Blanket insulation shall be 0.75 pound density, roll type fiberglass with a white embossed 0.002" thick vinyl scrim foil (heavy duty) vapor barrier having a "UL" minimum underwriters laboratory flame spread of .25 and smoke rating of 50. Insulation shall have side tabs to joint adjacent blankets.

1.02 REFERENCES

The latest edition of publications listed below form a part of this Specification in addition to The Kentucky Building Code to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

AA ASD-1	Aluminum Standards & Data
AA SAS-30	Aluminum Construction Manual Series - Section 1, Specifications for Aluminum Structures

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 101	Voluntary Specifications for Aluminum Prime Windows and Sliding Glass Doors
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AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC S335	Specification of Structural Steel Buildings - Allowable Stress Design, Plastic Design
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AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI SG-673	Cold-Formed Steel Design Manual
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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36	Structural Steel
ASTM A 53	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded

and Seamless

ASTM A 252	Welded and Seamless Steel Pipe Piles
ASTM A 446	Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality
ASTM A 463	Steel Sheet, Cold-Rolled, Aluminum-Coated, Type 1 and Type 2
ASTM A 500	Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 501	Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
ASTM A 529	Structural Steel with 42 ksi (290 MPa) Minimum Yield Point (1/2 In. (13 mm) Maximum Thickness)
ASTM A 570	Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality
ASTM A 572	High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality
ASTM A 588	High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4 In. (100 mm) Thick
ASTM A 606	Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance
ASTM A 607	Steel, Sheet and Strip, High-Strength Low-Alloy, Columbium or Vanadium or Both, Hot-Rolled and Cold-Rolled
ASTM A 618	Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing
ASTM A 792	Steel Sheet, Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
ASTM B 117	Salt Spray (Fog) Testing
ASTM B 209	Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 221	Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
ASTM B 241	Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube

ASTM B 308	Aluminum-Alloy 6061-T6 Standard Structural Shapes, Rolled or Extruded
ASTM B 429	Aluminum-Alloy Extruded Structural Pipe and Tube
ASTM C 518	Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
ASTM D 522	Mandrel Bend Test of Attached Organic Coatings
ASTM D 523	Specular Gloss
ASTM D 659	Evaluating Degree of Chalking of Exterior Paints
ASTM D 714	Evaluating Degree of Blistering of Paints
ASTM D 968	Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D 1654	Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
ASTM D 2244	Calculation of Color Differences from Instrumentally Measured Color Coordinates
ASTM D 2247	Testing Water Resistance of Coatings in 100% Relative Humidity
ASTM D 2794	Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D 3841	Glass-Fiber-Reinforced Polyester Plastic Panels
ASTM E 84	Surface Burning Characteristics of Building Materials
ASTM E 96	Water Vapor Transmission of Materials
ASTM E 1042	Acoustically Absorptive Materials Applied by Trowel or Spray
ASTM G 23	Operating Light-Exposure Apparatus (Carbon-Arc Type) with and without Water for Exposure of Nonmetallic Materials
ASTM G 90	Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight
AMERICAN WELDING SOCIETY (AWS)	
AWS D1.1	Structural Welding Code - Steel

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

BHMA A156.1	Butts and Hinges
BHMA A156.2	Bored and Preassembled Locks and Latches
BHMA A156.4	Door Controls - Closers
BHMA A156.6	Architectural Door Trim
BHMA A156.7	Template Hinge Dimensions

BUILDING SYSTEMS INSTITUTE

BSI-01	Metal Building Systems
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FEDERAL SPECIFICATIONS (FS)

FS HH-I-558	Insulation, Blocks, Boards, Blankets, Felts, Sleeving (Pipe and Tube Covering), and Pipe Fitting Covering, Thermal (Mineral Fiber, Industrial Type)
FS RR-D-575	Door, Metal, Sliding and Swinging: Door Frame, Metal (Flush and Semiflush)

UNDERWRITERS LABORATORIES (UL)

UL 580	Tests for Uplift Resistance of Roof Assemblies
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1.03 GENERAL

Metal Roofings shall be the product of a recognized metal building manufacturer. Roof slope shall be as indicated. Building addition shall be single-span structure with the following framing systems: continuous beam frames. Building dimensions shall be not less than those indicated. Frame and covering shall be matched and pre-punched to receive fasteners. The completed building shall be free of excessive noise from wind induced vibrations under the ordinary weather conditions to be encountered at the location where the building is erected, and meet all specified design requirements. Roof deck assemblies shall be Class 90 as defined in UL 580. Erection of the building structure shall be performed by a contractor having specialized experience in the erection of pre-engineered buildings for a period of at least 10 years. A brief list of similar projects by this contractor shall be submitted with detail drawings.

1.04 DESIGN REQUIREMENTS

A. Design Conditions

Design loads shall be developed using procedures contained in BSI-01. The following data shall be used in developing design loads:

1. Building system dead loads.

2. Collateral loads of 15 pounds per square foot. Collateral loads are weights of other permanent features such as, mechanical and electrical systems, partitions, and ceilings. Pre-engineered manufacturer shall specifically direct how hangers to be connected.
3. Roof live loads of 20 pounds per square foot. (Live load reduction is not permitted.) Pre-Engineered Manufacturer shall specifically direct how hangers is to be connected to the framing.
4. Ground snow loads of 25 pounds per square foot with a building importance factor of 1.0. A conversion factor of 0.7 shall be used for the ground-to-roof conversion factor.
5. The higher value of either the live load or the snow load shall be utilized.
6. Snow drift loads shall be added where roof meets the side wall.
7. Basic wind speed of 90 miles per hour (fastest mile) with an importance factor of 1.34. Concentrated loads of 450 pounds. Approximate locations of concentrated loads are indicated on the drawings.
8. Seismic zone 1.

B. Foundation Requirements

Foundations shall be provided as shown on the PLANS. Structural reinforcement will be adequate to compensate for building framework.

C. Framing and Structural Members

Structural steel members shall be designed in accordance with AISC S335. Structural cold-formed steel framing members shall be designed in accordance with AISI SG-673. Aluminum framing and structural members shall conform to AA ASD-1 and shall be designed in accordance with the AA SAS-30. Framed openings shall be designed to structurally replace the covering and framing displaced. Welding of steel shall conform to the requirements of AWS D1.1, and welding of aluminum shall conform to the requirements of AA SAS-30.

D. Exterior Covering

Except as otherwise specified, steel covering shall be designed in accordance with AISI SG-673. Aluminum covering shall be designed in accordance with the AA ASD-1. Maximum wind load deflection for wall panels and the maximum live deflection for roof panels shall not exceed 1/180th of the span between supports for aluminum and for steel. Maximum deflections shall be based on sheets continuous across two or more supports with sheets unfastened and fully free to deflect.

E. Gutters

Gutters and downspouts shall be designed to carry the flow from the roof resulting from rain falling at the rate of 4 inches per hour for a 5-minute duration.

F. Framed Openings

Openings indicated on drawings for items such as pedestrian doors, overhead coil door, air intakes on roof, pipe penetration of exterior skin and other related items shall have added framing and bracing to prevent any lateral movement and deflection of outer skin.

Metal building supplier shall provide any added materials necessary to structurally support hanging items.

G. Added Framing

1.5 SUBMITTALS

The following shall be submitted in accordance with Section 01300:

A. Detail Drawings

Detail drawings shall consist of catalog cuts; design and erection drawings; and complete design analysis; shop painting and finishing specifications; instruction manuals; manufacturer's recommended erection methods and procedures and other data as necessary to clearly describe design, materials, sizes, layouts, construction details, fasteners, and erection. Manufacturer's recommended erection methods and procedures shall describe the basic sequence of assembly, temporary bracing, shoring, and related information necessary for assembly of the metal roofing. For all metal roofing designs, except those programmed on a computer, the detail drawings shall be accompanied by engineering design calculations for structural trusses and covering components. For computer programmed designs, detail drawings shall be accompanied by stress values and a certificate, signed by a licensed professional engineer licensed in the State of Kentucky, stating the design criteria and procedures used and attesting to the adequacy and accuracy of the design. A brief list of locations where trusses of similar design have been used shall be submitted with the detail drawings and shall include information regarding date of installation, name and address of owner, and how the structure is used.

B. Samples

The following samples are required for approval:

- a. Accessories: One sample of each type of flashing, trim, closures, caps and similar items. Size shall be sufficient to show construction and configuration.
- b. Covering, Roof and Wall: One piece of each type to be used, 9-inches long, full width. The sample for factory color finished covering shall be accompanied by certified laboratory test reports showing that the sheets to be furnished are produced under a continuing quality control program and that a representative sample has been tested within the past 12 months and has met the quality standards specified in paragraph "FACTORY COLOR FINISH."

- c. Fasteners: Two samples of each type to be used with statement regarding intended use.
- d. Gaskets and Insulating Compounds: Descriptive data.
- e. Sealant: One sample, approximately 1 pound, and descriptive data.
- f. Descriptive data for each if not fully covered by detail drawings.

C. Certificates of Compliance

Certificates of compliance from the metal building manufacturer stating that the metal building furnished for this project complies with the material and fabrication requirements of this section are required. The certificates shall also state that the metal building was designed for the roof slope indicated.

1.6 DELIVERY AND STORAGE

Materials shall be delivered to the site in a dry and undamaged condition and stored out of contact with the ground. Materials other than framing and structural members shall be covered with weathertight coverings and kept dry. Storage accommodations for roof and wall covering shall provide good air circulation and protection from surface staining.

1.7 GUARANTEE

Notwithstanding the requirements of clause "Warranty of Construction" specified in the Warranty Section, the building shall be guaranteed against water leaks arising out of or caused by ordinary wear and tear by the elements for a period of 5 years. Such guarantee shall start upon final acceptance of the work or the date the Owner takes possession, whichever is earlier.

PART 2 - PRODUCTS

2.01 BUILDING COMPONENTS

A. General

The size and weight of prefabricated components shall permit easy handling in the field and the maximum size and weight of any component shall be suitable for transportation by commercial carrier. Each piece or part of the assembly shall be clearly and legibly marked to correspond with the detail drawings.

B. Building Nomenclature

The building "width" and "length" shall be measured as noted on plans.

The building eave height shall be measured from bottom of primary frame base plate to top of the eave strut. The top of the eave strut is the point of intersection between the inside surfaces of the wall and roof covering. Height is noted on the PLANS.

The bay spacing shall be measured as follows:

1. Interior bays from centerline to centerline of interior frames.
2. End bays from center of column to centerline of first interior.

C. Frame type

Engineered wood trusses with clear span shall be provided with roof slope as noted on documents. Primary frame shall be of type shown on documents, welded rigid design.

D. End Frame

Rigid end frame (full load): End Frames shall be fabricated wood truss rigid frame of same type and design as Primary Trusses in building.

E. Gutters and Downspouts

Gutters and downspouts shall be fabricated of aluminum, zinc-coated steel or aluminum-zinc alloy coated steel. All accessories necessary for the complete installation of the gutters and downspouts shall be furnished. Accessories shall include gutter straps, downspout elbows, downspout straps and fasteners fabricated from metal compatible with the gutters and downspouts.

F. Minimum Thickness

Materials, other than roof and wall covering, shall be of thickness necessary to conform to design requirements, however the following table lists the minimum thickness, which will be allowed:

Items	Minimum Uncoated Thickness
Light Gauge Steel-Structural Members other than Wall and Roof Covering	0.048 Inch
Gable and Eave Trim, Fascia Closure Strips, Rake Flashing, Coping and Liner Panels	
Steel	0.018 Inch
Aluminum	0.032 Inch
Gutters and Downspouts	
Steel	0.018 Inch
Roof Ventilators	
Aluminum	0.032 Inch
Louvers	
Steel	0.048 Inch
Aluminum	0.064 Inch

G. Sealant

Sealant shall be an elastomeric type containing no oil or asphalt. Exposed sealant shall

cure to a rubber-like consistency. Concealed sealant may be the non-hardening type. Sealant for standing seam panels shall be factory applied conforming to the manufacturer's recommendations.

H. Gaskets

Gaskets and insulating compounds shall be non-absorptive and suitable for insulating contact points of incompatible materials. Insulating compounds shall be non-running after drying.

2.02 FACTORY COLOR FINISH

Wall and roof panels shall have a factory color finish on the exposed side and be resistant to chlorine. The exterior finish shall consist of either a synthetic resin base coating applied to a cleaned, pretreated surface, or a dry film coating bonded by adhesive to a cleaned metal substrate. Color shall be as selected by OWNER. The dry film thickness of the exterior coating shall be not less than 0.8 mil. The interior color finish shall consist of the same coating and dry film thickness as the exterior and shall also be resistant to chlorine. The interior and exterior color finish shall meet the test requirement specified below. The manufacturer shall have conducted tests on previously manufactured sheets of the same type and finish as proposed for the project. The term "appearance of base metal" refers to the metal coating on steel or the aluminum base metal.

- A. Salt Spray Test: A sample of the sheets shall withstand a salt spray test for a minimum of 1000 hours in accordance with ASTM B 117, including the scribe requirement in the test. Immediately upon removal of the panel from the test, the coating shall receive a rating of 10, no blistering, as determined by ASTM D 714; and a rating of 10, 1/16 inch failure at scribe, as determined by ASTM D 1654.
- B. Formability Test: When subjected to a 180-degree bend over a 3/8-inch diameter mandrel in accordance with ASTM D 522, exterior coating film shall show no evidence of fracturing to the naked eye.
- C. Accelerated Weathering, Chalking Resistance and Color Change: A sample of the sheets shall withstand a weathering test a minimum of 2000 hours in accordance with ASTM G 23, using a Type D apparatus, without cracking, peeling, blistering, loss of adhesion of the protective coating, or corrosion of the base metal. Protective coating that can be readily removed from the base metal with a penknife blade or similar instrument shall be considered as an area indicating loss of adhesion. After the 2000-hour weatherometer test, exterior coating shall not chalk greater than No. 8 rating in accordance with ASTM D 659 test procedures. After the 2000-hour weatherometer test, exterior coating color change shall not exceed 2 NBS units in accordance with ASTM D 2244.
- D. Humidity Test: When subjected to a humidity cabinet in accordance with ASTM D 2247 for 1500 hours, a scored panel shall show no signs of blistering, cracking, seepage or corrosion.
- E. Impact Resistance: Factory-painted sheet shall withstand direct and reverse impact in accordance with ASTM D 2794 equal to 1.5 times metal thickness in mils, expressed in inch-pounds, with no loss of adhesions.

- F. Abrasion Resistant Test: When subjected to the falling sand test in accordance with ASTM D 968, the coating system shall withstand a minimum of 100 liters of sand before the appearance of the base metal.
- G. Specular Gloss: Finished surfaces shall have a specular gloss value of 30 to 70 at an angle of 60 degrees when measured in accordance with ASTM D 523.

2.03 SHOP PAINTING

Ferrous surfaces shall be cleaned of oil, grease, loose rust, loose mill scale, and other foreign substances and shop painted. Structural columns, rigid framing exposed cross bracing and support channels indicated on drawings shall be coated with TNEMEC brand coating, Series 91H2O with a primer thickness of 2.5 mils. Finish coating to be of color selected and applied per Schedule in Division 9, Painting.

PART 3 - EXECUTION

3.01 ERECTION

A. General

Erection shall be in accordance with the approved erection instructions and drawing and with applicable provision of AISC S335. Finished structure shall be proven weathertight. Dissimilar materials, which are not compatible, when contacting each other shall be insulated from each other by means of gaskets or insulating compounds. Framing members fabricated or modified on site shall be saw or abrasive cut; boltholes shall be drilled. On-site flame cutting of framing members, with the exception of small access holes in structural beam or column webs, shall not be permitted. Improper or misallocated drill holes shall be plugged with an oversize screw fastener and gasketed washer; however, sheets with an excess of such holes or with such holes in critical locations shall not be used. Exposed surfaces shall be kept clean and free from sealant, metal cuttings, excess material from thermal cutting, and other foreign materials. Exposed surfaces, which have been thermally cut, shall be finished smooth within a tolerance of 1/8 inch. Stained, discolored or damaged sheets shall be removed from the site. Concrete work is specified in Section 03300 CONCRETE. Touch up all drilling, cutting, sawing or abrasive work with TNEMEC Primer and Finish Paint.

B. Framing and Structural Members

Anchor bolts shall be accurately set by template while the concrete is in a plastic state. Uniform bearing under base plates and sill members shall be provided using a non-shrinking grout when necessary. Members shall be accurately spaced to assure proper fitting of covering. Separate leveling plates under column base plates shall not be used. As erection progresses, the work shall be securely fastened to resist the dead load, and wind and erection stresses.

C. Wall Covering and Roof Covering

Wall covering shall be applied with the longitudinal configurations in the vertical position. Roof covering shall be applied with the longitudinal configurations in the

direction of the roof slope. Accessories shall be fastened into framing members, except as otherwise approved. Closure strips shall be provided as indicated and where necessary to provide weathertight construction.

1. Lap Type Panels with Exposed Fasteners

Except for self-framing buildings, end laps shall be made over framing members with fasteners into framing members approximately 2 inches from the end of the overlapping sheet. Side laps shall be laid away from the prevailing winds. Side lap distances, end lap distances, joint sealing, and spacing and fastening of fasteners shall be in accordance with the manufacturer's standard practice insofar as the maximum spacings specified are not exceeded and provided such standard practice will result in a structure which will be free from water leaks and meet design requirements. Spacing of fasteners shall present an orderly appearance and shall not exceed: 8 inches on center at end laps of covering, 12 inches on center at connection of covering to intermediate supports, 12 inches on center at side laps of roof coverings, and 18 inches on center at side laps of wall coverings except when otherwise approved. Side laps and end laps of roof and wall covering and joints at accessories shall be sealed. Method of applying joint sealant shall conform to the manufacturer's recommendation. Fasteners shall be installed in straight lines within a tolerance of 1/2 inch in the length of a bay. Fasteners shall be driven normal to the surface and to a uniform depth to properly seat the gasketed washers.

2. Concealed Fastener Wall Panels

Panels shall be fastened to framing members with concealed fastening clips or other concealed devices standard with the manufacturer. Spacing of fastening clips and fasteners shall be in accordance with the manufacturer's written instructions insofar as the maximum fastener spacings specified are not exceeded and provided such standard practice will result in a structure which will be free from water leaks and meet design requirements. Spacing of fasteners and anchor clips along the panel interlocking ribs shall not exceed 12 inches on center except when otherwise approved. Fasteners shall not puncture covering sheets except as approved for flashing, closures, and trim; exposed fasteners shall be installed in straight lines. Interlocking ribs shall be sealed with factory-applied sealant. Joints at accessories shall be sealed.

3. Concealed Clip, Standing Seam Room Panels

Roof and fascia panels shall be fastened to framing members with concealed fastening clips or other concealed devices standard with the manufacturer. Spacing of clips and fasteners shall be in accordance with the manufacturer's written instructions. End laps, when approved by the Engineer, shall be made over framing members. Fasteners shall not puncture covering sheets except as approved for flashing, closures, and trim. Exposed fasteners shall be installed in straight lines. Interlocking ribs shall be sealed if standard with or recommended by the manufacturer. End laps of covering sheets and joints at accessories shall be sealed. Seams between roof panels shall be mechanically field formed with a seamer at the project site.

D. Gutters and Downspouts

Gutters and downspouts shall be rigidly attached to the building. Gutters shall be installed to provide drainage and shall be designed with adequate provisions for expansion and contraction.

E. Field Painting

Immediately upon detection, abraded or corroded spots on shop-painted surfaces shall be wire brushed and touched up with the same material used for the shop coat. Factory color finished surfaces shall be touched up as necessary with the manufacturer's recommended touch-up paint.

3.02 PRIMARY MEMBERS

A. Primary structural framing shall refer to the Primary Frames (transverse rigid frames and columns), expandable and non-expandable End Frames (rafters/corner posts/end posts), Wind/Seismic Bracing.

1. Members fabricated from plate, plate coils, strip mill plate or flat bar stock shall have flanges and webs joined on one side of the web by a continuous welding process. All material shall have a minimum yield strength of 50,000 psi. Material will conform to physical specifications of the following ASTM specification: plate (ASTM A-572, Gr. 50); plate coils and strip mill plate (ASTM A-570, Gr. 50); and flat bar (ASTM A-3, Modified ASTM A-529, Gr. 50).
2. Members fabricated from W shapes (hot-rolled structural sections) will conform to the physical specifications of ASTM A-529, Gr. 42, except that steel shall have a yield strength of 42,000 psi.
3. Members fabricated from other hot-rolled structural sections (S shapes/American Standard channels/angles/rods for anchor bolts/all other miscellaneous structural shapes) shall have a minimum yield strength of 36,000 psi and will conform to the physical specifications ASTM A-36.
4. Rods used for bracing will conform to the physical specifications of ASTM A-529, Gr. 50.
5. Cables used for bracing shall be zinc coated steel wire (7 strands), extra high strength grade.
6. Members fabricated by cold forming process shall have minimum yield strength of 55, 000 psi and will conform to the physical specifications of ASTM A-570.

3.03 CONNECTIONS

A. All field connections shall be bolted (unless otherwise noted).

1. All primary bolted connections, as shown on drawings, shall be furnished with high strength bolts conforming to the physical specifications of ASTM A-325.
2. All secondary bolted connections, as shown on drawings, will be furnished with machine bolts conforming to the physical specifications of ASTM A-325.

- B. All shop welding shall be by either the submerged arc, gas metal arc, or shielded arc process. Groove joint welds shall develop the full strength of the members connected. Welding shall conform to the applicable requirements of the American Welding Society "Structural Welding Code", (AWS D1.1-94 with ultrasonic test acceptance criteria modified in accordance with AWS D1.1-94 Section 1.1.2 based on suitability for service criteria. The modified ultrasonic acceptance criteria are given in "Alternative Table 8.2 AWS D1.1-94. The documentation supporting the modified acceptance criteria is contained in the report "Testing and Inspection of Welding Procedures" by Goodrich Testing and Engineering, Inc. of Nashville, Tennessee.

3.04 ANCHOR BOLTS

- A. Anchor bolts shall be minimum ASTM307- 3/4" x 4'0" overall length with 4" end hooks and upper 4" threaded unless otherwise shown on drawings. Pre-engineered manufacturer shall determine number and layout of the anchor bolts. Anchor bolts shall be provided and installed by the Contractor.

3.05 ROOF AND WALL COVERING

General:

- A. Standard Covering for roofs or walls shall be a ribbed-type panel having 36-inch net coverage. These panels shall be 24-gauge steel, with or without a color coating.
- B. Covering for roofs shall be a standing seam panel having either 24" net coverage, 30" net coverage, or 16" net coverage. These panels shall be 24-gauge steel with color coating.
- C. Covering for walls shall be a concealed fastener panel having 16-inch net coverage. These panels shall be 24 gauge, with a color coating. Exposed fasteners are optional in place of concealed fasteners.
- D. All panels, both standard and premium, shall be precision roll-formed to the required configuration specified.

3.06 PANEL MATERIAL

- A. Galvalume is a specialty steel sheet product with a patented coating of (corrosion-resistant), aluminum-zinc alloy applied by a continuous hot dipping process. Typical coating weight is 0.5-oz. per square foot of coated sheet (both sides) – equivalent to approximately 0.8-mil thickness on each side. Galvalume steel panels shall have a minimum yield strength of 50,000 psi unless otherwise specified. Galvalume steel will conform to ASTM specification A-792.
- B. Premium Paint, color coated panels shall have the exterior side finished with an extended life, fluoropolymer coating utilizing Kynar 500® Resin. This coating shall be applied over a Galvalume substrate. Surfaces shall be properly prepared, then coated and oven-baked to cure. Top coating system shall have a dry film thickness of 0.75 - .90 mils on the exterior surface. Specular Gloss at 60° viewing angle shall be 35 +/- 5%. The interior side of these panels shall be protected by a back coat system of .60 +/- .05 mils thickness. Panels shall be coated prior to roll forming. Paint shall be resistant to chlorine.

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3.07 FLASHING, TRIM & CLOSURES

- A. Flashing and/or trim shall be furnished at eaves, rake, corners, base, framed openings, and wherever necessary to seal against the weather and provide a finished appearance.
- B. Gutters are box-shaped with face profile shaped to match rake trim. Downspouts are rectangular-shaped (2 7/8 x 4 1/4 min. size) or 4" round terminate in downspout boot. Color for gutter and downspouts shall match building color.
- C. Color coated, Galvalume for flashing, trim, metal closures, gutter and downspouts, and other miscellaneous uses shall be 26-gauge thickness of the same specification as the roof and wall covering material.
- D. Material used for Base Angle/Trim members shall be color coated, 18 gauge, galvanized steel, 36,000-yield strength.
- E. Preformed, closed cell, polyethylene closure strips matching the profile of the panel shall be installed along the eave and at other locations to provide weathertightness when shown on erection drawings.

3.08 FASTENERS

- A. Wall fasteners shall be self-drilling carbon steel screws with an integral 5/16 inch hex-washer head. Screws for "panel to structural" application shall be #12 diameter with a minimum length of 1 1/4 inches. "Stitch" screws shall be 1/4 inch diameter and 3/4 inches long.

Standard Wall Fasteners shall be screw without a sealing/separation washer under the steel, hex-washer head.

Both "standard" and "optional" Wall Fasteners shall have carbon steel heads. Entire fastener (body and head) shall have 0.0005 minimum thickness zinc plating plus a polymer coating for long term corrosion resistant. Fastener head shall also be painted to match wall panel and/or trim color.

- B. Roof Fasteners shall be self-drilling carbon steel screw with an integral 5/16' hexwasher head (washer face undercut to encapsulate a sealing washer). Screws for "panel to structural" application shall be #12 diameter with a minimum length of 1 1/4 inches. "Stitch" screws shall be 1/4 inch diameter and 3/4 inches long.

Standard Roof Fasteners shall be screws with carbon steel heads and shall have a sealing washer (PVC or EPDEM). Entire fastener (body and head) shall have a 0.0005 minimum thickness zinc plating plus a polymer coating or long-term corrosion resistance. When used with color coated material. Fastener head shall also be painted to match panel and/or trim color.

3.09 SEALANTS

- A. Sealants for side laps, end laps, accessories, etc. shall be performed, butyl rubber based compound. The material shall be non-hardening, non-shrinking and non-corrosive and shall have excellent adhesion to metals, painted surfaces and plastics to temperatures from -30° to 160°F. These sealants shall be in tape mastic form, of shape and size recommended by building manufacturer for various applications, and shall have paper backing for easy handling.
- B. Tube sealants shall be used to supplement tape mastic sealants and shall be applied in locations indicated by erection instructions. Tube sealant shall be a synthetic, elastomer-based material, which becomes tack-free in less than 2 hour at 75°F but retains flexibility.

3.10 INSTALLATION OF WALL AND ROOF PANELS

- A. Wall panels shall be continuous from base to eave. If panel lengths exceed manufacturing and shipping limitations, splice shall occur over a wall girt.
- B. Roof panels shall be continuous from eave to ridge. If panel lengths exceed manufacturing and shipping limitations, splice end laps shall occur at a roof purlin. Sealant shall be used in all roof panel end laps.
- C. All ribbed, roof panel side laps shall be sealed with a field applied, continuous ribbon of tape mastic sealant. Eaves shall also be sealed.
- D. Fastener population and pattern for both wall and roof panels shall be as shown on erection details.

3.11 UNDERWRITERS LABORATORIES UPLIFT RATING

- A. By increasing roof fastener population and changing installation pattern, roof panels will obtain an Underwriters Laboratories wind uplift classification of Class 90. UL ratings specified shall be adhered to.

3.12 PIPE FLASHING

- A. Pipe flashing shall be one piece construction to accommodate pipes made of steel, cast iron or PVC material.
- B. Units shall be made of a flexible rubber compound (EPDM or equal) formulated to provide maximum weathertightness. Unit shall be pre-molded to form a pipe collar. Bonded to base of collar shall be a 1/32" +/- thick, moldable aluminum ring, which bends with ease to conform to any panel configuration.
- C. Pipe flashing unit shall be furnished with necessary sealant and screw fasteners to attach unit to roof panels and provide a weathertight assembly.

3.13 BUILDING FOUNDATION

- A. Foundation shall be as shown on the PLANS.

3.14 WARRANTIES

- A. Building provided by concrete block manufacture shall provide an addition through year extended warranty against failure caused by faulty or substantial material not detectable in manufacturer or assembly process.
- B. Building warranty shall also include a one-year workmanship warranty caused by faulty erectors.
- C. Standard warranty shall also include wall and roof paint application.

3.15 WATER/WEATHER TIGHTNESS OF ROOF & CONCRETE MASONRY WALLS

- A. A 20-year weathertightness shall be provided by building contractor.

END OF SECTION

SECTION 15010

MECHANICAL GENERAL REQUIREMENTS

GENERAL REQUIREMENTS:

All requirements under Division One and the General and Supplementary Conditions of these specifications shall be a part of this section. Each contractor shall be responsible to thoroughly familiarize himself with all its contents as to requirements which affect this division or section. The work required under this section includes all material, equipment, appliances, transportation, services, and labor required to complete the entire system as required by the drawings and specifications.

SCOPE:

The work included in this division consists of the furnishing of all labor, equipment, transportation, excavation, backfill, supplies, material, appurtenances and service necessary for the satisfactory installation of the complete and operating Mechanical Systems (s) indicated or specified in the Contract Documents.

Any Materials, labor, equipment or services not mentioned specifically herein which may be necessary to complete or perfect any part of the Mechanical Systems in a substantial manner, in compliance with the requirements stated, implied or intended in the drawings, and or specifications, shall be included as part of this Contract.

It is the intent of this Contract to deliver to the Owners a "like new" project once work is complete. Although plans and specifications are complete to the extent possible, it shall be the responsibility of the Contractors involved to coordinate all new systems with items of construction provided by others, and to relocated items which interfere with new equipment or materials required for the complete installation without additional cost to the Owner.

DEFINITIONS AND ABBREVIATIONS:

Contractor – Any Contractor whether proposing or working independently or under the supervision of a General Contractor and/or Construction Manager and who installs any type of mechanical work (controls, Plumbing, HVAC, Sprinkler, Air Systems, etc.) or, the General Contractor.

Engineer – The Consulting Mechanical-Electrical Engineers either consulting to the Owner, Architect, other Engineers, etc.

Architect – The Architect of Record for the project.

Furnish – Deliver to the site in good condition and turn over to the Contractor who is to install.

Provide – Furnish and install complete, tested and ready for operation.

Indicated – Shown on the Drawings or Addenda thereto.

Typical – Where indicated repeat this work, method or means each time the same or similar condition occurs whether indicated or not.

OSHA – Office of Safety and Health Administration.

NEC – National Electrical Code.

NFPA – National Fire Protection Association.

ASME – American Society of Mechanical Engineers.

AGA – American Gas Association

SMACNA – Sheet Metal and Air Conditioning Contractors National Association.

ANSI – American National Standards Institute.

ASHRAE – American Society of Heating, Refrigeration and Air Conditioning Engineers.

NEMA – National Electrical Manufacturers Association.

UL – Underwriters Laboratories

INSPECTION OF THE SITE:

The contractor shall personally inspect the site of the proposed work and inform himself fully as to the conditions under which the work is to be done. Failure to do so will not be considered sufficient justification to request or obtain extra compensation over and above the contract price.

MATERIALS AND WORKMANSHIP:

All material and apparatus shall be new and in first class condition. All workmanship shall be of the finest possible by experienced mechanics. All installations shall be made in a manner that will comply with applicable Codes and laws. Any abnormal noise caused by rattling equipment, piping, ducts, air devices, and squeaks in rotating components will not be acceptable. In general, all materials and equipment shall be of commercial specification grade in quality.

DRAWINGS AND SPECIFICATIONS:

The drawings are diagrammatic only and indicate the general arrangement of the systems and are to be followed. If deviations from the layouts are necessitated by field conditions, detailed layouts of the proposed departures shall be submitted to the Engineer for approval before proceeding with the work. The drawings are not intended to show every item which may be necessary to complete the systems. All proposers shall anticipate that additional items may be required and submit their bid accordingly.

Each Contractor shall make all his own measurements in the field and shall be responsible for correct fitting. He shall coordinate this work with all other branches of work in such a manner as to cause a minimum of conflict or delay.

The Engineer shall reserve the right to make adjustments in location of piping, ductwork, equipment, etc. where such adjustments are in the interest of improving the project.

Unless dimensioned, the mechanical drawings only indicate approximate locations of equipment, piping, ductwork, etc.. Dimensions given in figures on the drawings shall take precedence over scaled dimensions and all dimensions, whether given in figures or scaled, shall be verified in the field to insure no conflict with other work.

Special Note: Always check ceiling heights indicated on Architectural Drawings and Schedules and insure that they may be maintained after all mechanical and electrical equipment is installed.

COORDINATION:

Coordinate all work with that of other trades so that the various components of the systems will be installed at the proper time, will fit the available space, and will allow proper service access to those items requiring maintenance. Any components which are installed without regard to the above shall be relocated at no additional cost to the owner.

It is the Contractor's responsibility to provide materials with trim which will fit properly the types of ceiling, wall, or floor finishes actually installed. Model numbers in specifications or shown on drawings are not intended to designate the required trim.

Contractor shall maintain all necessary barricades to maintain the security needs of the penal facility. Coordinate all work egress and entry requirements with the facility security personnel.

ORDINANCES AND CODES:

Comply with National Fire Protection Association codes, Kentucky Building Code, International Mechanical Code requirements, Lexington Fire Marshall requirements, and/or all other applicable codes and ordinances. Obtain and pay for all permits. Contractor shall be held responsible for any violation of the law.

The Contractor shall give all necessary notices, obtain and pay for all permits, fees, inspections and other costs, in connection with his work. He shall also file all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction, whether indicated or specified or not. He shall also obtain all required certificates of inspection for his work and deliver same to the Architect before request for acceptance and final payment for the work.

PROTECTION OF EQUIPMENT:

Adequately protect equipment from damage or theft after delivery to job. Additional requirements made be necessary to meet with the security needs of the penal facility, with particular interest regarding tool accessibility. Cover equipment with heavy polyethylene plastic as required to protect from plaster, dirt, paint, water, or physical damage. Equipment which has been damaged by construction activities will be rejected, and contractor is obligated to furnish new equipment of a like kind.

Keep premises broom clean at all times from foreign material created under this contract. All piping, equipment, etc. shall have a neat and clean appearance at the termination of the work. Tools shall be removed from site or locked up and secured after work each day.

EQUIPMENT AND MATERIALS SUBSTITUTIONS OR DEVIATIONS:

When any Contractor requests approval of materials and/or equipment of different physical size, capacity, function, color, access, it shall be understood that such substitution, if approved. Will be made without additional cost to anyone other than the Contractor requesting the change regardless of changes in connections, space requirements, electrical characteristics, etc. from that indicated, electrical service, etc.. In all cases where substitutions affect other trades, the Contractor requesting such substitutions shall advise all such Contractors of the change and shall remunerate them for all necessary changes in their work. Any drawings, Specifications, Diagrams, etc., require to describe and coordinate such substitutions or deviations shall be professionally prepared at the responsible Contractor's expense. Approval of Shop Drawings by the Engineers does not in any way absolve the Contractor of this responsibility.

Notwithstanding any reference in the specifications to any article, device, product, material, fixture, form, or type of construction by name, make or catalog number, such reference shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; any devices, products, materials, fixtures, forms, or types of construction which, in the judgement of the Engineer, are equivalent to those specified are acceptable, provided the provisions of Paragraph (A) immediately preceding are met. Requested Substitutions shall be submitted to the Engineer a minimum of five days prior to bids.

Wherever any equipment and material is specified exclusively without the phrase “**or equal**” only such items shall be used unless substitution is accepted in writing by the Engineers.

SUPERVISION OF WORK:

Each Contractor shall personally supervise the work for which he is responsible or have a competent superintendent, approved by the Engineers, on the work at all times during progress with full authority to act for him.

SHOP DRAWINGS:

Submit for approval eight sets of manufacturers shop drawings of all major items of equipment and all items requiring coordination between contractors. Before submitting shop drawings and material lists, the contractor shall verify that all equipment submitted is mutually compatible and suitable for the intended use, and shall fit the available space and allow ample room for maintenance. The Engineer's checking and subsequent approval of such shop drawings shall not relieve the contractor from responsibility for errors in dimensions, details, size of members, or quantities; or omissions of components or fittings; or for coordinating items with actual building conditions. Provided any needed wiring diagrams.

Catalog data must have the items or model number clearly marked and all accessories indicated. Mark out all inapplicable items.

OPERATION AND MAINTENANCE INSTRUCTIONS:

Submit to the architect three copies each of material for maintenance and operation instruction manuals, appropriately bound into manual form including approved copies of the following, revised if necessary to show system and equipment as actually installed:

- Manufacturers Catalog Sheets
- Wiring Diagrams
- Maintenance instructions
- Operating instructions
- Parts Lists

Contractor shall also provide adequate verbal instructions of system operation to owner's representative at the termination of the work.

GUARANTEE:

Each contractor shall guarantee all equipment, apparatus, materials, and workmanship entering into this contract to the best of its respective kind and shall replace all parts at his own expense, which are proven defective within one year from final acceptance of the work by the Engineer. The effective date of completion of the work shall be the date of the Engineer's Statement of Substantial Completion. Items of equipment which have longer guarantees, as called for in

these specifications, shall have warranties and guarantees completed in order, and shall be in effect at the time of final acceptance of the work by the Engineer. The Contractor shall present the Engineer with such warranties and guarantees at the time of final acceptance of the work. The Engineer shall then submit these warranties, etc. to the Owner. Refer to other sections for any special or extra warranty requirements.

RECORD DRAWINGS:

Each Contractor shall insure that any deviations from the Design are as they occur recorded in red, erasable pencil on record drawings kept at the jobsite. The Engineer shall review the record documents from time to time to insure compliance with this specification. Compliance shall be a contingency of final payment. Pay particular attention to the location of under floor sanitary and water lines, shut-off valves, cleanouts and other appurtenances important to the maintenance and operation of Mechanical Systems. Also, pay particular attention to Deviations in all exterior utilities. Keep information in a set of drawings set aside at the job site especially for this purpose and deliver to the Engineers the originals and three (3) copies of the record drawings upon completion of the work. Delivery of these documents will be contingent of final payment.

QUALIFICATIONS OF WORKMEN:

All mechanical work shall be accomplished by qualified workmen competent in the area of work for which they are responsible. HVAC Contractors shall be licensed as master HVAC mechanics in accordance with the laws of the State of Kentucky.

All plumbing work shall be accomplished by Journeymen Plumbers under the direct supervision of a Master Plumber as defined and clarified under Kentucky State Plumbing Law Regulations and Code. Proof and Certification may be requested by the Engineer.

All sheet metal, insulation and pipe fitting work shall be installed by workmen normally engaged or employed in these respective trades.

All electrical work shall be installed only by competent workmen under direct supervision of a fully qualified Electrician.

CONDUCT OF WORKMEN:

Each Contractor shall be responsible for the conduct of all workmen under his supervision. Misconduct on the part of any workman to the extent of creating a safety hazard, or endangering the lives and property of others, shall result in the prompt relief of that workman. Bringing on site alcoholic beverages or other intoxicants, narcotics, barbiturates, hallucinogens or debilitating drugs; weapons, knives, and blades not required as a tool, is strictly forbidden.

ROUGH-IN:

Coordinate without delay all roughing-in with general construction. All piping, conduit, rough-in shall be concealed except in unfinished areas and where otherwise shown.

CONCRETE BASES:

Each Contractor shall be finally responsible for the provisions of all concrete work required for the installation of any of his systems or equipment. He may, at his option, arrange with the others to provide the work. This option, however, will not relieve the Contractor of his responsibilities relative to dimensions, quality or workmanship, locations, etc.. In the absence of other concrete specifications, all concrete related to Mechanical work shall be 3000 psi

minimum compression strength at 28 days curing and shall conform to the standards of the American Concrete Institute Publication AC1-318.

Contractor shall furnish concrete bases for his equipment where indicated on the drawings. Concrete housekeeping pads shall be minimum 4" thick, reinforced with 6 X 6 wire mesh, and have chamfered edges.

ACCESSIBILITY:

The Contractor shall locate and install all equipment so that it may be serviced, and maintained as recommended by the manufacturer. Allow ready access and removal of the entire unit and, or parts such as valves, filters, fan belts, motors, prime shafts, etc.

Provide locking access doors in ceilings, walls, etc. where indicated or required for access or maintenance to all concealed valves and equipment installed under this section. Doors shall have concealed hinges and anchor straps; manufactured by Milcor, Zurn, Titus, or equal. Obtain architect's approval of type and locations before ordering. Turn over (4) sets of keys to the Using Agency upon completion.

ELECTRICAL WIRING:

All control and interlock conduit and wiring for mechanical systems is the responsibility of the Mechanical Contractor; however, he may choose to hire an electrician to perform this work.

All control wiring shall be #14 minimum gage and installed in 1/2" minimum conduit. Wiring shall be in full conformance with NFPA 70, National Electric Code.

REQUIRED CERTIFICATE:

Upon completion of the project, the Contractor shall deliver all plumbing system and other inspection certificates acquired during the course of the project to the Owner for their records. The Contractor shall upon completion of the Final Punch list, deliver to Architect and Engineer a written certification that all systems and work has been completed in compliance with the plans and specifications. The Contractor also shall deliver over to the Owner all required maintenance manuals and phone numbers of the equipment suppliers. The delivery of these documents and certifications will be required prior to final payment and release of retainage.

INDEMNIFICATION:

The Contractor (s) shall hold harmless and indemnify the Engineer, employees, officers, agents and consultants from all claims, loss, damage, actions, causes of actions, expenses and/or liability resulting from, brought for, or on account of any personal injury or property damage received or sustained by any person, persons, (including third parties), or any property growing out of, occurring, or attributable to any work performed under or related to this contract, resulting in whole or in part from the negligence of the Contractor, and subcontractor, any employee, agent or representative.

END OF SECTION

SECTION 15040

EXCAVATION, TRENCHING, BACKFILLING AND GRADING

DESCRIPTION OF WORK:

Excavation and Backfilling:

Do all excavation of all materials encountered including rock required for work under this section. Backfill all trenches, tamping well in 6" layers. System shall be tested, made tight and accepted before backfill. Remove from premises all excess material not used in backfilling. Repair all concrete walks, sidewalks, drives, paving, etc. damaged. Repair materials shall generally match existing construction. All backfilling and repairing shall meet all requirements of the city and others having jurisdiction. Repair work shall be thoroughly first class.

Extent of earthwork is to be determined from work indicated on the drawings.

Backfilling of trenches is included as part of this work.

QUALITY ASSURANCE:

Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

JOB CONDITIONS:

Site Information: Complete data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn from any available data. Classification of Rock: Unclassified.

Should uncharted, or incorrectly charted piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

Provide minimum of one week notice to Architect/Engineer and Owner, and receive written notice to proceed before interrupting any utility.

Use of Explosives:

The use of explosives is **not** permitted.

Protection of Persons and Property: No open excavations shall be left overnight.

Protect structures, utilities, retaining walls, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

SOIL MATERIALS:

Definitions:

Suitable Soil: Soil deemed suitable by the Engineer.

Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, natural or crushed sand.

Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100% passing a 1 ½" sieve and not more than 5% passing a No. 4 sieve.

Backfill and Fill Materials: Satisfactory soil materials free of clay, rock or gravel larger than 2" in any dimension, debris waste, frozen materials, vegetable and other deleterious matter.

EXCAVATION:

Coordinate the temporary removal of any security gates with the penal facility; temporary barricades shall be provided as directed by the Using Agency to maintain facility population control.

Excavation consists of removal and disposal of material encountered when establishing required piping elevations.

Excavation Classifications: The trenching and excavation specified in this section shall be Unclassified. All rock encountered in the installation of piping and conduits shall be removed at no increase in contract price.

Stability of Excavations: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.

Maintain sides and slopes of excavations in safe condition until completion of backfilling.

Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.

Dewatering: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

Dispose of excess soil material and waste material as herein specified.

Excavation for Trenches: Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room.

Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze-ups.

Where rock is encountered, carry excavation 6" below required elevation and backfill with a 6" layer of crushed stone or gravel prior to installation of pipe.

For pipes or conduit 5" or less in nominal size and for flat-bottomed multiple duct conduit units, do not excavate beyond indicated depths. Hand excavate bottom out to accurate elevations and support pipe or conduit on undisturbed soil.

For pipes or conduit 6" or larger in nominal size, tanks and other mechanical/electrical work indicated to receive subbase, excavate to subbase depth indicated, or, if not otherwise indicated, to 6" below bottom of work to be supported.

Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.

Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F. (1°C).

COMPACTION:

General: Control soil compaction during construction providing minimum percentage of density specified for each area classification.

Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum dry density for soils which exhibit a well-defined moisture density relationship determined in accordance with ASTM D 698; and not less than the following percentages of relative density, determined in accordance with ASTM D 2049, for soil which will not exhibit a well-defined moisture-density relationship.

Compact top 6" of subgrade and each layer of backfill or fill material at 90% maximum dry density.

Moisture Control: When subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.

Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

BACKFILL AND FILL:

General: Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.

In excavations, use satisfactory excavation or borrow material.

Under piping and conduit, use subbase material where subbase is indicated under piping or conduit; shape to fit bottom 90° of cylinder.

Backfill excavations as promptly as work permits, but not until completion of the following:

1. Inspection, testing, approval, and recording locations of underground utilities.
2. Removal of shoring and bracing, and backfilling of voids with satisfactory materials.
3. Removal of trash and debris.

Placement and Compaction: Place backfill and fill materials in layers not more than 8” in loose depth for material compacted by heavy compaction equipment, and not more than 4” in loose depth for material compacted by hand operated tampers.

Before compaction, moisten each layer as necessary to provide suitable moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

MAINTENANCE:

Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

Settling: Where settling is measurable or observable at excavated areas 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 surface or finish to match adjacent work, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

DISPOSAL OF EXCESS AND WASTE MATERIALS:

Remove excess excavated material, trash, debris and waste materials and dispose of it off Owner’s property.

END OF SECTION

SECTION 15400
PLUMBING

QUALITY ASSURANCE:

Plumbing Code Compliance: Comply with applicable portions of Kentucky State Plumbing Code and pertaining to plumbing materials, construction and installation of products. Also comply with all state and local codes having jurisdiction. No work shall begin until the Contractor has approved plumbing plans. The Contractor is responsible for installing the indicated systems in accordance with code, therefore any modifications to the project required by the Division of Plumbing shall be considered as part of this project and shall be made at no increase in contract price.

DELIVERY STORAGE, AND HANDLING:

Except for concrete, hub-and-spigot, clay, and similar units of pipe, provide factory-applied plastic end-caps on each length of pipe tube. Maintain end-caps through shipping, storage and handling as required to prevent pipe-end damage and eliminate dirt and moisture from inside of pipe and tube.

Piping shall be stored outside of the facility until building is enclosed, then the contractor shall store pipe and tube inside and protected from weather.

Protect flange and fittings from moisture and dirt by inside storage and enclosure, or by packaging with durable, waterproof wrapping.

SUBMITTALS:

Product Data: Submit catalog cuts, specifications, installation instructions, and dimensioned drawings for each type of valve, specialty, etc. Include pressure drop curve or chart for each type and size of equipment.

UTILITY CONNECTIONS

This contractor shall provide all utility connections required and indicated on the drawings; and all interior or exterior connections to "mains" and existing service lines shall be installed complete and in strict compliance with the requirements of the codes having jurisdiction and the serving municipality. All service lines and connection points shall be verified in the field by this contractor. This contractor shall provide all service piping and accessories required to complete connection.

PLUMBING PIPING MATERIALS:

Domestic water: All domestic water piping installed below base slab, or below grade, shall be type "K" soft temper tubing with flared copper fittings and connections, or type "K" hard temper copper tubing with conventional wrought copper fittings and silver solder (Silfos)

joints. Care shall be taken to install as few underground copper piping joints as is possible. All domestic water piping installed below grade shall have 36" minimum cover.

All piping for hot and cold water above the slab, within the building, shall be type "L" hard temper copper tube with wrought copper fittings and soldered connections made up with lead free solder equal in performance to 95/5 solder.

Soil and Waste: All soil and waste piping above ground and inside the building shall be standard weight cast iron soil and pipe fittings. "No-hub" system is permitted above ground where allowed by code. All soil and waste piping under the base slab and to points noted outside the building wall shall be standard weight cast iron soil pipe and fittings. "No-hub" waste piping is **not** permitted below base slab. The use of Schedule 40 PVC plastic piping and solvent joined fittings in walls, toilet rooms and below base slab is permitted.

Plumbing Vents: All vent piping shall be standard weight cast iron soil pipe with cast iron drainage fittings. Vent all fixtures and conceal pipe in partitions and above ceilings. "No-hub" system is permitted above base slab (not below slab) where allowed by code. Under no circumstances will PVC be permitted to run about ceilings in the return air plenums.

Condensate Waste: Condensate waste piping above ceiling from the interior HVAC units shall be Type "M" copper with wrought fittings. Sweat joints with 95/5 solder. Any interior condensate lines shall be insulated as specified in 15250.

PIPING INSTALLATION:

Pipe shall be accurately cut from job measurements and shall be neatly aligned, securely connected, and properly supported. Piping shall be thoroughly cleaned before installation. Provide pipe sleeves where piping passes through structure. Threaded, welded, and soldered joints shall be made in a workmanlike manner according to good pipe fitting practices. Welding shall be performed by a certified welder.

All piping penetrating the roof shall be weather sealed with Pate Pipe Seals, installed conformance with manufacturer's instructions.

Cast iron pipe for sewers shall have joint connected with neoprene compression gaskets, Tyseal or equal. Lay pipe at uniform slope, free from sags, with hub end upstream. Support at each joint. Minimum slope shall be 1/8" per foot to conform to city code. Contractor shall field verify that installation will tie in to the indicated sewer connection elevation point prior to beginning installation. If the waste line outfall has a conflict, then contractor shall notify engineer, so alternate routing may be worked out.

Locate piping runs, except as otherwise indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details and notations or, if not otherwise indicated, run piping in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold piping close to walls,

overhead construction, columns and other structural and permanent-enclosure elements of building; limit clearance to 1/2" where furring is shown for enclosure or concealment of piping, but allow for insulation thickness, if any. Where possible, locate insulated piping for 1.0" clearance outside insulation. Wherever possible in finished and occupied spaces, conceal piping from view, by locating in column enclosures, in hollow wall construction or above suspended ceilings; do not encase horizontal runs in solid partitions, except as indicated.

Electrical Equipment Spaces: Do not run piping over electrical panels or other electronic equipment spaces and enclosures.

Thread pipe in accordance with ANSI B2.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound, or pipe joint tape (Teflon) where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave not more than three threads exposed.

Braze copper tube-and-fitting joints where indicated, in accordance with ANSI B31.

Solder copper tube-and-fitting joints where indicated, in accordance with recognized industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in manner which will draw solder full depth and circumference of joint. Wipe excess solder from joint before it hardens.

Ferrous pipe hangers shall be Fee & Mason Figure 215 or equal Unistrut malleable iron split ring hanger; copper pip hangers shall be Figure 361 cast brass with plated adjuster. No perforated strap iron hangers will be permitted. Fee & Mason #400 "Auto-Grip" type hangers are an acceptable alternative hanger. Concrete inserts, where required, shall be Unistrut, Midwest, or Truscon. Hangers shall be spaced at ten foot intervals or less, as required to avoid swag, prevent vibration, and allow accurate leveling or grading. Vertical piping shall be supported by Fee & Mason Figure 241 or equal clamp for ferrous piping, and Figure 368 for copper. Provide sheet metal saddles for insulated piping.

Do not use wire or perforated metal to support piping, and do not support piping from other piping, ductwork or other supported mechanical or electrical items. Install hangers and supports to provide indicated pipe slopes.

Where dissimilar metal piping are joined together, a dielectric coupling shall be used.

PIPING STERILIZATION:

Sterilize the entire hot and cold water piping system with solution containing not less than 50 PPM available chlorine. Solution shall remain in the system a minimum of 24 hours, with each valve being operated several times during the period. After completion, flush system with city water until chlorine residual is lowered to incoming city water level.

TESTING:

All water piping shall be tested with 25 PSI over static water pressure but not less than 100 PSI hydrostatic pressure. All waste piping shall be tested with all stacks filled with water, and any other tests required by the Plumbing Inspector. All piping shall be tested before any insulation installed, and before backfill, and shall be subject to the above pressure for an uninterrupted period of not less than 24 hours. All lines, joints, flanges, valve stems, etc., shall be leak tight.

General: Provide temporary equipment for testing, including pump and gages. Test piping system before insulation is installed. Remove control devices before testing. Test each natural section of each piping system independently, but do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating. Fill each section with water and pressurize for indicated pressure and time.

Observe each test section for leakage at end of test period. Test fails if leakage is observed or if pressure drop exceeds 5% of test pressure.

Repair piping systems sections which fail required piping test, by disassembly and re-installation, using new materials to extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.

Drain test water from piping systems after testing and repair work has been completed.

CLEANOUTS:

Cleanouts shall be installed at points as noted on the drawings, as well as at the foot of each soil, waste or interior downspout stack, minimum every 50 feet in horizontal soil and waste lines, and at other points as required for easy system maintenance. Cleanouts shall be full size of the pipe up to 4", and 4" size for pipe above 4" size. Grease all cleanout plugs.

Unless indicated otherwise on the Drawings, Cleanouts must be as follows:

All **floor cleanouts** shall be Jay R. Smith #4051 series, coated cast iron, with square Nikaloy top, hub outlet with gasket, of sizes required. It shall be the responsibility of this contractor to determine the type of floor covering to be used at each cleanout location, and to rough-in and install each cleanout flush with the finished floor construction.

All **wall cleanouts** shall be Jay R. Smith #4472 series, with round stainless steel access cover, center screw and recessed bronze tapped plug, of sizes required.

All **cleanouts for installation exterior to the building** where required by the drawings or code, shall be Jay R. Smith #4237-U, full size of line, cast iron, hub outlet, heavy duty round cast iron tractor cover with vandal proof screw. Each exterior cleanout shall be embedded in a 12" x 12" x 12" block or concrete, flush with finished grade.

Approved equivalent Josam, Zurn, or Wade is acceptable.

PLUMBING VALVES AND STRAINERS:

Gate Valves: 2½" and smaller, Jenkins Figure 47-U bronze rising stem with screwed ends; 3" and larger, Jenkins Figure 651-A iron body, bronze trimmed, OS & Y, rising stem, flanged.

Check Valves: 2½" and smaller, Jenkins Figure 92-A bronze body with screwed ends; 3" and larger, Jenkins Figure 624 iron body, bronze trim, flanged.

Strainers: 2½" and smaller, Crane #988-½ iron body, screwed ends; 3" and larger, Crane #989-½ iron body, flanged.

Drain Valves: American-Standard #4224.028 with ¾" hose thread outlet.

Equivalent Jenkins, Crane, Nibco, Hammond, or Mueller valves will be acceptable.

Copper unions shall be Streamline or equal cast bronze sweat type with ground joint. Ferrous to copper unions shall be Universal Controls or equal dielectric type with threaded nylon insert.

Install valves where required for proper operation of piping and equipment, including valves in branch lines where necessary to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary. Install shut-off valves for each piece of plumbing equipment.

Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward for horizontal plane unless unavoidable. Install valve drains with hose end adapter for each valve that must be installed with stem below horizontal plane.

Water Backflow Prevention:

This contractor shall furnish and install a backflow preventer (BFP) immediately downstream from the point of water service entry.

BFP shall be Watts #709 or approved equal Wilkins, double check valve type with intermediate relief valve, bronze body with stainless steel trim, bronze ball valve shut-offs on inlet and outlet, and bronze strainer with stainless steel screen and cleanout. Unit shall be suitable for 175 psi working pressure.

END OF SECTION

SECTION 15440
PLUMBING FIXTURES AND EQUIPMENT

Submittals:

Product Data: Submit manufacturer's specifications for plumbing fixtures, equipment and trim, including catalog cut of each fixture type and trim item furnished, roughing-in dimensioned drawings, templates for cutting substrates; fixture carriers and installation instructions.

Product Delivery, Storage and Handling:

Deliver plumbing fixtures individually wrapped in factory-fabricated containers.

Handle plumbing fixtures carefully to prevent breakage, chipping and scoring the fixture finish. Do not install damaged plumbing fixtures; replace and return damaged units to equipment manufacturer

Plumbing Fixtures:

General: Provide factory-fabricated fixtures of type, style and material indicated. For each type fixture, provide fixture manufacturer's standard trim, carrier, seats and valves as indicated by their published product information; either as designed and constructed, or as recommended by the manufacturer, and as required for a complete installation. Where type is not otherwise indicated, provide fixtures complying with governing regulations.

Furnish and install fixtures as scheduled, equal to Kohler American-Standard, Stern-Williams or Crane plumbing fixtures. All fixtures shall be of same manufacturer where possible. Fixtures shall be set firm and true, connected to all required piping services ready to use; all fixtures shall be left clean.

Plumbing Fittings, Trim and Accessories:

Water Outlets: At locations where water is supplied (by manual, automatic or remote control), provide commercial quality faucets, valves, or dispensing devices, of type and size indicated, and as required to operate as indicated. Include manual shutoff valves and connecting stem pipes to permit outlet servicing without shutdown of water supply piping systems.

Vacuum Breakers: Provide with flush valves where required by governing regulations, including locations where water outlets are equipped for hose attachment.

P-Traps: Include adjustable and removable P-traps where drains are indicated for direct connection to drainage system.

Carriers: Provide carriers indicated, or if not indicated, provide cast-iron supports for fixtures of either graphite gray iron, ductile iron, or malleable iron as required.

Fixture Bolt Caps: Provide manufacturer's standard exposed fixture bolt caps finished to match fixture finish.

Escutcheons: Where fixture supplies and drains penetrate walls in exposed locations, provide chrome plated cast-brass escutcheons with set screw.

All faucets, stops and fittings must be of one manufacturer with interchangeable parts, unless otherwise specified.

Inspection and Preparation:

Examine roughing-in work of domestic water and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors and substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping, and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected.

Install plumbing fixtures of types indicated where shown and at indicated heights; in accordance with fixture manufacturer's written instructions, roughing-in drawings, and with recognized industry practices. Ensure that plumbing fixtures comply with requirements and serve intended purposes. Comply with applicable requirements of the Kentucky State and local codes pertaining to installation of plumbing fixtures.

Fasten plumbing fixtures securely to indicated supports or building structure; and ensure that fixtures are level and plumb. Secure plumbing supplies behind or within wall construction so as to be rigid, and not subject to pull or push movement.

Calk joint between fixture and wall or floor with elastomeric sealant. Color of sealant to match fixture.

Clean and Protect:

Clean plumbing fixtures of dirt and debris upon completion of installation.

Protect installed fixtures from damage during the remainder of the construction period.

Field Quality Control:

Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.

Inspect each installed unit for damage to finish. If feasible, restore and match finish to original at site; otherwise remove fixture and replace with new unit. Remove cracked or dented units and replace with new units.

END OF SECTION

SECTION 15740
HVAC EQUIPMENT AND TERMINAL UNITS

QUALITY ASSURANCE:

Manufacturers: Firms regularly engaged in manufacturer of terminal units, of types and sizes required, whose projects have been in satisfactory use in similar service for not less than 5 years.

ARI Compliance: Test and rate heat pump units in accordance with Air Conditioning and Refrigeration Institute (ARI) Standards.

UL or ETL Compliance: Construct and install heat pump units in compliance with applicable standards.

SUBMITTALS:

Shop Drawings: Submit assembly type shop drawings showing unit dimension, construction details, and field connection details.

Maintenance Data: Submit maintenance instructions, including lubrication instructions, filter replacement, motor, and drive replacement, and spare parts list. Include this data in maintenance manuals.

EXHAUST FANS (EF):

Centrifugal fan, direct or belt driven, up-blast or down-blast, as scheduled. Jenn-air, Penn, Greenheck, Acme, Aerolator, Aerovent, Dayton, Cook or equal. Provide aluminum, or galvanized steel housings as scheduled. Provide square base. Provide permanent split-capacitor type motor for direct driven fans; capacitor-start, induction run type motor for belt driven fans. Provide insulated metal curbs to fit base of roof ventilator, height as indicated, and type to suit roof construction.

Dampers: Provide gravity actuated discharge dampers.

HEAT PUMP CONDENSING UNITS (HP):

The exterior condensing units shall be Carrier, Trane, York, McQuay, Lennox, **or approved equal**. Provide split system heat pump service or cooling only service as listed on the drawings. Units shall be UL or ARI listed.

Provide unit with compressor mounted on vibration isolators, suction accumulator, loss of charge protection, high pressure cut-out, low suction pressure protection, external service valves, test port, and liquid line filter-drier. Compressor shall be provided with internal fusing.

Provide unit with reversing valve, low voltage controls, defrost controls, crankcase heaters, and required transformers.

Provide unit with heavy ga. chassis and weather resistant coating, and full charge of R-22 refrigerant.

Provide unit with accessories and additional requirements as listed on the drawings.

VERTICAL AIR HANDLER UNITS (AH):

Provide vertical heat pump air handling unit Carrier, Trane, McQuay, York, Lennox **or equal** as scheduled on the drawings. Orientations shall be upflow as indicated. Unit construction shall be listed by U.L. Filter and return air inlets shall be on the side of the unit, or a return air plenum must be provided for the base.

Unit casing shall be heavy gauge steel with baked enamel finish. The heat exchanger section shall be insulated, and the filters shall be 1" replaceable.

Unit shall be provided with standard factory controls. Provide "auto-on-off" automatic change-over thermostat. Provide all control transformers and relays as required.

Provide refrigerant cooling coils of copper tubes and aluminum fins. Coil casing shall be insulated, and shall be provided with drain pan and condensate pipe connections. Capacity control by factory installed expansion valve.

Electric heaters shall meet the performance listed on the Drawings at rated voltage. Provide heater with magnetic contactors, and thermal overload protection.

INSTALLATION:

General: Install HVAC units as indicated and in accordance with manufacturer's installation instructions.

Uncrate units and inspect for damage. Verify that nameplate data corresponds with unit designation.

Protect units with protective covers during balance of construction.

Suspend units on vibration isolators and make duct connections with flexible duct connectors.

ADJUSTMENT AND CLEANING OF TERMINAL UNITS:

General: After construction is completed, including painting, clean unit exposed surfaces, vacuum clean terminal coils and inside of cabinets.

Retouch any marred or scratched surfaces of factory finished cabinets, using finish materials furnished by manufacturer.

END OF SECTION

SECTION 15850
DUCTWORK AND AIR HANDLING SPECIALTIES

QUALITY ASSURANCE:

SMACNA Compliance: Comply with applicable portions of Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) HVAC duct construction standards.

Industry Standards: Comply with American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc. (ASHRAE) recommendations pertaining to construction of duct accessories, except as otherwise indicated.

UL Compliance: Construct, test, and label fire dampers in accordance with Underwriters Laboratories (UL) Standard 555 "Fire Dampers and Ceiling Dampers".

NFPA Compliance: Comply with applicable provisions of ANSI/NFPA 90A "Air Conditioning and Ventilating Systems", pertaining to installation of duct accessories.

SUBMITTALS:

Product Data: Submit manufacturer's data for each type of duct accessory, including dimensions, capacities, and materials of construction; and installation instructions.

Shop Drawings: The Contractor is instructed that prior to the fabrication or purchase of any ductwork, shop drawings on the ductwork layout for the entire building will need to be provided for the review of the Engineer indicating that the contractor has fully coordinated the sheet metal with the other trades and requirements of the project. The Contractor may at his option use the design drawings as his submittal with proposed changes, modifications, coordination notes written thereon. Submittal of the ductwork will be held as proof that the installing Contractor has certified that the ductwork systems may be installed and coordinated without conflicts with other building system/devices.

Submit assembly-type shop drawings for each type of duct assembly showing interfacing requirements with ductwork, and method of fastening or support.

FILTERS:

Filters shall be 1" thick throwaway type or as otherwise indicated. All air units shall have filters installed any time they are operated before final acceptance. Provide extra set of filters and install in units just before turning over building to owner. Manufactured by Duststop, Farr, Cambridge, or approved equal.

DUCTWORK:

Furnish and install all galvanized steel ductwork and housings as shown on drawings. All ducts shall be in conformance with current SMACNA Standards relative to gauge, bracing, joints, etc. Reinforce all housings and all ducts over 30" with 1/4" angles not less than 5'-6" on centers, and closer if required for sufficient rigidity to prevent vibration. Provide airtight joints and blade elbows. Support horizontal runs of duct on not to exceed 8'-0" centers from strap iron hangers.

All offsets in ducts of 45 degrees or more shall have turning vanes of same gauge as duct and shall be rigidly fastened with guide strips. Vanes in ducts over 30" deep shall be installed in multiple sections with vanes not over 30" long and shall be rigidly fastened.

Provide balancing dampers in all supply runouts, where shown on drawings and wherever necessary for complete control of air flow. Where access to dampers through a suspended ceiling is required, coordinate the proper location of the access doors. Provide "Spin-in" fitting with scoop-type extractor and double bearing volume dampers for all round duct branch takeoffs to individual air devices. Spin-in fittings shall be installed with a minimum of (5-6) five to six sheet metal screws regardless of manufacturer's recommended screw layout, and at least two (2) screws must catch at least one turn of the wire support.

Round or oval duct shall be spiral lockseam sheet metal, Semco, United, or equal, with smooth interior surface, with round duct gauges per the following table:

<u>SIZE</u>	<u>GAUGE</u>
14" & under	26
15" thru 26"	24
28" thru 36"	22
38" thru 50"	20
52" thru 60"	18

Fittings shall be welded prefabricated, 20 gauge for 36" fittings and under, 18 gauge for all larger sizes. All 90-degree tee's shall be conical type. Seal all joints in ductwork as recommended by SMACNA.

FLEXIBLE DUCT:

Flexible duct shall be Class 1, insulated type, polymeric liner with steel wire helix core duct, fiberglass insulation 1½" thick and outer fiberglass vapor barrier jacket. Flexible duct run shall not exceed 10 feet in length, and be installed in as straight a line as possible. Manufactured by Thermaflex "M-KE", Certainteed, Flexmaster. Secure to rigid ducts and to diffusers with plastic or metal bands and seal with hardcast.

Bend radius for flexible duct must not be less than (2) duct diameters.

DAMPERS

Low Pressure Manual Dampers: Provide dampers of single blade or multiblade type, constructed in accordance with SMACNA "Low Pressure Duct Standards". Volume dampers shall be opposed blade interlocking type, factory made by Ruskin, APC, Air Balance, **or approved equal**.

TURNING VANES:

Fabricated Turning Vanes: Provide fabricated turning vanes and vane runners, constructed in accordance with SMACNA "Low Pressure Duct Standards".

Manufactured Turning Vanes: Provide turning vanes constructed of 1½" wide curved blades as set at 1½" o.c., and set into side strips suitable for mounting in ductwork, per SMACNA Standards for low pressure duct.

DUCT HARDWARE:

Quadrant Locks: Provide for each damper, quadrant lock device on one end of shaft; and end bearing plate on other end for damper lengths over 12". Provide extended quadrant locks and end extended bearing plates for externally insulated ductwork.

DUCT ACCESS DOORS:

Construction: Construct of same or greater gate as ductwork served, provide insulated doors for insulated ductwork. Provide flush frames for uninsulated ductwork, extended frames for externally insulated duct. Provide one side hinged, other side with 1 handle type latch for doors 12" high and smaller, 2 handle type latches for larger doors.

All ductwork fire dampers not accessible from removal the ceiling grille shall be provided with an access door to access the linkage. All slot diffusers with fire dampers in the throat and sidewall grille penetrations shall have the connected ductwork supplied with an access door near the first damper. All fire damper access doors shall be permanently labeled on the exterior having letters not less than 0.5" in height reading "Fire Damper" in accordance with Code.

INSTALLATION:

Install duct accessories in accordance with manufacturer's installation instructions, with applicable portions of details of construction as shown in SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function.

Support ducts rigidly with suitable ties, braces, hangers, and anchors of type which will hold ducts true to shape and to prevent buckling.

Seal ductwork, to seal class recommended, and method prescribed in SMACNA "HVAC Duct Construction Standards - First Edition, 1985".

Complete fabrication of work at project as necessary to match shop fabricated work and accommodate installation requirements.

Locate ductwork runs, except as otherwise indicated, vertically and horizontally and avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, details and notations, or if not otherwise indicated, run ductwork in shortest route which does not obstruct unusable space or block access for servicing building and its equipment. Hold ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building. Limit clearances to 1/2" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. Wherever possible in finished and occupied spaces, conceal ductwork from view, by locating in mechanical shafts, hollow wall construction or above suspended ceilings. Coordinate layout with suspended ceiling and lighting layouts and similar finished work.

Where ducts pass through interior partitions and walls, work and wall openings shall be planned in advance to ensure that openings are properly sleeved or that the openings are constructed to match duct sizes. Conceal space between construction opening and duct over duct-plus-insulation with sheet metal flanges of same gage as duct. Overlap opening on 4 sides by at least 1½”.

Where ducts pass thru block walls, ensure that a lintel sized per the structural specifications is provided above penetration. Provide duct sleeve if opening does not closely match that of duct.

Install turning vanes in all rectangular supply, return and outside air duct turns 45 deg. or greater.

Coordinate duct installations with installation of accessories, dampers, equipment, controls and other associated work of ductwork system.

Support ductwork in manner complying with SMACNA “HVAC Duct Construction Standards – First Edition, 1985”.

CLEANING AND PROTECTION:

Clean ductwork internally, unit-by-unit as it is installed, of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration.

BALANCING:

Seal any leaks in ductwork that become apparent in balancing process.

END OF SECTION

SECTION 15870
OUTLETS AND INLETS

SUBMITTALS:

Product Data: Submit manufacturer's data on outlets and inlets including the following:

Schedule of outlets and inlets indicating drawing designation, room location, number furnished, model number, size and accessories furnished.

Data sheet for each type of outlet and inlet, and accessory furnished; indicating construction, finish, and mounting details.

Performance data for each type of outlet and inlet furnished, velocity traverse, throw and drop, and noise criteria ratings. Indicate selections on data.

Ratings are to be certified by ADC or AMCA.

PRODUCT DELIVERY, STORAGE, AND HANDLING:

Deliver outlets and inlets wrapped in factory fabricated fiberboard type containers. Identify on outside of container type of outlet or inlet and location to be installed. Avoid crushing or bending and prevent dirt and debris from entering and settling in devices.

Store outlets and inlets in original cartons and protect from weather and construction work traffic. Where possible, store indoors; when necessary to store outdoors, store above grade and enclose with waterproof wrapping.

CEILING AIR DIFFUSERS:

General: Except as otherwise indicated, provide manufacturer's standard ceiling air diffusers where shown; of size, capacity, direction of throw, and type indicated; constructed of materials and components as specified in this section and as required for complete installation.

Ceiling Compatibility: Provide diffusers with border styles that are compatible with adjacent ceiling systems, and that are specifically manufactured to fit into ceiling module with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems which will contain each type of ceiling air diffuser.

Opposed Blade: Adjustable opposed blade damper assembly, key operated from face of diffuser.

Diffuser Accessories:

Operating Keys: Tools designed to fit through diffuser face and operate volume control device and/or pattern adjustment.

Available Manufacturers: Subject to compliance with requirements, manufacturers offering diffusers which may be incorporated in the work include, but not limited to the following:

Anemostat Products Div., Dynamics Corp. of America
Carnes Co., Div. of Wehr Corp.
Metalaire
Price
Krueger Mfg. Co.

Tuttle & Bailey Div. of Interpace Corp.
Titus Co.

CEILING RETURN, EXHAUST AND TRANSFER AIR REGISTERS AND GRILLES:

General: Except as otherwise indicated, provide manufacturer's standard ceiling registers and grilles, where shown, of size, capacity and type indicated; constructed of materials and components as specified in this section; and as required for complete installation.

Ceiling Compatibility: Provide registers and grilles with border styles that are compatible with adjacent ceiling systems, and that are specifically manufactured to fit into ceiling module with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems which will contain each type of ceiling register or grille.

Available Manufacturers: Subject to compliance with requirements, manufacturers offering registers and grilles which may be incorporated in the work include, but are not limited to the following:

Anemostat Products Div., Dynamics Corp. of America
Carnes Co., Div. of Wehr Corp.
Metalaire
Price
Krueger
Titus Co.

INSPECTION:

Examine areas and conditions under which outlets and inlets are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

INSTALLATION:

General: Install all outlets and inlets as recommended by the manufacturer; in accordance with recognized industry practices; to insure that products serve intended functions.

Coordinate with other work, including ductwork and duct accessories, as necessary to interface installation of outlets and inlets with other work. Provide transition ductwork as required to mate to the device inlet/outlet.

END OF SECTION

SECTION 15910
ELECTRIC TEMPERATURE CONTROL SYSTEMS

DESCRIPTION OF WORK:

Extent of temperature control system work is indicated by drawings and schedules, and by requirements of this section.

Control Wiring, except for power wiring, necessary for electric-electronic temperature control systems, is work of this section.

GENERAL MATERIALS AND EQUIPMENT:

General: Provide electric-electronic temperature control products in sizes and capacities indicated, consisting of dampers, thermostats, clocks, sensors, controllers, and other components as required for complete installation. Except as otherwise indicated, provide manufacture's standard temperature information, designed and constructed as recommended by manufacturer. Provide electric-electronic temperature control systems with the following functional and construction features as indicated.

The Contractor shall provide all required relays, transformers, terminal strips, enclosures, wiring, etc. to ensure that the required control sequences are maintained. Fully coordinate with the equipment manufacturer all control requirements that involves relays to the motor starters.

FINAL ADJUSTMENT:

After completion of installation, adjust thermostats, motors and similar equipment provided as work of this section.

Instruct the Owner's representative in the operation and maintenance of all control systems and equipment. Provide a minimum of 4 hours of detailed instruction for the Owner's Representative.

THERMOSTATS MOUNTED IN EQUIPMENT OR FURNISHED BY MANUFACTURER:

Shall be thoroughly checked and placed in proper operation by the Contractor where such thermostats are found faulty. The Contractor shall verify the size, type and quantity that he requires to place the faulty equipment in proper operation.

END OF SECTION

SECTION 15990
TESTING, ADJUSTING, AND BALANCING

Refer to other sections of the Specifications for additional testing requirements.

QUALITY ASSURANCE:

Installer: A firm certified by Associated Air Balance Council (AABC) in those testing and balancing disciplines similar to those requires for this project.

Industry Standards: Comply with America Society of Heating, Refrigeration and Air Conditioning Engineers, Inc. (ASHRAE) recommendations pertaining to measurements, instruments and testing, adjusting and balancing, except as otherwise indicated.

SUBMITTALS:

Submit certified test reports signed by Test and Balance Supervisor who performed TAB work.

Include identification and types of instruments used and their most recent calibration date with submission of final test report.

JOB CONDITIONS:

Do not proceed with testing, adjusting, and balancing work until work has been completed and is operable. Ensure that there is no latent residual work still to be completed.

Do not proceed until work scheduled for testing, adjusting, and balancing is clean and free from debris, dirt and discharged building materials.

HVAC Testing, Adjusting and Balancing:

All equipment shall be adjusted to operate as intended by the specification. All bearings shall be lined up. Bearings that have dirt or foreign material in them shall be replaced with new bearings without additional cost to the owner. All thermostats and control devices shall be adjusted to operate as intended. Adjust burners, pumps, fans, etc. for proper and efficient operation. Certify to Engineer that all adjustments have been made and that system is operating satisfactorily. Adjust all supply outlets to supply the amount of air shown on the drawings. Further adjustments shall be made to obtain uniform temperature in all spaces. Calibrate, set, and adjust all automatic temperature controls. Check proper sequencing of all interlock systems, and operation of all safety controls.

Contractor shall employ the services of a testing and balancing firm to take test readings on all fans and units, and to adjust fan speeds to deliver specified amounts of air. Testing and balancing report logs shall be made showing all air supply quantities, fan and unit test readings, etc.; (3) three copies of the log shall be submitted to the Engineer before final inspection of the project and is necessary for final payment. Log shall be listed by unit, and shall additionally indicate unit horsepower, motor nameplate amps, and actual amps draw after all adjustments are completed. Also each room shall be listed with total exhaust, supply and return air quantities listed.

Patch holes in insulation, ductwork and housings, which have been cut or drilled for test purposes, in manner recommended by original installer.

Prepare a report of recommendation for correcting unsatisfactory mechanical performances when system cannot be successfully balanced; including, where necessary, modifications which exceed requirements of contract documents for mechanical work.

Retest, adjust and balance systems subsequent to significant system modifications, and resubmit test results.

END OF SECTION

SECTION 16005

SCOPE OF THE ELECTRICAL WORK

1. GENERAL

Each Electrical Contractor's attention is directed to Section 16010 – General Provisions, Electrical, and all other Contract Documents as they apply to his work.

2. SCOPE OF THE ELECTRICAL WORK

The Electrical work for this project includes all labor, materials, equipment, fixtures, excavation, backfill and related items required to completely install, test, place in service and deliver to the Owner complete electrical systems in accordance with the accompanying plans and all provisions of these specifications. The work shall primarily include, but is not limited to the following:

- A. New 208/120 volt, 3 phase, 4 wire panelboard. This includes coordination with existing building conditions in order to ensure that electrical service is established to new facility as part of this contract.
- B. All conduits, conductors, outlet boxes, fittings, etc.
- C. All power distribution equipment including panel boards, disconnect switches, fuses, contactors, starters, etc..
- D. All wiring devices and device plates.
- E. All light fixtures, lighting control systems (as required), and lamps.
- F. Electrical connection to all electrically operated equipment furnished and/or installed by others, including HVAC equipment.
- G. New Fire Alarm devices for new construction to have the capability of talking to the existing fire alarm system serving the existing facility.
- H. Inspection of electrical system by a licensed Electrical Inspector.
- I. Empty raceway system for the facilities telecom, data (computer network), and cable T.V. systems.
- J. Grounding, per NEC 250.
- K. All necessary coordination with electric utility company, and the telephone company to insure that work connections, that they are to provide, is accomplished.
- L. All necessary fees and cost for permits, inspections, work by utility companies, etc. The contractor shall contact the utility companies prior to submitting a bid to determine exactly these charges will be.

- M. Prior to submitting a bid, the Contractor shall contact all serving utility companies to determine exactly what each utility company will provide and exactly what is required of the Contractor and shall include such requirements in his base bid.

END OF SECTION

SECTION 16010
GENERAL PROVISIONS – ELECTRICAL WORK

1. GENERAL

- A. The Instructions to Bidders, General and Special Conditions, and all other contract documents shall apply to the Electrical Contractor's work as well as to each of his Sub Contractor's work. Each Contractor is directed to familiarize himself in detail with all documents pertinent to this Contract. In case of conflict between these General Provisions and the General and/or Special Conditions, the affected Contractor shall contact the Engineer for clarification and final determination.
- B. Each Contractor shall be governed by any alternates, unit prices and Addendums or other required or implied contract instrument insofar as they may affect his part of the work.
- C. The work included in this division consists of the furnishing of all labor, equipment, transportation, excavation, supplies, material and appurtenances and performing all operations necessary for the satisfactory installation of complete and operating Electrical Systems indicated on the drawings and/or specified herein.
- D. Any materials, labor, equipment or services not mentioned specifically herein which may be necessary to complete or perfect any part of the Electrical Systems in a substantial manner, in compliance with the requirements stated, implied, or intended in the drawings and specifications, shall be included as part of this Contract. With submission of bid, the Contractor shall give written notice of any materials or apparatus believed inadequate or unsuitable; in violation of laws, ordinances, rules or regulations of authorities having jurisdiction; and any necessary items of work omitted. In the absence of such written notice, it shall be understood that the Contractor has included the cost of all required items in his bid, and that he will be responsible for the approved satisfactory functioning of the entire system without extra compensations.
- E. It is not the intent of this section of the specifications (or the remainder of the contract documents) to make any Contractor, other than the General Contractor (or Construction Manager, if applicable), responsible to the Owner, Architect and Engineer. All transactions such as submittal of shop drawings, claimant of work under the various sections shall be the responsibility of the General Contractor or Construction Manager, if applicable.
- F. It is the intent of this Contract to deliver to the Owners a "like new" project once work is complete. Although plans and specifications are complete to the extent possible, it shall be responsibility of the Contractors involved to remove and/or relocate or re-attach any existing or new systems which interfere with new equipment or materials to be installed by other trades without additional cost to the Owner.
- G. In general, whenever utilities are interrupted, either deliberately or accidentally, the Contractor shall work continuously to restore said service. The Contractor

shall provide tools, materials, skilled journeymen of his own and other trades as necessary and premium time as needed, all without requests for extra compensation to the Owner, unless other arrangements have been made through the Owner and Architect.

H. Definitions:

- (1) Electrical Contractor - Any Contractor whether bidding or working independently or under the supervision of a General Contractor, that is: the one holding the Prime Contract, and/or Construction Manager and who installs any type of Electrical work, such as: power, lighting, television, telecommunications, data, fiber optic, intercom, fire detection and alarm, security, video, underground or overhead electrical, etc.
- (2) Electrical Sub-Contractor - Each or any Contractor contracted to, or employed by, the Electrical Contractor for any work required by the Electrical Contractor.
- (3) Engineer - The Consulting Mechanical-Electrical Engineers either consulting to the Owner, Architect, other Engineers, etc.
- (4) Architect - The Architect of Record for the project, if any.
- (5) Furnish - Deliver to the site in good condition.
- (6) Provide - Furnish and install in complete working order.
- (7) Install - Install equipment furnished by others in complete working order.
- (8) Contract Documents - All documents pertinent to the quality and quantity of all work to be performed on the project. Includes, but not limited to: Plans, Specifications, Addenda, Instructions to Bidders, (both General and Sub-Contractors), Unit Prices, Shop Drawings, Field Orders, Change Orders, Cost Breakdowns, Construction Manager's Assignments, Architect's Supplemental Instructions, Periodical Payment Requests, etc.

- I. Note: Any reference within these specifications to a specific entity, i.e., "Electrical Contractor" is not to be construed as an attempt to limit or define the scope of work for that entity or assign work to a specific trade or contracting entity. Such assignments of responsibility are the responsibility of the Contractor or Construction Manager that is holding the prime contract, unless otherwise provided herein.

2. INTENT

- A. It is the intention of these specifications and all associated drawings to call for finished work, tested, and ready for operation. Wherever the word "provide" is used, it shall mean "furnish and install complete and ready for use."

- B. Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work, the same as if herein specified or shown.

3. ELECTRICAL DRAWINGS AND SPECIFICATIONS

- A. The drawings are diagrammatic only and indicate the general arrangement of the systems and are to be followed insofar as possible. If deviations from the layouts are necessitated by field conditions, detailed layouts of the proposed departures shall be submitted in writing to the Engineer for approval before proceeding with the work. The Contract Drawings are not intended to show every vertical or horizontal offset which may be necessary to complete the systems. Contractors shall, however, anticipate that additional offsets may be required and submit their bid accordingly.
- B. The drawings and specifications are intended to supplement each other. No Contractor or supplier shall take advantage of conflict between them, or between parts of either, but should this condition exist, the Contractor or supplier shall request a clarification of the condition at least ten days prior to the submission of bids so that the condition may be clarified by Addendum. In the event that such a condition arises after work is started, the interpretation of the Engineer shall be the determining factor. In all instances, unless modified in writing and agreed upon by all parties thereto, the Contract to accomplish the work shall be binding on the affected Contractor.
- C. The drawings and specifications shall be considered to be cooperative and complimentary and anything appearing in the specifications which may not be indicated on the drawings or conversely, shall be considered as part of the Contract and must be executed the same as though indicated by both.
- D. This Contractor shall make all his own measurements in the field and shall be responsible for correct fitting. He shall coordinate this work with all other branches of work in such a manner as to cause a minimum of conflict or delay.
- E. The Engineer shall reserve the right to make minor adjustments in location of conduit, fixtures, outlets, switches, etc., where he considers such adjustments desirable in the interest of concealing work or presenting a better appearance.
- F. Each Contractor shall evaluate ceiling heights called for on Architectural Plans. Where the location of Electrical equipment may interfere with ceiling heights, the Contractor shall call this to the attention of the Engineer in writing prior to making the installation. Any such changes shall be anticipated and requested sufficiently in advance so as to not cause extra work on the part of the Contractor or unduly delay the work.
- G. Should overlap of work between the various trades become evident, this shall be called to the attention of the Engineer. In such event neither trade shall assume that he is to be relieved of the work which is specified under his branch until instructions in writing are received from the Engineer.

- H. The Electrical drawings are intended to show the approximate location of equipment, materials, etc. Dimensions given in figures on the drawings shall take precedence over scaled dimensions and all dimensions whether given in figures or scaled shall be verified in the field. In case of conflict between small and large scale drawings, the larger scale drawings shall take precedence.
- I. The Electrical Contractor and his Sub Contractors shall review all drawings in detail as they may relate to his work (structural, architectural, site survey, mechanical, etc.). Review all drawings for general coordination of work, responsibilities, ceiling clearances, wall penetration points, chase access, fixture elevations, etc. Make any pertinent coordination or apparent conflict comments to the Engineers at least ten days prior to bids, for issuance of clarification by written addendum.
- J. Where on any of the drawings a portion of the work is drawn out and the remainder is indicated in outline, or not indicated at all, the parts drawn out shall apply to all other like portions of the work. Where ornament or other detail is indicated by starting only, such detail shall be continued throughout the courses or parts in which it occurs and shall also apply to all other similar parts of the work, unless otherwise indicated.
- K. Always check ceiling heights indicated on Architectural Drawings and Schedules and insure that these heights may be maintained after all mechanical and electrical equipment is installed. If a conflict is apparent, notify the Engineer in writing for instructions.

4. SHOP DRAWINGS

- A. Each Electrical Contractor shall submit to the Engineer, within thirty (30) days after the date of the Contract, eight (8) sets of shop drawings and/or manufacturer's descriptive literature on all equipment required for the fulfillment of his contract. Each shop drawing and/or manufacturer's descriptive literature shall have proper notation indicated on it and shall be clearly referenced so the specifications, schedules, light fixture numbers, panel numbers, etc., so that the Architect may readily determine the particular item the Contractor proposes to furnish. All data and information scheduled, noted or specified shall be noted in red on the submittals. The Contractor shall make any corrections or changes required and shall resubmit for final approval as outlined above. Approval of such drawings, descriptive literature and/or schedules shall not relieve the Contractor from responsibility of deviation from drawings or specifications unless they have, in writing, directed the Architect's attention to such deviations at the time of submission of drawings, descriptive literature and schedules; nor shall it relieve them from responsibility for errors of any nature in shop drawings, descriptive literature and schedules. The term "as specified" will not be accepted.
- B. If the Contractor fails to comply with the requirements set forth above, the Engineer shall have the option of selecting any or all items listed in the specifications or on the drawings; and the Contractor will be required to furnish all materials in accordance with this list.

- C. It shall be noted that approval of shop drawings by the Engineer applies only to conformance with the design concept of the project and general compliance with the information given in the contract documents. In all cases, the installing Contractor alone shall be responsible for furnishing the proper quantity of equipment and/or materials required, for seeing that all equipment fits the available space in a satisfactory manner and that piping, electrical and all other connections are suitably located.
- D. The Engineer's review and approval of shop drawings, schedules or other required submittal data shall not relieve the Contractor from responsibility for: the adaptability of the equipment or materials to the project; compliance with applicable codes, rules, regulations; information that pertains to fabrication and installation; dimensions and quantities; electrical characteristics; and coordination of the work with all other trades involved in this project. Nor shall it relieve him from responsibility for error in shop drawings or schedules.
- E. No final rough-in, connections, etc. shall be accomplished until approved equipment shop drawings are in the hands of the Contractors concerned. It shall be each Contractor's responsibility to obtain approved shop drawings and to make all connections, etc. in the neatest and most workmanlike manner possible. Each Contractor shall coordinate with all the other Contractors having any connections, roughing-in, etc. to the equipment.
- F. All shop drawings are to be reviewed and stamped by the Contractor prior to submission to the Engineer to ensure general compliance with the specified equipment.

NOTE: Any shop drawings received without being reviewed and stamped by the Contractor shall be returned Rejected without engineering review.

- G. In accord with the provisions specified hereinbefore, shop drawings, descriptive literature and schedules shall be submitted on each of the following:
- Panelboards
 - Light Fixtures
 - Disconnect Switches
 - Wiring Devices
 - Fire Alarm System Equipment
 - TVSS

5. SPECIAL WRENCHES, TOOLS AND KEYS

- A. Each Electrical Contractor shall provide, along with the equipment provided, any special wrenches or tools necessary to dismantle or service equipment or appliances installed by him. Wrenches shall include necessary keys, handles and operators for valves, cocks, etc. and keys to electrical panels, emergency generators, the alarm pull boxes and panels, etc. At least two of any such special wrench keys, etc. shall be turned over to the Engineer prior to completion of the project.

6. MAINTENANCE AND OPERATION MANUALS

A. Upon substantial completion of the project, the Electrical Contractor shall deliver to the Engineers (in addition to the required Shop Drawings) three (3) complete copies of operation and maintenance instructions and parts lists for all equipment provided. These documents shall be at least to include:

(1) Manufacturers Catalog Sheets.

(2) Detailed operating instructions.

(3) Detailed maintenance instructions including preventive maintenance schedules.

(4) Parts list(s) along with addresses and phone numbers indicating where parts may be purchased.

7. EXAMINATION OF SITE AND CONDITIONS

A. Each Contractor shall inform himself of all of the conditions under which the work is to be performed, the site of the work, the structure of the ground, the obstacles that may be encountered, the availability and location of necessary facilities and all relevant matters concerning the work. All Contractors shall carefully examine all Drawings and Specifications and inform themselves of the kind and type of materials to be used throughout the project and which may, in any way, affect the execution of his work.

B. Each Contractor shall fully acquaint himself with all existing conditions as to ingress and egress, distance of haul from supply points, routes for transportation of materials, facilities and services, availability of temporary or permanent utilities, etc. His work shall cover all expenses or disbursements in connection with such matters and conditions. Each Contractor shall verify all work shown on the drawings and conditions at the site, and shall report in writing to the Engineer ten days prior to bid, any apparent omissions or discrepancies in order that clarifications may be issued by written addendum. No allowance is to be made for lack of knowledge concerning such conditions after bids are accepted.

8. EQUIPMENT AND MATERIALS SUBSTITUTIONS OR DEVIATIONS

A. When any Contractor requests approval of substitute materials and/or equipment, and when under an approved formal alternate proposal, it shall be understood and agreed that such substitution, if approved, will be made without additional cost regardless of changes in connections, spacing, service, mounting, etc. In all cases where substitutions affect other trades, the Contractor offering such substitutions shall advise all such Contractors of the change and shall reimburse them for all necessary changes in their work. Any drawings, Specifications, Diagrams, etc., required to describe and coordinate such substitutions or deviations shall be professionally prepared at the responsible Contractor's expense. Special Note: Approval of Shop Drawings by the Engineer does not absolve the Contractor of this responsibility.

- B. Notwithstanding any reference in the specifications to any article, device, product, material, fixture, form, or type of construction by name, make, or catalog number, such reference shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. Each Contractor, in such cases, may, at his option, use any article, device, product, material, fixture, form, or type of construction which in the judgment of the Engineer is equivalent to that specified, provided the provisions of paragraph (A) immediately preceding are met. Substitutions shall be submitted to the Engineer a minimum of ten days prior to bid date for approval to bid in written form through addenda or other method selected by the Engineer. If prevailing laws of cities, towns, states or countries are more stringent than these specifications regarding such substitutions, then those laws shall prevail over these requirements.
- C. Wherever any equipment and material is specified exclusively only such items shall be used unless substitution is accepted in writing by the engineers.
- D. Each Contractor shall furnish along with his proposal a list of specified equipment and materials which he proposes to provide. Where several makes are mentioned in the Specifications and the Contractor fails to state which he proposes to furnish, the Engineer shall have the right to choose any of the makes mentioned without change in price.

9. SUPERVISION OF WORK

- A. Each Contractor and his Sub-Contractors shall personally supervise the work or have a competent superintendent that is approved by the Engineers on the project site at all times during progress of the work, with full authority to act for him in matters related to the project.

10. CODES, RULES, PERMITS, FEES, REGULATIONS, ETC.

- A. The Contractor shall give all necessary notices to the engineer before request for acceptance and final payment for the work.
- B. Ignorance of Codes, Rules, regulations, utility company requirements, laws, etc., shall not diminish or absolve Contractor's responsibilities to provide and complete all work in compliance with such.
- C. The Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus or drawings required in order to comply with all applicable laws, ordinances rules and regulations, whether or not shown on drawings and/or specified.
- D. All materials furnished and all work installed shall comply with the current edition of the National Electrical Codes, National Fire Codes of the National Fire Protection Association, the requirements of local utility companies, and with the requirements of all governmental agencies or departments having jurisdiction.
- E. All material and equipment for the electrical systems shall bear the approval label, or shall be listed by the Underwriters' Laboratories, Incorporated. Listings

by other testing agencies may be acceptable with written approval by the Engineer.

- F. All electrical work is to be constructed and installed in accordance with plans and specifications which have been approved in their entirety and/or reflect any changes requested by the State Fire Marshal, as applicable or required. Electrical work shall not commence until such plans are in the hands of the Electrical Contractor.
- G. The Contractor shall insure that his work is accomplished in accord with OSHA Standards and/or any other applicable government requirements.
- H. Where conflict arises between any code and the plans and/or specifications, the code shall apply except in the instance where the plans and specifications exceed the requirements of the code. Any changes required as a result of these conflicts shall be brought to the attention of the Architect at least ten working days prior to bid date, otherwise the Contractor shall make the required changes at his own expense. The provisions of the codes constitute minimum standards for wiring methods, materials, equipment and construction and compliance therewith will be required for all electrical work, except where the drawings and specifications require better materials, equipment, and construction than these minimum standards, in which case the drawings and specifications shall be the minimum standards.

11. COST BREAKDOWNS

- A. Within thirty days after acceptance of the Contract, each Contractor is required to furnish to the Architect one copy of a detailed cost breakdown on each respective area of work. These cost breakdowns shall be made on forms provided or approved by the Architect. Payments will not be made until satisfactory cost breakdowns are submitted.

12. GUARANTEES AND WARRANTIES

- A. Each Electrical Contractor shall unconditionally guarantee all equipment, apparatus, materials, and workmanship entering into this Contract to be the best of its respective kind and shall replace all parts at his own expense, which are proven defective within one year from final acceptance of the work by the Engineer. The effective date of completion of the work shall be the date of the Engineer's Certificate of Substantial Completion.
- B. Items of equipment which have longer guarantees, as called for in these specifications, such as generators, engines, batteries, transformers, etc., shall have warranties and guarantees completed in order, and shall be in effect at the time of final acceptance of the work by the Engineer. The Contractor shall present the Engineer with such warranties and guarantees at the time of final acceptance of the work. The Engineer shall then submit these warranties, etc. to the Owner. The Owner reserves the right to use equipment installed by the Contractor prior to date of final acceptance. Such use of equipment shall in no way invalidate the guarantee except that Owner shall be liable for any damage to

equipment during this period due to negligence of his operator or other employee.

13. INSPECTION, APPROVALS AND TESTS

- A. Before requesting a final inspection from the Architect, each Contractor shall thoroughly inspect his installation to assure that the work is complete in every detail and that all requirements of the Contract Documents have been fulfilled. Failure to accomplish this portion of the Contract may result in charges from the Architect and/or Engineers for unnecessary and undue work on their part.
- B. The Contractor shall provide as a part of this contract electrical inspection by a competent Electrical Inspection Agency, licensed to provide such services in the State of Kentucky. The name of this agency shall be included in the list of materials of the Form of Proposal by the Contractor. All costs incidental to the provision of electrical inspections shall be borne by the Electrical Contractor.
- C. The Contractor shall advise the Inspection Agency in writing with an information copy of the correspondence to the Architect when he anticipates commencing work. Failure of the Inspection Agency to inspect the work in the stage following and submit the related reports may result in the Contractor's having to expose concealed work not so inspected. Such exposure will be at the expense of the responsible Contractor.
- D. An inspection shall be scheduled for rough as well as finished work. The rough inspection shall be divided into as many inspections as may become necessary to cover all roughing-in without fail and a report of each such inspection visit shall be submitted to the Architect and the Contractor within three days of the inspection.
- E. Approval by an Inspector does not relieve the Contractor from the responsibilities of furnishing equipment having a quality of performance equivalent to the requirements set forth in these plans and specifications. All work under this contract is subject to the inspection and approval of the Engineer, whose decision is binding.
- F. Before final acceptance, the Contractor shall furnish three copies of the certificates of final approval by the Electrical Inspector to the Engineer and one copy to the State Fire Marshal's Office, as applicable. Final payment for the work shall be contingent upon completion of this requirement.
- G. The Contractor shall test all wiring and connections for continuity and grounds before equipment and fixtures are installed, and when indicated or required, demonstrate by Megger Test the insulation resistance of any circuit or group of circuits. Where such tests indicate the possibility of faulty insulation, locate the point of such fault, pull out the conductor at fault, replace same with new and demonstrate by further test the elimination of such fault.

14. CHANGES IN ELECTRICAL WORK

REFER TO GENERAL AND SPECIAL CONDITIONS.

15. CLAIMS FOR EXTRA COST

REFER TO GENERAL AND SPECIAL CONDITIONS.

16. SURVEYS, MEASUREMENTS AND GRADES

- A. The Contractor shall lay out his work and be responsible for all necessary lines, levels, elevations and measurements. He must verify the figures shown on the drawings before laying out the work and will be held responsible for any error resulting from his failure to do so.
- B. The Contractor shall base all measurements, both horizontal and vertical from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at site and check the correctness of same as related to the work.
- C. Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the Engineer through normal channels of job communication and shall not proceed with his work until he has received instructions from the Engineer.

17. GENERAL GUIDELINES FOR SUBSURFACE ACTIVITY

- A. Each Electrical Contractor's attention is directed particularly to "Section 3 – General" this section and all other contract documents as they may apply to his work.
- B. Each Electrical Contractor shall include all excavating, filling, grading and related items required to complete his work as shown on the drawings and specified herein.
- C. Electrical distribution lines and underground telephone or TV cables shall, in no case, be placed in the same trench with sanitary, storm, domestic or fire protection water lines. Phone cable may, at the Contractor's option, and if acceptable to both utility companies, be placed in a common trench with power lines as long as 8" of earth separation is maintained. T.V. cable shall, in all cases, be placed in a separate trench with two feet separation from electrical power lines.
- D. Depths of bury shall be as indicated on the drawings.

18. SUBSURFACE DATA

- A. Subsurface investigations have been made and the results shown on the drawings. The information was obtained primarily for use in preparing foundation design. Each Electrical Contractor may draw his own conclusions there from. No responsibility is assumed by the Owner for subsoil quality or conditions other than at the locations and at the time investigations were made. No claim for

extra compensation, or for extension of time, will be allowed on account of subsurface conditions inconsistent with the data shown.

- B. Materials to be excavated shall be unclassified, and shall include earth, rock, or any other material encountered in the excavation to the depth and extent indicated on the drawings and specified herein. No adjustment in the Contract sum will be made on account of the presence or absence of rock, shale, or other materials encountered in the excavating.

19. BENCH MARKS AND MONUMENTS

- A. Maintain carefully all bench marks, monuments and other referenced points. If disturbed or destroyed, replace as directed.

20. EXCAVATION

- A. Each Electrical Contractor shall accept the site as he finds it and remove all trash, rubbish and material from the site prior to starting excavation for his work.
- B. Excavate trenches to sufficient width and depth for proper installation of the work and where required, smooth the bottom on the trench with hand tools.
- C. The removal of rock shall be accomplished by use of hand or power tools only. Blasting shall not be permitted unless authorized in writing by the Architect. Any damage to existing structures, exterior services or rock intended for bearing, shall be corrected at the responsible Contractor's expense.
- D. Keep trenches free from water while construction therein is in progress. Under no circumstances lay conduit or cable in water. Pumping or bailing water from this Contractor's trenches, which is required during construction shall be accomplished at his expense.
- E. In no case shall excavation work be accomplished that will damage in any way the new structure, existing structures, equipment, etc. Each Contractor shall take the necessary steps to prevent flow of eroded earth by water or landslide onto the property of others, or against the structures. The repair of all such damage, or any other damage incurred in the course of excavation, shall be borne by the responsible Contractor.

21. BACKFILL

- A. Backfill shall be accomplished with clean debris free earth and the new earth tamped at 12" intervals so as to avoid earth sinks along the trench. The responsible Contractor will be required to return to the project and fill any sunken areas along the route of his work.
- B. Backfill trenches only after conduit and cable have been inspected, tested, and locations of pipe lines have been recorded on "record" drawings.
- C. The backfill below paved areas shall be brought to proper grade to receive the sub-base and paving. No paving shall be placed on un-compacted fill.

- D. The backfill below the sod (or seeded) areas shall be brought to within six inches of finished grade. The remaining six inches shall be backfilled with clean soil.

22. TEMPORARY USE OF EQUIPMENT

- A. The permanent electrical equipment, when installed, may be used for temporary services, subject to an agreement between the Contractors involved, the Owner, and with the consent of the Engineer. Should the permanent systems be used for this purpose, these Contractors shall pay for all temporary connections required and any replacements required due to damage without cost, leaving the same in "as new" condition.
- B. Permission to use the permanent equipment does not relieve the Contractors who utilize this equipment from the responsibility for any damages to the building construction and/or equipment which might result because of its use.

23. TEMPORARY SERVICES

- A. The Contractor shall arrange with the General Contractor or Construction Manager for temporary electrical and other services which he may require to accomplish his work.

24. RECORD DRAWINGS

- A. The Contractor shall insure that any deviations from the design are being recorded daily or as necessary on record drawings being maintained by the Contractor. Dimensions from fixed, visible permanent lines or landmarks shown in vertical and horizontal ways shall be utilized. The Engineer shall review the as-built documents from time to time to insure compliance with this requirement. Compliance shall be a requirement for final payment. Pay particular attention to the location of under-floor or underground exterior in-contract or utility-owned or leased service lines, main switches and other appurtenances important to the maintenance and safety of the Electrical System.

25. MATERIALS AND WORKMANSHIP

- A. All electrical equipment, materials and articles incorporated in the work shall be new and of comparable quality to that specified. All workmanship shall be first-class and shall be performed by electricians skilled and regularly employed in their respective trades. The Contractor shall determine that the equipment he proposes to furnish can be brought into the building(s) and installed within the space available. All equipment shall be installed so that all parts are readily accessible for inspection, maintenance, replacement, etc. Extra compensation will not be allowed for relocation of equipment for accessibility or for dismantling equipment to obtain entrance into the building(s).
- B. All conduit and/or conductors shall be concealed in or below walls, ceilings or floors unless otherwise noted. All fixtures, devices and wiring that are required shall be installed to make up complete systems as indicated on the drawings and specified herein.

- C. All materials, where applicable, shall bear Underwriters' Laboratories label or that of another Engineer-approved testing agency, where such a standard has been established.
- D. Each length of conduit, wireway, duct, conductor, cable, fitting, fixture and device used in the electrical systems shall be stamped or indelibly marked with the makers mark or name.
- E. All electrical equipment shall bear the manufacturer's name and address and shall indicate its electrical capacity and characteristics.
- F. All electrical materials, equipment and appliances shall conform to the latest standards of the National Electrical Manufacturers Association (NEMA) and the National Board of Fire Underwriters (NBFU) and shall be approved by the Owner's insuring agency if so required.

26. QUALIFICATIONS OF WORKMEN

- A. All electrical work shall be accomplished by qualified workmen competent in the area of work for which they are responsible. Untrained and incompetent workmen as evidenced by their workmanship shall be relieved of their responsibilities in those areas. The Engineer shall reserve the right to determine the quality of workmanship of any workman and unqualified or incompetent workmen shall refrain from work in areas not satisfactory to him. Requests for relief of a workman shall be made through the normal channels of responsibility established by the Architect or the contract document provisions.
- B. All electrical work shall be accomplished by Journeymen electricians under the direct supervision of a licensed Electrician. All applicable codes, utility company regulations, laws and permitting authority of the locality shall be fully complied with by the Contractor.
- C. Special electrical systems, such as Fire Detection and Alarm Systems, Communications Systems, Telecommunications or Data Systems, Lightning Protection Systems, Television or Video Systems, Special Electronic Systems, Control Systems, etc., shall be installed by approved workmen normally engaged or employed in these respective trades. As an exception to this, where small amounts of such work are required and are, in the opinion of the Engineer, within the competency of workmen directly employed by the Contractor involved, they may be provided by this Contractor.

27. CONDUCT OF WORKMEN

- A. The Contractor shall be responsible for the conduct of all workmen under his supervision. Misconduct on the part of any workmen to the extent of creating a safety hazard, or endangering the lives and property of others, shall result in the prompt relief of that workman. The consumption or influence of alcoholic beverages, narcotics or illegally used controlled substances on the jobsite is strictly forbidden.

28. COOPERATION AND COORDINATION BETWEEN TRADES

- A. The Contractor is expressly directed to read the General Conditions and all detailed sections of these specifications for all other trades and to study all drawings applicable to his work, including Architectural, Mechanical and Structural Drawings, to the end that complete coordination between trades will be effected. Each Contractor shall make known to all other affected trades the intended positioning of materials and equipment and intended order of work. Coordinate all work with that of other trades and proceed with the installation in such a manner as to assure no delays to other trades. Similarly, determine the intended locations and sizes of equipment, roughing-in requirements and equipment which is to be provided by others, but is to be connected by each Electrical Contractor. Failure of the responsible Contractor to make known his needs and to determine the requirements of others will not be cause for additional compensation to correct interferences which could have been avoided by proper coordination.
- B. Each Electrical Contractor shall be responsible for coordination with the General Contractor, equipment suppliers, manufacturers, Mechanical Contractor(s), etc., to insure that necessary provisions for connections, operational switches, disconnect switches, fused disconnects, etc., for electrically operated equipment provided under other divisions of the specifications, or called for on the plans, or required by codes are made.
- C. If any discrepancies occur between accompanying drawings and these specifications and drawings and specifications covering other Contracts, each trade shall report such discrepancies to the Engineer far enough in advance so that a workable solution can be presented. No extra payment will be allowed for relocation of conduit, wireway, bus duct, conductors, equipment, etc., not installed in accordance with the above instructions, and which interfere with work and equipment of other trades.
- D. In areas where air diffusers and lighting fixtures are to be installed, the Mechanical Trades, the Electrical Trade and the General Trades shall coordinate the location of their respective construction and installations to as to provide a combined symmetrical arrangement that is acceptable to the Engineer and Architect.

29. PROTECTION OF EQUIPMENT

- A. The Contractor shall be entirely responsible for all material and equipment furnished by him in connection with his work and special care shall be taken to properly protect all parts thereof from damage during the construction period. Such protection shall be by a means acceptable to the Engineer. All conduit rough-in shall be properly plugged or capped during construction in a manner approved by the Engineer. Equipment damaged while stored on site either before or after installation shall be repaired or replaced (as determined by the Engineer) by the responsible Contractor.

30. CONCRETE WORK

- A. The Contractor shall be responsible for the provision of all concrete work required for the installation of any of his systems or equipment. If this work is provided by another trade, it will not relieve the Electrical Contractor of his responsibilities relative to dimensions, quality of workmanship, locations, etc. In the absence of other concrete specifications, all concrete related to Electrical work shall be 3000 PSI minimum compression strength at 28 days curing and shall conform to the standards of the American Concrete Institute Publication ACI-318. Heavy equipment shall not be set on pads for at least seven days after pour.
- B. All concrete pads shall be complete with all pipe sleeves, embeds, anchor bolts, reinforcing steel, concrete, etc., as required. Pads larger than 18" in width shall be reinforced with minimum #4 round bars on 6" centers both ways. All reinforcing steel shall be per ASTM requirements, tied properly, lapped 18 bar diameters and supported appropriately up off form, slab or underlayment. Bars shall be approximately 3" above the bottom of the pad with a minimum 2" cover. All parts of pads and foundations shall be properly rodded or vibrated. If exposed parts of the pads and foundations are rough or show honeycomb after removing forms properly adhered repairs shall be made. If structural integrity is violated, the concrete shall be replaced. All surfaces shall be rubbed to a smooth finish.

Special Note: All pads and concrete lighting standard bases shall be crowned slightly in center to avoid water ponding beneath equipment.

- C. In general, concrete pads for small equipment shall extend 6" beyond the equipment's base dimensions. For large equipment with service access panels, extend pads 18" beyond base or overall dimensions to allow walking and servicing space at locations requiring service access.
- D. Exterior concrete pads shall be 4" minimum above grade and 4" below grade on a tamped 4" dense grade rock base unless otherwise noted or required by utility company. Surfaces of all foundations and bases shall have a smooth finish with three-quarter inch radius or chamfer on exposed edges, troweled or rubbed smooth. Be certain all exterior pads are crowned approximately 1/8" per foot of slope from center for drainage.

31. RESTORATION OF NEW OR EXISTING SHRUBS, PAVING, ETC.

- A. The Contractor shall restore to their original condition all paving, curbing surfaces, drainage ditches, structures, fences, shrubs, existing or new building surfaces and appurtenances, and any other items damaged or removed by his operations. Replacement and repairs shall be in accordance with good construction practice and shall match materials employed in the original construction of the item to be replaced. All repairs shall be to the satisfaction of the Engineer, and in accord with the Architect's standards for such work, as applicable.

32. MAINTENANCE OF EXISTING UTILITIES AND LINES

- A. The locations of all piping, conduits, cables, utilities and manholes existing, or otherwise, that come within the contract construction site, shall be subject to continuous uninterrupted maintenance with no exception unless the Owner of the utilities grants permission to interrupt same temporarily, if need be. Provide one week's written notice to Engineer and Owner prior to interrupting any utility service or line. Also see Article 4. – General, this section.
- B. Known utilities and lines as available to the Engineer are shown on the drawings. However, it is additionally required that, prior to any excavation being performed, each Contractor ascertain that no utilities or lines, known or unknown, are endangered by the excavation.
- C. If the above mentioned utilities or lines occur in the earth within the construction site, the Contractor shall first probe and make every effort to locate the lines prior to excavating in the respective area.
- D. Cutting into existing utilities and services shall be done in coordination with and as designated by the Owner of the utility. The Contractor shall work continuously to restore service(s) upon deliberate or accidental interruption, providing premium time and materials as needed without extra claim to the Owner.
- E. The Contractor shall repair to the satisfaction of the Engineer any surface or subsurface improvements damaged during the course of the work, unless such improvement is shown to be abandoned or removed.
- F. Machine excavation shall not be permitted within ten feet of existing gas or fuel lines. Hand excavate only in these areas, in accord with utility company, agency or other applicable laws, standards or regulations.
- G. Protect all new or existing lines from damage by traffic, etc. during construction.
- H. Protect existing trees, indicated to remain with fencing or other approved method. Hold all new subsurface lines outside the drip line of trees, offsetting as necessary to protect root structures. Refer to planting or landscaping plans, or in their absence, consult with the Architect.

33. CUTTING, PATCHING AND REPAIRING

- A. Each Electrical Contractor shall be responsible for all openings, sleeves, trenches, etc. that he may require in floors, roofs, ceilings, walls, etc. and shall coordinate all such work with the General Contractor and all other trades. He shall coordinate with the General Contractor any openings which he is to provide before submitting a bid proposal in order to avoid conflict and disagreement during construction. Improperly located openings shall be reworked at the expense of the responsible Contractor.
- B. Each Electrical Contractor shall plan his work ahead and shall place sleeves, frames or forms through all walls, floors and ceilings during the initial construction, where it is necessary for conduit, bus duct, conductors, wireways,

etc., to go through; however, when this is not done, this Contractor shall do all cutting and patching required for the installation of his work, or he shall pay other trades for doing this work when so directed by the Architect. Any damage caused to the buildings by the workmen of the responsible Contractor must be corrected or rectified by him at his own expense.

- C. Each Electrical Contractor shall cut holes in casework, equipment panels, etc. (if any), as required to pass pipes in and out.
- D. Each Electrical Contractor shall notify other trades in due time where he will require openings of chases in new concrete or masonry. He shall set all concrete inserts and sleeves for his work. Failing to do this, he shall cut openings for his work and patch same as required at his own expense.
- E. Openings in slabs and walls shall be cut with core drill. Hammer devices will not be permitted. Edges of trenches and large openings shall be scribe cut with a masonry saw.
- F. Cast iron sleeves shall be installed through all walls where pipe enters the building below grade. Sleeves shall be flush with each face of the wall and shall be sufficiently larger than the entering pipe to permit thorough caulking with lead and oakum between pipe and sleeve for waterproofing.
- G. In all cases, sleeves shall be at least two pipe sizes larger than nominal pipe diameter.
- H. Sleeves passing through roof or exterior wall or where there is a possibility of water leakage and damage shall be caulked water tight for horizontal sleeves and flashed and counter-flashed with lead (4 lb.) or copper and soldered to the piping, lapped over sleeve and properly weather sealed.
- I. All rectangular or special shaped openings in plaster, stucco or similar materials including gypsum board shall be framed by means of plaster frames, casing beads, wood or metal angle members as required. The intent of this requirements is to provide smooth even termination of wall, floor and ceiling finishes as well as to provide a fastening means for lighting fixtures, panels, etc. Lintels shall be provided where indicated over all openings in bearing walls, etc.
- J. No cutting is to be done at points or in a manner that will weaken the structure and unnecessary cutting must be avoided. If in doubt, contact the Architect.
- K. Each Electrical Contractor shall be responsible for properly shoring, bracing, supporting, etc. any existing and/or new construction to guard against cracking, settling, collapsing, displacing or weakening while openings are being made. Any damage occurring to the existing and/or new structures, due to failure to exercise proper precautions or due to action of the elements, shall be promptly and properly made good to the satisfaction of the Architect.
- L. All work improperly done or not done at all as required by the Electrical trades in this section will be performed by the General Contractor at the direction of the

Contractor whose work is affected. The cost of this work shall be paid for by the Contractor responsible.

34. SMOKE AND FIRE PROOFING

- A. The Contractor shall not penetrate rated fire walls, ceilings or floors with conduit, cable, bus duct, wireway or other raceway system unless all penetrations are protected in a code compliant manner which maintains the rating of the assembly. Smoke and firestop all openings made in walls, chases, ceiling and floors. Patch all openings around conduit, wireway, bus duct, cable tray, etc., with appropriate type material to smoke stop walls and provide needed fire rating at fire walls and floors.
- B. Smoke and fire proofing materials and method of application shall be approved by the local authority having jurisdiction. Submit shop drawings to Engineer for approval on materials to be used and method of installation.
- C. Provide fire-stop systems that are produced and installed to resist the spread of fire according to requirements indicated, resist passage of smoke and other gasses, and maintain original fire-resistance rating of construction assembly.
- D. Provide fire-stop systems with F-ratings, and T-ratings, indicated, as determined per ASTM E814, but not less than that equaling or exceeding fire-resistance ratings of the construction assembly.

35. QUIET OPERATION, SUPPORTS, VIBRATION AND OSCILLATION

- A. All work shall operate under all conditions of load without any objectionable sound or vibration, the performance of which shall be determined by the Engineer. Noise from moving machinery or vibration noticeable outside of room in which it is installed, or annoyingly noticeable noise or vibration inside such room, will be considered objectionable. Sound or vibration conditions considered objectionable by the Engineer shall be corrected in an approved manner by the Contractor (or Contractors responsible) at his expense.
- B. All equipment subject to vibration and/or oscillation shall be mounted on vibration supports suitable for the purpose of minimizing noise and vibration transmission, and shall be isolated from external connections such as piping, ducts, etc., by means of flexible connectors, vibration absorbers or other approved means. Surface mounted equipment such as panels, switches, etc., shall be affixed tightly to their mounting surface.
- C. The Contractor shall provide supports for all equipment furnished by him using an approved vibration isolating type as needed. Supports shall be liberally sized and adequate to carry the load of the equipment and the loads of attached equipment, piping, etc. All equipment shall be securely fastened to the structure either directly or indirectly through supporting members by means of bolts or equally effective means. No work shall depend from the supports or work of unrelated trades unless specifically authorized in writing by the Architect or Engineer.

36. FINAL CONNECTIONS TO EQUIPMENT

- A. The roughing-in and final connections to all electrically operated equipment furnished under this and all other sections of these specifications, or by others, shall be included in the Contract and shall consist of furnishing all labor and materials for connection. The Contractor shall carefully coordinate with equipment suppliers, manufacturer representatives, the vendor or other trades to provide complete electrical and dimensional interface to all such equipment (kitchen, hoods, mechanical equipment, panels, refrigeration equipment, Owner's equipment, etc.).

37. WELDING

- A. The Contractor shall be responsible for quality of welding done by his organization and shall repair or replace any work not done in accordance with the Architect's or structural Engineer's specifications for such work. If required by the Engineer, the responsible Contractor shall cut at least three welds during the job for X-raying and testing via an Engineer-approved method. These welds are to be selected at random and shall be tested as a part of the responsible Contractor's work. Certification of these tests and X-rays shall be submitted, in triplicate, to the Engineer. In case a faulty weld is discovered, the Contractor shall be required to furnish additional tests until satisfactory results are obtained.

38. ACCESSIBILITY

- A. The Contractor shall be responsible for the sufficiency of the size of shafts and chases, the adequate clearance in double partitions and suspended ceilings for the proper installation of his work. He shall cooperate with the General Contractor (or Construction Manager) and all other Contractors whose work is in the same space, and shall advise each Contractor of his requirements. Such spaces and clearances shall, however, be kept to the minimum size required to ensure adequate clearance and access.
- B. The Contractor shall locate all equipment which must be serviced, operated, or maintained in fully accessible positions. Equipment shall include but not be limited to junction boxes, pull boxes, contactors, panels, disconnects, controllers, switchgear, etc. Minor deviations from drawings may be made to allow for better accessibility, and any change shall be approved where the equipment is concealed.
- C. Each Contractor shall provide the access panels for each concealed junction box, pull box, fixtures or electrical device requiring access or service as shown on Engineer's plans or as required. Locations of these panels shall be identified in sufficient time to be installed in the normal course of work. All access panels shall be installed in accord with the Architect's standards for such work.
- D. Access Doors; in Ceilings or Walls:
- (1) Manufacturers: Titus, Kreuger, Milcor or approved equivalent.

(2) Installation in mechanical, electrical, or service spaces:
14 gauge aluminum brushed satin finish, 1" border.

(3) Installation in finished areas:
14 gauge primed steel with 1" border to accept the architectural finishes specified for the space. Confirm these provisions with the Architect prior to obtaining materials or installing any such work.

39. ELECTRICAL CONNECTIONS

- A. The Electrical Contractor shall furnish and install all wiring except: (1) temperature control wiring; (2) equipment control wiring; and (3) interlock wiring. All of this type of wiring shall be provided by the supplier or installer of the equipment it serves. The Electrical Contractor shall furnish and install all power wiring complete from power source to motor or equipment junction box, including power wiring through starters. The Electrical Contractor shall install all starters not factory mounted on equipment. Unless otherwise noted, the supplier of equipment shall furnish starters with the equipment. Also refer to Division 15 of Specifications, shop drawings and equipment schedules for additional information.
- B. The Division 15 Mechanical Contractor(s) shall, regardless of voltage, furnish and install all temperature control wiring and conduit and all the interlock wiring, and equipment control wiring and conduit for the equipment that the Mechanical Contractor furnishes. All such conduit and raceway installations shall be provided in accord with these Division 16 requirements.
- C. After all circuits are completed and energized, the Electrical Contractor shall be responsible for all power wiring. All control wiring shall be the responsibility of the Mechanical Contractor. Motors and equipment shall be provided for current characteristics as shown on the drawings.

40. MOTORS

- A. Each motor shall be provided by the equipment supplier or manufacturer with conduit terminal box, adequate starting and internal thermal overload protective equipment as specified or required. The capacity shall be sufficient to operate associated driven devices under all conditions of operation and load and without overload, and at least of the horsepower indicated or specified. Each motor shall be selected for quiet operation, maximum efficiency and lowest starting KVA per horsepower as applicable. Also, see Division 15 of Specifications for further requirements and scheduled sizes.

41. CUTTING AND PATCHING

- A. Unless otherwise indicated or specified, each Contractor shall provide his own cutting and patching necessary to install the work specified in this Division. Patching shall match adjacent surfaces to the satisfaction of the Engineer and shall be in accord with the Architect's standards for such work, as applicable.

- B. No structural members shall be cut without the approval of the Engineer and all such cutting shall be done in a manner directed by him.

42. SLEEVES AND PLATES

- A. Each Contractor shall provide and locate all sleeves and inserts required for his work before the floors and walls are built, or shall be responsible for the cost of cutting and patching required where sleeves and inserts were not installed, or where incorrectly located. Each Contractor shall do all drilling required for the installation of his hangers. Drilling of anchor holes may be prohibited in post-tensioned concrete construction, in which case the Contractor shall request approved methods from the Architect and shall carefully coordinate setting of inserts, etc., with the Structural Engineer and/or Architect.
- B. Sleeves shall be provided for all electrical conduit passing thru concrete floor slabs and concrete, masonry, tile and gypsum wall construction. Sleeves shall not be provided for piping running embedded in concrete or insulating concrete slabs on grade, unless otherwise noted.
- C. Where sleeves are placed in exterior walls below grade, the space between the pipe or conduit and the sleeves shall be packed with oakum and lead, mechanical waterstop or other approved material and made completely water tight by a method approved by the Engineer and/or Architect.
- D. Where conduit motion due to expansion and contraction will occur, make sleeves of sufficient diameter to permit free movement of pipe. Check floor and wall construction finishes to determine proper length of sleeves for various locations; make actual lengths to suit the following:
 - (1) Terminate sleeves flush with walls, partitions and ceiling.
 - (2) In areas where pipes are concealed, as in chases, terminate sleeves flush with floor.
 - (3) In all areas where pipes are exposed, extend sleeves $\frac{1}{4}$ inch above finished floor, except in rooms having floor drains, where sleeves shall be extended $\frac{3}{4}$ inches above floor.
- E. Sleeves shall be constructed of 24 gauge galvanized sheet steel with lock seam joints for all sleeves set in concrete floor slabs terminating flush with the floor. All other sleeves shall be constructed of galvanized steel pipe unless otherwise indicated on the drawings.
- F. Fasten sleeves securely in floors, walls, so that they will not become displaced when concrete is poured or when other construction occurs around them. Take precautions to prevent concrete, plaster or other materials being forced into the space between pipe and sleeve during construction. Fire and smoke stop all sleeves in a manner approved by the local authority having jurisdiction or per prevailing codes. Submit shop drawings for approval to the Engineer on the proposed materials and methods.

43. WEATHERPROOFING

- A. Where any work pierces waterproofing, including waterproof concrete, the method of installation shall be as approved by the Architect and/or Engineer before work is done. The Contractor shall furnish all necessary sleeves, caulking and flashing required to make openings absolutely watertight.
- B. Wherever work penetrates roofing, it shall be done in a manner that will not diminish or void the roofing guarantee or warranty in any way. Coordinate all such work with the roofing installer.

44. OPERATING INSTRUCTIONS

- A. Upon completion of all work and all tests, each Contractor shall furnish the necessary skilled labor and helpers for operating his systems and equipment for a period of three days of eight hours each, or as otherwise specified. During this period, instruct the Owner or his representative fully in the operations, adjustment, and maintenance of all equipment furnished. Give at least one week's written notice to the Owner and Engineer in advance of this period. The Engineer may attend any such training sessions or operational demonstrations. The Contractor shall certify in writing to the Engineer that such demonstrations have taken place, noting the date, time and names of the Owner's representative that were present.
- B. Each Contractor shall furnish three complete bound sets for approval to the Engineer of typewritten and/or blueprinted instructions for operating and maintaining all systems and equipment included in this contract. All instructions shall be submitted in draft, for approval, prior to final issue. Manufacturer's advertising literature or catalogs will not be acceptable for operating and maintenance instructions.
- C. Each Contractor, in the above mentioned instructions, shall include the maintenance schedule for the principal items of equipment furnished under this contract and a detailed, easy to read parts list and the name and address of the nearest source of supply.

45. SCAFFOLDING, RIGGING AND HOISTING

- A. Each Contractor shall furnish all scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises of any equipment and apparatus furnished. Remove same from premises when no longer required.

46. CLEANING

- A. Each Contractor shall, at all times, keep the area of his work presentable to the public and clean of rubbish caused by his operations; and at the completion of the work, shall remove all rubbish, all of his tools, equipment, temporary work and surplus materials, from and about the premises, and shall leave the work clean and ready for use. If the Contractor does not attend to such cleaning immediately upon request, the Engineer may cause cleaning to be done by others and charge the cost of same to the responsible Contractor. Each

Contractor shall be responsible for all damage from fire which originates in, or is propagated by, accumulations of his rubbish or debris.

- B. After completion of all work and before final acceptance of the work, each Contractor shall thoroughly clean all equipment and materials and shall remove all foreign matter such as grease, dirt, plaster, labels, stickers, etc., from the exterior of materials, equipment and all associated fabrication. Pay particular attention to finished area surfaces such as lighting fixture lenses, lamps, reflectors, panels, etc.

47. PAINTING

- A. Each fixture device, panel, junction box, etc., that is located in a finished area shall be provided with finish of color and type as selected or approved by the Architect or Engineer. If custom color is required, it shall be provided at no additional cost to the Owner. All other equipment, fixtures or devices located in finished or unfinished areas, that are not required to have or are provided with finish color or coating shall be provided in a prime painted condition, ready to receive finish paint or coating. All galvanized metal in finished areas shall be properly prepared with special processes to receive finish paint as directed and approved by the Engineer.

48. INDEMNIFICATION

- A. The Contractor shall hold harmless and indemnify the Engineer, employees, officers, agents and consultants from all claims, loss, damage, actions, causes of actions, expense and/or liability resulting from, brought for, or on account of any personal injury or property damage received or sustained by any person, persons, (including third parties), or any property growing out of, occurring, or attributable to any work performed under or related to this contract, resulting in whole or in part from the negligence of the Contractor, any subcontractor, any employee, agent or representative.

49. CONTRACTOR'S USE OF ENGINEER'S CADD FILES

- A. It is understood that the Contractor may wish to obtain the Engineer's computer generated drawings for use in preparation of Shop Drawings. If this permission is granted then the Contractor must conform to the following understanding:
 - (1) The Data contained in the files are part of the Engineer's instrument of service and shall not be used for any purposes other than a convenience in the preparation of shop drawings for the referenced project. Any firm being granted the use of these files shall agree to make no claim and hereby waive any claim or cause of action against Engineers that may result from the use of these electronic files. Furthermore, your firm shall indemnify and hold the Engineer harmless against all damages, liabilities or costs, including attorney's fees and defense costs arising from or resulting from your use of these files.
 - (2) These electronic files are not the construction documents and may differ from the Contract Documents. The Engineer will make no representation regarding

the accuracy or completeness of the electronic files transmitted. By use of these files, the Contractor is not relieved of the required duty to fully comply with the signed and sealed Contract Document, and all duly noted Addenda.

- (3) The electronic drawings are diagrammatic in nature and are not to be considered as being dimensionally accurate. The responsibility of the Contractor to determine, set, check, confirm and coordinate all dimensions, take field measurements, verify field conditions, and coordination of work with other contractors is not relieved by usage of these files.
- (4) Under no circumstances shall delivery of the electronic files to any firm be deemed a sale of the drawings by the Engineer's, and no warranties are made, either expressed or implied, of these files as to their fitness for any particular purpose. In no event shall the Engineers be liable for any loss of profit or any consequential damages as a result of the use of the electronic files.
- (5) The service fee for use of these drawing files is to be set at \$30.00 per sheet requested.

END OF SECTION

SECTION 16110

RACEWAYS AND FITTINGS

1. GENERAL

- A. This section is intended to specify the raceways, conduit, conduit fittings, hangers, junction boxes, splice boxes, specialties and related items necessary to complete the work as shown on the drawings and specified herein.
- B. This section specifies basic materials and methods and is a part of each Division 16 Section that implies or refers to electrical raceways specified therein.
- C. The types of raceways specified in this section include the following:
 - 1. Steel electrical metallic tubing (E.M.T.).
 - 2. Rigid galvanized steel conduit (G.R.S.).
 - 3. Intermediate metal conduit (I.M.C.).
 - 4. Rigid aluminum conduit.
 - 5. Flexible metal conduit (aluminum or steel)
 - 6. Liquid-tight flexible metal conduit.
 - 7. Rigid non-metallic conduit.
- D. All raceways, as listed in 1 (C) above and otherwise specified herein shall be provided in compliance with latest editions of all applicable UL, NEMA, N.E.C. and A.N.S.I. standards. All conduit, raceways and fittings shall be Underwriters Laboratories listed and labeled, or bear the listing of an agency acceptable to the local authority having jurisdiction.
- E. Conduit and raceways, as well as supporting inserts in contact with or enclosed in concrete shall comply with the latest edition of all A.C.I. standards and the equipment manufacturer's recommendation for such work.
- F. P.V.C. or other non-metallic conduit shall be rated for the maximum operating temperature that could be developed by the conductors it encloses, while in normal operation.
- G. The decision of the Engineer shall be final and binding in any case where a question or inquiry arises regarding the suitability of a particular installation or application of raceways, supports or materials, if other than outlined herein.
- H. Minimum size of conduit shall be 3/4" trade size unless otherwise noted on the drawings. All conduit and raceways shall be sized for the number of conductors contained, in accord with the latest edition of the National Electrical Code or any other applicable standards.
- I. The installer of raceway systems shall avoid the use of dissimilar metals within raceway installations that would result in galvanic-action corrosion.

2. MATERIALS

A. STEEL ELECTRICAL METALLIC TUBING

1. Electrical metallic tubing, (E.M.T.) of corrosion-resistant steel construction shall be permitted for concealed installation in dry interior locations. Electrical metallic tubing shall not be installed in concrete slabs or where exposed to physical damage. Electrical metallic tubing shall be permitted for exposed work in mechanical and electrical rooms and other exposed structure areas where not subjected to physical damage, as determined by the Engineer.

B. RIGID GALVANIZED STEEL CONDUIT

1. Rigid galvanized steel conduit shall be used where subject to physical damage for exposed work in mechanical spaces, within factory or other industrial work areas, for exposed fit-up work on machinery, for exposed exterior damp or wet location work, in hazardous atmospheres, in exterior underground locations where installed beneath roadways, where ells occur in underground P.V.C. conduits, or where turning out of concrete encased duct banks, and at other locations as specifically called out on the drawings.
2. Rigid galvanized steel conduit shall be used for all building interior power wiring or cables of over 600 volts.

C. INTERMEDIATE METAL CONDUIT

1. Unless otherwise indicated on the drawings, intermediate metal conduit (I.M.C.) may be used in any location in place of rigid galvanized steel conduit, as permitted by codes, and as approved by the Engineer.

D. RIGID ALUMINUM CONDUIT

1. Rigid aluminum conduit shall be permitted for installation indoors in dry locations only. Under no conditions shall it be cast into concrete slabs or pass thru construction where prolonged contact will degrade the aluminum. All ells used in rigid aluminum conduit systems shall be rigid galvanized steel.

E. FLEXIBLE METAL CONDUIT

1. Flexible conduit shall be used where permitted by NEC. It may be constructed of aluminum or steel. It shall be installed with connectors designed for the purpose. All flexible metal conduit shall be installed as a single piece. No joints shall be installed. Flexible conduit shall not be used in wet or dusty locations or where exposed to oil, water or other damaging environments. An equipment grounding conductor or bonding jumper shall be used at all flexible conduit installations.

F. LIQUIDTIGHT FLEXIBLE METAL CONDUIT

1. Weatherproof flexible metal conduit shall be wound from a single strip of steel, neoprene covered, equivalent to "Liquatite" or "Sealtite" Type "UA". It shall

be installed in such a manner that it will not tend to pull away from the connectors. Provide strain relief fittings equivalent to “Kellems” as required where subject to vibration. Flexible connections to motors in dusty areas shall be dust-tight, in areas exposed to the weather – weatherproof.

G. RIGID NON-METALLIC CONDUIT

1. Rigid non-metallic conduit shall be constructed of P.V.C., nominally schedule 40 weight, except where encased in concrete, where it may be “EB” type. If installation will enclose utility company provided conductors, verify exact type required, and install in accord with their standards, where more stringent than this specification in normal building conditions.
2. Rigid non-metallic conduit may be used in exterior wet or damp locations where installed under slab or underground. It shall not be run in interior locations, except with special permission from the Engineer for use in corrosive environments, and then only if protected from physical damage. No rigid non-metallic conduit may be installed in environmental air plenums or cast into above-grade concrete slabs. No rigid non-metallic conduit may be installed in locations where the ambient temperature might exceed the rating of the raceway.
3. Where rigid non-metallic conduit is placed underground, as for feeder circuits, secondary or branch circuit runs and where ell is made upward through a slab on grade, transition the turning ell and the riser to rigid steel conduit to a height of 6” above the concrete slab. Transition may then be made of E.M.T. or other approved conduit for remainder of run.
4. Flexible non-metallic conduit shall not be used, except by special permission, obtained in writing from the Engineer.
5. Provide equipment grounding conductors of copper, sized as required by codes, in all circuits installed in rigid non-metallic raceways.

3. RACEWAY FITTINGS

- A. Raceway fittings (or condulets) shall be of gray iron, malleable iron or heavy copper-free case aluminum. They shall be furnished in proper configurations, avoiding excessive plugged openings. Any openings that are left shall be properly plugged. All coverplates shall be gasketed with neoprene or similar approved materials, rated for the environment.
- B. Where required, raceway fittings shall be provided in explosion-proof configurations rated for the atmosphere. Place conduit seal off fittings at each device in accord with applicable codes. Seal-off fittings shall be packed with wadding, and poured with an approved non-shrink sealing compound.
- C. Where conduit transitions in a run from a cold to a warm environment, (such as at a freezer, refrigerator or exterior wall) seal-off fittings shall be placed on the warm side immediately at the boundary to prevent migration of condensation within raceway systems.

- D. Expansion fittings shall be provided at all locations where conduit or other raceways cross over expansion joints. Provide copper ground bonding jumpers across expansion fittings.
 - E. Conduit bodies, junction boxes and fittings shall be dust tight and threaded for dusty areas, weatherproof for exterior locations and vapor tight for damp areas. Conduit fittings shall be as manufactured by Crouse Hinds, Appleton, Killark or approved equivalent. All surface mounted conduit fittings as with "FS", "FD", "GUB" types, etc., shall be provided with mounting hubs.
 - F. Where lighting fixtures, appliances or wiring devices are to be suspended from ceiling outlet boxes, they shall be provided with 3/4" rigid conduit pendants. Outlet boxes shall be malleable iron, provided with self-aligning covers with swivel ball joint and No. 14-gauge steel locking ring. Provide safety chain between building structure and ballast housing of light fixtures for all fixtures, appliances or devices greater than 10 lbs. weight. Fixtures shall be installed plumb and level.
 - G. Fittings for threaded raceways shall be tapered thread with all burrs removed, reamed ends and cutting oil wiped clean.
 - H. Fittings for E.M.T. conduit shall be of the set-screw type. Fittings for sizes 2" and larger shall have two setscrews each side. Conduit stops shall be formed in center of couplings. All E.M.T. connectors and couplings shall be of formed steel construction.
 - I. Indentation or die-cast fittings shall **not** be permitted in any raceway system.
 - J. Compression type fittings shall be utilized for E.M.T. conduit installed in damp or dusty locations, or where otherwise indicated.
 - K. All conduit fittings shall be securely tightened. All threaded fittings shall engage seven full threads. Fasteners shall be properly torqued to manufacturer's recommendations.
4. SUPPORT AND HANGERS
- A. Supports and hangers shall be installed in accord with all applicable codes and standards. They shall be corrosion-resistant, galvanized or furnished with an equivalent protective coating. All electrical raceways shall be hung independently from the building structure with UL listed approved materials. Hangers and supports depending from the support systems of other trades work shall **not** be permitted, except with specific approval in writing from the Engineer. The use of tie wire for support or fastening of any raceway system is prohibited. Perforated metal tape shall **not** be used for raceway support.
 - B. No race way shall be installed on acoustic tile ceiling tees, or in any location that will impair the functioning, access or code-required clearances for any equipment or system.
 - C. Supports for raceways shall be of material compatible with the raceway, of malleable iron, spring steel, stamped steel, or other approved material. Die-cast fittings are **not** permitted for supports.
 - D. The installing contractor shall provide all necessary supports and braces for raceways, in a rigid and safe installation, complying with all applicable codes.

- E. Individual conduits run on building walls or equipment shall be secured by one hole galvanized malleable iron or stamped steel pipe strap or "minerallac" 2-piece straps. The straps are to be anchored by an approved means such as expansion anchors, toggle bolts, through bolts, etc. Where required by codes or other standards, provide spacers behind mounting clamps to space conduits off walls.
- F. Individual conduits run on building steel shall be secured by means of clamp supports similar and equal to those manufactured by the C.C. Korn Company, Elcen Co., B-Line or approved equivalent. Provide korn clamps, bulb tee clamps, flange clamps, beam clamps, "minerallacs", etc.
- G. Where feasible, vertical and/or horizontal runs of conduit shall be grouped in common hangers on "trapezes" of channel stock as manufactured by "Unistrut" or equivalent, 1-5/8" minimum depth. Utilize conduit clamps appropriate to the channel.
- H. Channel strut systems for supporting electrical equipment or raceways shall be constructed of 16-gauge minimum hot dip galvanized steel with 9/16" diameter holes on 8" centers, with finish coat of paint as manufactured by Unistrut, B-Line, Kindorf, **or approved equivalent**.
- I. The minimum diameter of round all-thread steel rods used for hangers and supports shall be 1/4", 20 threads per inch. All-thread rod shall be furnished with a corrosion-resistant finish.
- J. Welding directly on conduit or fittings is **not** permitted.
- K. Provide riser support clamps for vertical conduit runs. Riser support clamps shall be of heavy gauge steel construction. Install riser support clamps at each floor level penetration, or as otherwise required.
- L. Provide conduit cable support clamps for vertical conductor runs as required or indicated on plans. Clamps to be insulating wedging plug, with malleable iron support ring. Install within properly sized and anchored junction box.
- M. Spring steel clips and fittings such as those manufactured by HITT-Thomas, Caddy-Erico, **or approved equivalent**, with black oxide finish are permitted in any indoor dry location for concealed work, where acceptable to the local authority having jurisdiction.

5. INSTALLATION

- A. This Contractor shall lay out and install all conduit systems so as to avoid any other service or systems, the proximity of which may prove injurious to the conduit, or conductors which it confines. All conduit systems, except those otherwise specifically shown to the contrary, shall be concealed in the building construction or run above ceilings. Size of all conduit shall conform to Table No. 1, Chapter 9, of the National Electrical Code, unless otherwise shown on the Contract Drawings.
- B. No conduit larger than 1" shall be installed in poured concrete slabs except with permission of the architect or engineer. All other shall be held below slab. Conduit shall be held at least 6" from flues or hot water pipes.

- C. All exposed conduit shall be installed with runs parallel or perpendicular to walls, structural members or intersections or vertical planes and ceilings, with right angle turns consisting of cast metal fittings or symmetrical bends unless otherwise shown. All conduit shall have supports spaced not more than eight feet apart.
- D. Conduit shall be installed in such a manner so as to insure against collection of trapped condensation. All runs of conduit shall be arranged so as to be devoid of traps. Trapped conduit runs shall be provided with explosion proof drains at low points. Runs of conduit between junctions shall not have more than the equivalent of three 90-degree bends.
- E. Junction boxes shall be installed so that conduit runs will not exceed 85', or as shown on the Contract Drawings.
- F. Underground electric, cable TV, telephone service or other rigid steel conduit and underfloor rigid steel conduit below the concrete floor slab shall be painted with two coats of bitumastic paint, such as "Asphaltum".
- G. All underground or underfloor conduits shall be swabbed free of all moisture and debris before conductors are pulled.
- H. At least one 1-inch and three 3/4-inch conduits shall be stubbed from flush-mounted panelboards into the nearest accessible area for future use. Provide suitable closures for these stubs. Identify each stub with a suitable hang tag.
- I. Install electrical raceways in accordance with manufacturer's written instructions, applicable requirements of latest edition of the N.E.C, and NECA "Standard of Installation", complying with recognized industry practices.
- J. Coordinate with other trades, including metal and concrete deck trades, as necessary to interface installation of electrical raceways and components.
- K. Level and square raceway runs, and install at proper elevations and required heights. Hold tight to structure wherever possible, to maximize available space and not restrict other trades.
- L. Complete installation of electrical raceways before starting installation of cables or wires within raceways.
- M. All underground conduits shall be buried to minimum depth of 24" from the top of the concrete encasement or raceway to finished grade, unless otherwise noted on plans. Observe minimum burial requirements of local utility company where their standards or regulations apply. Conduits containing primary power conductors, (higher than 600 volts to ground) shall be 42" to top below finished grade, unless otherwise noted on plans.
- N. All raceways systems shall be mechanically continuous and connected to all electrical outlets boxes, cabinets, in accordance with manufacturer's installation sheets.
- O. All metal raceway shall be electrically continuous and bonded in accordance with the National Electrical Code for proper grounding.

6. SPECIALTIES

- A. All E.M.T. terminations at junction boxes, panels, etc. shall be made with case hardened locknuts and appropriate fittings, with insulated throat liners. Insulating terminations shall be manufactured as a single unit. The use of split sleeve insulators is **not** permitted.
- B. All rigid conduit, except main and branch feeders, shall have heavy fiber insulating bushings reinforced with double locknuts. All branch and main feeders shall have insulated bushings with grounding lugs and shall be bonded to enclosures with appropriately sized copper jumpers, except at pad mounted transformers. Bonding jumpers shall be installed as required by the N.E.C. and other applicable codes.
- C. All conduit stubbed through floor during construction shall have openings protected with plastic caps approved for this purpose. Connections on both ends of all flexible conduit shall be equivalent to Thomas and Betts, Ideal, Appleton, Efcor, **or approved equivalent**, rated for the environment.
- D. All pulling lines left in open conduit systems shall be non-metallic, left securely tied off at each end.
- E. Where spare raceways terminate in switchboards or motor control centers a fishtape barrier shall be provided.

END OF SECTION

SECTION 16120

CONDUCTORS, IDENTIFICATION, SPLICING DEVICES AND CONNECTORS

1. GENERAL

- A. This section of the Specifications covers all of the electrical power, lighting, and control power (line voltage) conductors. It does not include voice/data conductors, but does include all drag wires for empty conduits.
- (1) All conduits installed without conductors shall have a 200 lb. test nylon string installed for future use, tied off securely at each end.
- B. No more than 40% conduit fill is permitted for any conduit system, including video, intercom, data, power or other signal circuits unless specifically indicated otherwise on the plans.
- C. No more than five conductors shall be installed in conduit except for switch legs and travelers in multi-point switching arrangements.
- D. If more than three phases are installed in a single raceway, an additional equipment grounding conductor and neutral shall be installed as indicated by the number of phase conductors.

2. MATERIALS

A. CONDUCTORS

- (1) All conductors shall be 98% conductive annealed copper unless otherwise noted, UL listed and labeled.
- (2) Lighting and receptacle branch circuits shall be not less than No. 12 copper wire or of the sizes shown on the drawings with Type THW, THHN or THWN insulation. All feeder circuits shall be Type THW or THHN of the size as shown on the Contract Drawings.
- (3) Conductors No. 10 and smaller sizes of wire shall be solid. Conductors No. 8 and larger sizes shall be stranded. No. 14 AWG drag wire shall be installed in all empty conduit and stubs for future use, as indicated. Conductors for fire alarm wiring and control wiring shall be stranded.
- (4) All wire on the project shall be new, in good condition, and shall be delivered in standard coils or reels.
- (5) The color of the wire shall be selected to conform with Section 210-5 of the latest edition of the National Electrical Code. Refer also to 16J-4, Color Coding.
- (6) All equipment grounding conductors shall have green color insulation.
- (7) Conductors used for motor connections and connections to vibrating or oscillating equipment shall be extra flexible.

- (8) Conductors for main ground from neutral bus, equipment grounding bus, building steel, grounding grid and main cold water pipe connection shall be bare copper.
- (9) All conductors shall be identified by color code and by means of labels placed on conductors in junction boxes and at terminal points with Brady, Gardner, T & B or approved equivalent labels indicating source, circuit No. or terminal No.

B. SPLICING DEVICES & CONNECTORS

- (1) Splicing devices for use on No. 14 to No. 10 AWG conductors shall be pressure type such as T & B "STA-KON", Burndy, Reliable or approved equivalent.
- (2) Terminating pressure applied ring type (or fork with upturned ends) terminations shall be employed on motor and equipment terminals where such terminals are provided on motor and equipment leads.
- (3) The use of split-bolt clamps will be permitted in wireways at service entrance only. Torque to 55 foot-pounds or as recommended by manufacturer.
- (4) Large connectors (lugs) shall be mechanical type, hex-head socket or crimp-on style, installed per the manufacturer's recommendations.
- (5) If aluminum feeder conductors are permitted elsewhere in these Specifications, all aluminum terminations shall be made with mechanical crimp type connectors with steel pins for inserting in lugs, Burndy, or equivalent.
- (6) No aluminum conductors shall be permitted to be used for branch circuitry.
- (7) Exterior underground connections made between bare ground wires or to ground rods shall be exothermically welded, "Cadweld" or equivalent.
- (8) Splices, where necessary shall be made with hydraulically-set "Hy-press" or equivalent crimped connectors. All splices shall be insulated to the full value of the wiring insulation using a cold-shrink kit or the equivalent in built-up materials.

3. INSTALLATION

- A. The pulling of all wires and cable on this project shall be performed in strict compliance with applicable sections of the National Electrical Code. No conductor entering or leaving a cabinet or box shall be deflected in such a manner as to cause excess pressure on the conductor insulation and after all insulation and insulating bushings are in place.
- B. The radius of bending of conductors shall be not less than eighteen (18) times the outside diameter of the conductor insulation.
- C. Conductors installed within environmental air plenums shall be per N.E.C., teflon-type insulation or approved equivalent.
- D. Conductors that are installed exposed shall not be routed across ceilings or ductwork. They shall be held up against building structure or against permanent support members.

They shall be installed in such a manner that they do not interfere with the operation of equipment or removal of ceiling tiles. Nylon tie-wraps shall be installed in such a manner so as to bundle conductors neatly, allowing run-outs of single conductors or groups to drop down to equipment served. Install grommeting where dropping out of trays or into panels or service columns. Install sleeves with bushings where penetrating partitions. Firestop sleeves with approved material. Do not penetrate firewalls if so indicated on plans.

- E. Maximum permissible pulling tensions, as recommended by the manufacturer for any given type of cable or wire installed shall not be exceeded. Utilize special remote readout equipment as required to ensure compliance.

4. COLOR CODING DISTRIBUTION VOLTAGE CONDUCTORS, 600 VOLT OR LESS

- A. Conductors to be color coded as follows:

- (1) 480/277 Volt Conductors

- Phase A – Brown
- Phase B – Orange
- Phase C – Yellow
- Neutral – Gray

- (2) 120/208 Volt Conductors

- Phase A - Black
- Phase B - Blue
- Phase C - Red
- Neutral - White

- (3) Control Wiring - Red, or as indicated.

- (4) Conductors within enclosures that may be energized when enclosure disconnect is off - yellow, or taped with ½" yellow tape every 6" of length, inside enclosure. Provide lamacoid plate warning sign on front of enclosure where this condition occurs.

- (5) D.C. Wiring: Positive - Light Blue, Negative - Dark Blue

END OF SECTION

SECTION 16135

CABINETS, OUTLET BOXES, AND PULL BOXES

1. GENERAL

- A. These specification sections cover all electrical cabinets, outlet boxes and pull boxes.
- B. Continuous runs of conduit shall have pull boxes at least each eighty-five (85) feet of run, or as near as possible to that limit.

2. MATERIALS & INSTALLATION

A. Cabinets, Outlets & Pull Boxes:

1. Cabinets for lighting and power, telephone, pull boxes, outlet boxes, or any other purposes specified or shown on the Contract Drawings, shall be constructed of code gauge, galvanized steel with sides formed and corner seams riveted or welded before galvanizing. **Boxes assembled with sheet metal screws will not be accepted.** Pull boxes shall include all boxes used to reduce the run of conduit to the required number of feet or bends, supports, taps, troughs, and similar applications and shall also be constructed as specified above. All cabinets and boxes for NEMA 1 and 1A application shall be provided with knockouts, as necessary, or shall be cut in the field by approved cutting tools which will provide a clean symmetrically cut opening. All boxes, except panels, shall be provided with code gauge fronts with 1/4 turn fasteners. Fronts for panels shall be as specified under "Panelboards".
2. Ceiling outlet boxes shall be galvanized steel, 4" octagonal, not less than 2-1/8" deep, with lugs or ears to secure covers, and those for use with ceiling lighting fixtures shall be fitted with 3/8" fixture studs fastened to the back of the boxes where applicable.
3. Special size concealed outlet boxes for clocks, speakers, alarms, TV, etc., shall be provided by the manufacturer of the equipment.
4. Unless otherwise noted on the drawings or in the specifications, outlet boxes shall be installed at the following heights to centerline of box:

a) Wall Switches	4'-0"
b) Convenience Power Outlets	1'-6"
c) Power Outlets (above counters)	9" above counter top
d) Telephone/Data Outlets	1'-6"
e) Wall-mounted Telephones	5'-6"
f) Weatherproof Outlets	2'-0"
g) Disconnects	5'-0" max to device centerline
5. The location of outlets, as shown on the drawings, shall be considered as approximate only. It shall be incumbent upon this Contractor to study the general building drawings, with relation to spaces surrounding each outlet, in order to make his work fit the work of others and in order that when the

fixtures are installed, they will be symmetrically located and will not interfere with any other work or equipment. Any change in fixture or layout shall be coordinated with and approved by the Architect/Engineer before this change is made.

6. All outlets, pull boxes, junction boxes, cabinets, etc., shall be sized per the current edition of the National Electrical Code.
- B. Cabinets, outlet boxes (FTGS) and junction or pull boxes (FTGS) shall be threaded for rigid-threaded conduit, dust-tight vapor-tight or weatherproof as required for areas other than for NEMA 1 or 1A application. These shall be as manufactured by Crouse-Hinds, Appleton, Pyle-National, Killark, **or approved equivalent.**
1. NEMA 1 or 1A cabinets, outlet boxes or pull or junction boxes shall be as manufactured by Appleton, Steel city, T & B, **or approved equivalent.**
 2. Outlet boxes for switches, receptacles, telephone, etc., concealed in walls shall be galvanized steel, 2" X 4" X 1-1/2" with plaster cover for one (1) or two (2) devices, as required. Where outlet boxes are installed in walls of glazed tile, brick, concrete block, or other masonry which will not be covered with plaster or in walls covered by wood wainscot or paneling, deep sectional masonry boxes shall be used and they shall be completely covered with the plates or lighting fixtures. This Contractor shall cooperate with the brick layers, block layers and carpenters to insure that the outlet boxes are installed straight and snugly in the walls. Receptacles shall be set vertically in walls.
 3. Outlet boxes mounted in glazed tile, brick, concrete block or other types of masonry walls shall be mounted about or below the mortar joint. **Do Not Split the Mortar Joint.**
 4. Boxes for more than two (2) devices shall be for number of devices required and shall be one piece. No ganging of single switch boxes will be allowed.
 5. Outlets for use on this project shall have only the holes necessary to accommodate the conduit at the point of insulation and shall be rigidly secure in position. Boxes will knockout removed and openings not used shall be replaced.
 6. Openings for conduit entrance in cabinets and boxes shall be prefabricated, punched, drilled and/or reamed. The use of a cutting torch for this purpose is prohibited.

END OF SECTION

SECTION 16143
WIRING DEVICES AND PLATES

1. GENERAL

- A. This section of the Specifications covers all wiring devices and cover plates, standard, weatherproof and dust-tight.
- B. Wiring devices, listed by manufacturer and catalogue numbers are to establish the type required. Equal devices of other manufacturers, such as Leviton, Hubbell, Bryant, P & S, G.E., or Eagle Electric Manufacturing Company for standard use, **or approved equivalent** devices for NEMA 1 or 1A area use, in other areas, as manufactured by Pyle-National, Killark or Appleton, will be considered. Insofar as possible, standard application or special application devices shall be by one manufacturer.

2. MATERIALS

- A. Table for General facility wall switches and power outlet devices:

TYPE	RATING	CONFIGURATION	COLOR	VENDOR CAT#
Receptacle – Duplex (Commercial Grade)	125V, 20A	NEMA 5-20R		Hubbell CR5362 GE 5362 Leviton 5362
Receptacle – G.F.I. Duplex (Commercial Grade)	125V, 20A	NEMA 5-20R		Hubbell GF 5352 GE GF 5342 Leviton 6898
Receptacle – Single (Commercial Grade)	125V, 20A	NEMA 5-20R		Hubbell 5361
Receptacle – Duplex, Safety Type (with tamper resistant screws)	125V, 20A	NEMA 5-20R		Hubbell HBL-8300-SG
Receptacle – Duplex, Isolated Ground with Orange Legend Plate	125V, 20A	NEMA 5-20R	Orange	Hubbell IG-5362 GE 5362-IG Leviton 5362-IG
Receptacle – Single	250V, 20A	NEMA 10-20R	Black	Hubbell 6810 GE 4124 Leviton 5032
Receptacle – Single	250V, 30A	NEMA 6-30R	Black	Hubbell 6810 GE 4124 Leviton 5032
Receptacle – Single	250V, 50A	NEMA 6-50R	Black	Hubbell 6810 GE 4124 Leviton 5032

Light Switch – Single Pole	120/277V, 20A	SPST		Hubbell 1221 GE 5951 Leviton 5951
Light Switch – 3 Way	120/277V, 20A	3-Way		Hubbell 1223 GE 5953 Leviton 5953
Light Switch – 4 Way	120/277V, 20A	4-Way		Hubbell 1224 GE 5954 Leviton 5954
Light Switch – Single Pole, Keyed	120/277V, 20A	SPST	N/A	Hubbell 1221L GE 5951L Leviton 5951L
Light Switch – 3-Way, Keyed	120/277V, 20A	3-Way	N/A	Hubbell 1223 L GE 5953L Leviton 5953L
Light Switch – 4-Way, Keyed	120/277V, 20A	4-Way	N/A	Hubbell 1224L GE 5954L Leviton 5954L

- Table Notes:
- 1) Switch, keyed to each, is to be furnished with one Hubbell #1209 key. Turn over to Owner at close of project and obtain receipt for verification that keys have been delivered.
 - 2) Provide matching cap (plug) for all receptacles rated 30 amperes, or greater, as required for equipment.
 - 3) All receptacles shall be back, or side, wired, clamping type

B. Small Motor Control Switches:

- (1) Fused toggle switch controlling small motor loads as indicated shall consist of an assembly, 2-gang with 30A, 120-277 volt motor-rated snap switch (Hubbell 3031-A) and fusetron box-mounted dual-element plugfuse as manufactured by Bussman Company or equivalent. To be used for control and disconnecting means of all single phase, 120 volt, 1/3 HP and smaller motors, unless otherwise noted on plans.
- (2) For 2-pole, 30A, 120-208-230 volt, 1/3 HP and less motor, provide an assembly to consist of Hubbell 3032-A switch and two "Fusetron" units. Size fuses at motor nameplate rating + 25%.

3. COLOR

- A.** Color of devices shall be as selected by the Architect. Samples (devices, plates or both) may be required to be submitted with other architectural color items by the General Contractor. The Electrical Contractor shall coordinate any such submission required with the General Contractor.

- B. Where surface finishes next to the devices vary in color or shade throughout the project
4. PLATES AND COVERS
- A. Unless otherwise specified or noted, all wiring device plates and covers shall be smooth thermoplastic, Hubbell "P" Series or equivalent. Color shall match device.
 - B. Cover plates shall be of one manufacture insofar as possible.
 - C. Weatherproof plates for G.F.C.I. receptacles shall be cast aluminum, self-closing, gasketed, suitable for standard box mounting, U.L. listed for wet location use, cover closed. Vertical mounting - Hubbell WP26, horizontal mounting - Hubbell CWP26H (die-cast zinc)
 - D. Weatherproof switch plates for toggle-handle switches shall be clear silicone rubber, for standard outlet boxes. Hubbell 1795 or equivalent.
 - E. Cover plates for telephone wall outlets shall be required to fit telephone supplier's modular jack.
5. INSTALLATION
- A. All wiring devices in dusty areas, exposed to weather and moisture shall be installed in Type "FS" conduit fittings having mounting hubs.
 - B. Devices that have been installed before painting shall be masked. No plates or covers shall be installed until all finishing and cleaning has been completed.
 - C. Provide G.F.C.I. duplex feed-thru style receptacles where indicated or required by the National Electrical Code, whether specifically called out or not. When a G.F.C.I. receptacle is on a circuit with other non-G.F.C.I. receptacles, it shall always be placed at the homerun point of the circuit and shall be wired to ground-fault interrupt the downstream outlets on that circuit unless specifically indicated to the contrary. Provide a "G.F.C.I. protected" label on each downstream outlet.
 - D. All receptacles shall be installed with ground prong at top position.
 - E. All outlets not provided with wiring devices shall be closed with a blank plate matching other plates in the area.

END OF SECTION

SECTION 16195

IDENTIFICATIONS

1. GENERAL

- A. Equipment, disconnect switches, motor starters, pushbutton stations, special device plates, and similar materials shall be clearly marked as to their function and use. Markings shall be applied neatly and conspicuously to the front of each item of equipment with 1/2" black lamacoid plate (or equivalent) with white letters 1/4" high.
- B. Each Electrical Contractor shall provide clearly legible typewritten directories in each electrical panel indicating the area, item of equipment, etc. controlled by each switch, breaker, fuse, etc. These directories are to be inserted into plastic card holders in each panel.
- C. New branch circuit panelboards shall be provided with a black lamacoid plastic plate with 1/2" white letters for panel designation and 1/4" white letters showing voltage and feeder information. Branch circuit switches shall be designated as to function. Panelboard and switchgear labels shall indicate the source they are fed from, and the circuit number at the source. Clearly indicate the exact label legend to be furnished with each panelboard and switchgear on the shop drawings for each item of equipment prior to submission of shop drawings.
- D. Lamacoid plates shall be located at center of top of trim for branch circuit panels, switch gear, and centered at side for branch circuit switches. Fasten with self-tapping stainless steel screws or other approved method.

END OF SECTION

SECTION 16452

GROUNDING AND GROUND FAULT PROTECTION

1. GENERAL

- A. All metallic conduit, wireways, supports, cabinets and equipment shall be grounded in accordance with the latest issue of the National Electrical Code and as shown on the Contract Drawings.
- B. The size of the grounding conductor for service equipment shall be not less than that given in Article No. 250-94 of the National Electrical Code, and as shown on the Contract Drawings.
- C. Grounding bus and non-current carrying metallic part of all equipment and conduits shall be securely grounded by connection to common ground.

2. MATERIALS

- A. Ground wires and cables shall be of the AWG sizes shown on the Contract Drawings. All ground wires and cables shall be copper.
- B. All grounding fittings shall be heavy cast bronze or copper of the mechanical type except for interconnection of grounding grid to cable, columns and ground-rods, which shall be welded type as manufactured by Cadweld, Burndy Co., Therm-O-Weld, **or approved equivalent**. Other bonding clamps or fittings shall be as manufactured by O.A. Co., Penn-Union, T & B, Burndy, or approved equivalent.
- C. Ground rods shall be 5/8" minimum diameter, eight feet long, copperweld steel. All ground electrode systems shall be installed in accord with manufacturer's recommendations, U.L. listings, and National Electrical Safety Codes.

3. INSTALLATION

- A. All grounding conductors shall be protected from mechanical injury and shall be rigidly supported. If ground conductors are run through conduit, they shall be securely bonded to such conduit at the entrance and exit. All connection of equipment shall be made with an approved type of solderless connection and same shall be bolted or clamped to equipment or conduit.
- B. All equipment grounding conductors to receptacles, electric heaters, furnace and other equipment not exceeding No. 10 AWG in size shall be green colored Type "TW".
- C. Equipment ground connections to GFI circuit breakers shall be carried and bonded to each outlet on the circuit(s) separate equipment grounding conductor with green color insulation and copper wire.

- D. Bonding terminals and connectors for grounding shall be of the thermal welded type, or mechanical type as required.
- E. All circuits shall have a separate grounding conductor.
- F. All isolated ground circuits shall have a normal grounding conductor (green colored insulation) to ground metal boxes and panels in addition to the isolated grounding conductor serving the circuit.
- G. Grounding connections shall **never** be made to fire protection, natural gas, flammable gas or liquid fuel piping, except where specifically indicated on the plans.
- H. Where dielectric fittings are utilized in piping systems, the piping system shall **not** be utilized as a ground path. Bonding jumpers shall not be utilized to bridge over such fittings. Piping systems shall **not** be utilized as ground paths except where specifically required by codes in the case of water piping.

END OF SECTION

SECTION 16470

ELECTRICAL DISTRIBUTION EQUIPMENT

1. BRANCH PANELBOARDS

- A. This section covers new lighting and power panelboards (refer to schedule and notes on Contract Drawings, of the Contract Drawings).
- B. All panelboards shall be of the circuit breaker type, and shall be of one manufacturer.
- C. Branch panelboards shall be as indicated on the drawings and as specified herein. The lighting/general power panelboards/loadcenters shall be of the dead-front, quick-make, quick-break, plug-in circuit breaker type, with trip indicating and trip free handles. All circuits shall be clearly and properly numbered and shall be provided with thermal magnetic protection. The panelboards shall be enclosed in code gauge, galvanized steel cabinets with smooth finished hinged doors without visible external fasteners and heavy chrome locks. Locks shall all be keyed alike. Each door shall have a directory card inside, covered with a plastic shield, filled in with black india ink or typewritten with circuit numbers and description indicated.
- D. Branch panelboards/loadcenters shall be surface or flush mounted as indicated on the Contract Drawings.
- E. Circuit breakers shall be of 10,000 A.I.C. RMS symmetrical rating unless otherwise indicated on the Contract Drawings.
- F. All main bus and connections thereto in branch panelboards shall be aluminum. All bus bars shall extend full length of panelboards.
- G. All circuit breakers used to switch lights shall be SWD rated.
- H. All HVAC equipment shall be protected by "HACR" rated breakers as required.
- I. Isolated ground panelboards/loadcenters shall be supplied with a separate isolated ground bus.
- J. Panels shall be Square "D", G.E., Siemens, **or approved equivalent.**
- K. Where branch panelboard is used as distribution panel the main circuit breaker shall be service entrance rated.
- L. Each panelboard, as a complete unit, shall have a short circuit current rating equal to or greater than the integrated equipment rating shown on schedules on the plans or as determined by verification with local utility company. This rating shall be established by testing with the overcurrent devices mounted in the panelboard. The short circuit tests on the overcurrent devices and on the panelboard structure shall be made simultaneously by connecting the fault to each overcurrent device with the panelboard connected to its rated voltage source. Method of testing shall be per Underwriters Laboratories Standard UL 67. The source shall be capable of supplying the specified panelboard short circuit current or greater. Testing of panelboard overcurrent devices

for short circuit rating only while individually mounted is **not** acceptable. Also, testing of the bus structure by applying a fixed fault to the bus structure alone is **not** acceptable. Panelboards shall be marked with their maximum short circuit current rating at the supply voltage and shall be UL listed.

2. INSTALLATION INSTRUCTIONS

- A. Panelboards/loadcenters with circuit breakers installed before the building has been finished and cleaned shall be masked.
- B. All dust and debris shall be removed from the panels before it is energized and placed in service.
- C. All panelboard fronts shall be omitted until final punch list inspection is made. Directories for each panelboard shall be completed and available for review by the A/E at that time.

3. SAFETY SWITCHES

- A. Provided general duty safety switches as a final disconnect means as required by NEC and as indicated on the Contract Drawings.
- B. All safety switches shall be NEMA Type 1 or NEMA 3R and General Duty Type GD and UL listed.
- C. All safety switches shall have switchblades that are fully visible in the "OFF" (open) position with the door open.
- D. All current carrying parts shall be plated by an electrolytic process to resist corrosion and to promote cooling.
- E. Switch mechanism shall be quick-make, quick-break, load rated, such that during normal operation of the switch, the operation of the contacts shall not be capable of being restrained by the operating handle after the closing and opening action of the contacts has started. The handle and mechanism shall be an integral part of the box (not cover) with facilities for pad locking in the open or closed position with up to three (3) padlocks. NEMA 3R switch doors shall be interlocked with switch handle so that the door can only be opened when the switch is in the "OFF" (open) position.
- F. Switches shall be as manufactured by Square D., G.E., Seimen's or **approved equivalent**.

4. FUSES

- A. Upon completion of the building, the Contractor shall provide the owner with spare fuses as show below. All fuses shall be BUSSMANN or Reliance Economy.
- B. 10% (minimum of 3) of each type and rating of installed fuses shall be supplied as spares.
- C. No fuses shall be installed in the equipment until the installation of complete, including test and inspections required prior to being energized. All fuses shall be of the same manufacturer to insure retention of selective coordination, as designed.

- D. Circuits 0 to 600 amperes shall be protected by current limiting BUSSMANN LOW-PEAK Dual Element Fuses, LPN-RK (250 volts) or LPPS-RK (600 volts). All dual element fuses shall have separate overload and short circuit elements. Fuse shall incorporate a spring activated thermal overload element having a 284 degree F melting point alloy and shall be independent of the short-circuit clearing chamber. The fuse shall hold 500% of rated current for a minimum of 10 seconds and be listed by Underwriters Laboratories, Inc. with an interrupting rating of 200,000 amperes R.M.S. symmetrical. The fuses shall be UL Class RK1.
- E. Motor Circuits – All individual motor circuits rated 480 amperes or less shall be protected by BUSSMANN LOW PEAK DUAL-ELEMENT FUSES LPN-RK (250 volts) or LPS-RK (600 volts). The fuses for 1.15 service factor motors shall be installed in rating approximately 125% of motor full load current except where high ambient temperatures prevail, or where the motor drives a heavy revolving part which cannot be brought up to full speed quickly, such as large fans. Under such conditions the fuse should be 150% to 200% of the Type KRP-C HI-CAP Time Delay Fuses of the rating shown on the drawings. 1.0 service factor motors shall be protected by BUSSMANN LOW-PEAK Dual-Element Fuses LPN-RK (250 volts) or LPS-RK (600 volts) installed in rating approximately 115% of the motor full load current except as noted above. The fuses shall be UL Class RK1 or L.

END OF SECTION

SECTION 16515

LIGHTING FIXTURES (INTERIOR & EXTERIOR)

1. GENERAL

- A. Furnish and install all lighting fixtures, as herein specified, complete with lamps and accessories for safe and effective operation. All fixtures shall be installed and left in an operable condition with no broken or damaged parts.
- B. All items furnished shall comply with the latest standards applicable such as U.L., NEMA, etc., and shall bear labels accordingly. All fixtures shall be the color specified or as selected by the Architect and fixtures shall have all scratches and damage marks finished and painted.
- C. Eight (8) copies of light fixture factory shop drawings and cuts, showing fixture dimensions, photometric data, installation information and, if applicable, air handling data, shall be submitted to the Engineer for written approval 30 days after bid date.
- D. Alternate fixtures may be substituted for types specified by name or catalog number. Proposed substitutions must be submitted to the Engineer ten working days prior to bid date for written approval to bid. This written approval will only be issued in addendum form.
- E. Where emergency battery packs are provided with fixtures (if any), they shall be connected to an unswitched power line and wired in accord with the manufacturer's recommendations.
- F. All reflecting surfaces, glass or plastic lenses, ballast housings, parabolic louvers, downlighting Alzak cones and specular reflectors shall be handled with care during installation or lamping to avoid fingerprints or dirt deposits. It is preferred that louvers be shipped and installed with clear plastic bags to protect louvers. At close of project, and after construction air filters are changed, remove bags. Any louver or cone showing dirt or fingerprints shall be cleaned with solvent recommended by the manufacturer to a like-new condition, or replaced as necessary in order to turn over to the Owner new fixtures at beneficial occupancy.
- G. Refer to architectural details as applicable for recessed soffit fluorescent fixtures or wherever fixture installations depend upon work of other trades. Coordinate all installations with other trades. Verify dimensions of spaces for fixtures, and if necessary, adjust lengths to assure proper fit and illumination of diffuser and/or area below.
- H. Locate pendant, surface mounted or chain-hung industrial fixtures in mechanical rooms and similar spaces to avoid ductwork and piping. Locate around and between equipment to maximize the available light. Request a layout from the Engineer if uncertain about an installation.

2. VOLTAGE

- A. All lighting fixtures shall be rated 120 volts single phase as noted on the Lighting Fixture Schedule located in the Electrical Plans.

3. BALLASTS

A. Electronic Instant-Start Fluorescent Ballast Specifications

- (1) Fluorescent ballast to be instant-start high performance electronic to operate at a frequency of 20KHz or higher with less than 2% lamp flicker, at an input voltage of 108 to 132 VAC (120 volt line) or 249 to 305 VAC (277 volt line) at an input frequency of 60 Hz, minimum of .88 ballast factor, power factor of .98. Light output to remain constant for line voltage of $\pm 4\%$. Ballast to comply with EMI and RFI limits set by FCC (CFR 47 part 18) for normal electrical equipment and have less than 1.4 lamp current crest factor (or less if required by the fluorescent lamp supplier). Verify this prior to submitting shop drawings. Ballast to meet ANSI Standard 82.41 and be UL listed Class P Type I. Ballast shall be non-PCB bearing.
- (2) Ballast to have less than 10% total harmonic distortion with less than 6% third harmonic distortion. Ballast to have "A" sound rating with a power factor greater than .99 and have a twenty year rated life. Ballasts used shall operate 1, 2, 3, or 4 T8 lamps as specified in the fixture specification. Use a 2, 3 or 4-lamp ballast to match number of lamps in fixture, and meet all switching requirements as shown on the drawings. Ballasts shall be unconditionally warrantied by the manufacturer for a period of three years from the date of substantial completion.
- (3) Motorola, Advance, Universal or Valmont are acceptable manufacturers.

NOTE: No single 2, 3, or 4 lamp ballast with 2 source input will be allowed for any fixture(s) shown supplied by both normal and emergency power.

- (4) Fluorescent ballasts shall be 120 volts, two or three lamp, electronic, solid state, full light output, U.L. listed, style Class "P", high power factor, sound "A" rated. Conform to FCC regulations Part 15, Subpart J. For electromagnetic interference. Advance Mark III, G.E. or Universal. All exterior fluorescent light fixtures shall be provided with cold temperature ballasts. No PCB filled ballasts shall be used.

2. LAMPS

- A. Lamps furnished and installed in indicated fixtures shall be as manufactured by Sylvania, G.E. or Philips. No others shall be acceptable.
- B. All incandescent lamps shall be rated 120 volts with a medium screw type base in wattages less than 300 watts and 120 volts, mogul screw type base in 300 watts and larger.
- C. All fluorescent lamps shall be T8; or as listed in the Lighting Fixture Schedule.

3. LIGHT FIXTURES

- A. See drawings for Lighting Fixture Schedule.
- B. Light fixtures shall be as listed or of equivalent manufacturer. All alternate fixtures must be approved by the Engineer and meet all specifications as listed in the fixture schedule.

4. INSTALLATION

- A. Light fixtures are to be independently hung from the ceiling.
- B. Setting and Securing: Set units plumb, square, and level with ceiling and walls, and secure according to manufacturer's printed instructions and approved shop drawings.
- C. All exterior fixtures shall be adequately and squarely supported and shall be hung plumb in perfect alignment when hung in groups.
- D. All fixtures shall be new and clean with new lamps.

END OF SECTION

SECTION 16671

TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS)

1. GENERAL

- A. The contractor shall furnish and install the Transient Voltage Surge Suppression (TVSS) equipment having the electrical characteristics, ratings and modifications as specified herein and as shown on the contract drawings. To maximize performance and reliability, the AC surge protection shall be integrated into electrical distribution equipment such as switchgear, switchboards, panelboards, busway and/or motor control centers.
- B. Each Surge Suppression Unit (transient voltage surge suppressor, or TVSS) furnished shall meet or exceed UL 1449, Second Edition, with capacity for each basic Category A, B and C, surge rise time of ten microseconds and a surge duration of at least one thousand microseconds.
- C. SPECIAL NOTE: When using a “Meggar” or similar instrument to test conductors in a panelboard or switchboard, disconnect any TVSS device connected to any combination of those conductors. Failure to do so may damage or destroy the TVSS device. If any damage occurs as a result of testing to a TVSS device, the Contractor shall replace the device.

2. REFERENCES

- A. TVSS units and all components shall be designed, manufactured and tested in accordance with the latest applicable UL Listed standards (UL 1449, 2nd Edition, 2007), UL 1283 and CSA certified per CSA 22.2.

3. SUBMITTALS – For Review/Approval

- A. The following information shall be submitted to the Engineer:
 - 1. Product Data: Submit manufacturer’s data on surge protection systems and components as part of shop drawing submissions. Indicate all capacity ratings, clamp times, maximum capacities, EMI/RFI attenuation data, withstand capabilities, physical construction and listing agency approvals.
 - 2. Maintenance Data: Submit maintenance instructions for surge suppression system. Include this data in Operation and Maintenance manuals

4. QUALIFICATIONS

- A. For the specified herein, the manufacturer shall be ISO 9000 certified.
- B. The manufacturer shall be regularly engaged in production of surge protection equipment, of types, sizes and ratings required, whose product have been satisfactorily used in similar service for not less than three years.
- C. Comply with NEC and NFPA requirements, as applicable to materials and installation of surge protection components and wiring. Surge protection equipment shall be UL listed and labeled for its intended use. Where applicable, equipment shall comply with ANSI standards for such equipment.
- D. SPECIAL NOTE: The physical routing, length and connections of the unit’s phase, neutral and ground conductors are critical to the performance of surge suppression units. The Contractor shall carefully observe and comply with ANSI standards for such equipment.

5. DELIVERY, STORAGE AND HANDLING

- A. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of manufacturer's instructions shall be included with the equipment at time of shipment.

6. OPERATION AND MAINTENANCE MANUALS

- A. Equipment operation and maintenance manuals shall be provided with each assembly shipped, and shall include instruction leaflets and instruction bulletins for the complete assembly and each major component.

7. MANUFACTURERS

- Liebert Corporation, Inc.
- Current Technologies, Inc.
- United Power, Inc.
- General Electric Corporation
- Transtector, Inc.
- Advanced Protection Technologies, Inc.

The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the Engineer ten (10) days prior to bid date.

8. VOLTAGE SURGE SUPPRESSION – GENERAL

A. Electrical Requirements:

1. Unit Operating Voltage – Refer to drawings for operating voltage and unit configuration.
2. Maximum Continuous Operating Voltage (MCOV) – The MCOV shall be greater than 115% of the nominal system operating voltage.
3. The suppression system shall incorporate a hybrid designed Metal-Oxide Varistors (MOV) surge suppressor for the service entrance and other distribution level. The system shall not utilize silicon avalanche diodes, selenium cell, air gaps or other components that may crowbar the system voltage leading to system upset or create any environmental hazards.
4. Protection Modes – For a Wye configured system, the device must have directly connected suppression elements between line-neutral (L-N), line-ground (L-G), and neutral-ground (N-G). For a Delta-configured system, the device must have suppression elements between line to line (L-L) and line to ground (L-G).
5. UL 1449 2nd Edition Suppressed Voltage Rating (SVR) – The Maximum UL 1449 2nd Edition SVR for the device must not exceed the following:

Modes	208Y/120 & 120/240	240 Delta	480Y/277	480 Delta	600Y/347	600 Delta
L-N and/or L-G	400V	800V	800V	1500V	1000V	2000V
N-G	400V	-	800V	-	1000V	-
L-L	800V	800V	1500V	1500V	2000V	2000V

B. TVSS Design:

1. **Balanced Suppression Platform** – The surge current shall be equally distributed to all MOV components to ensure equal stressing and maximum performance. The surge suppression platform must provide equal impedance paths to each matched MOV. Designs incorporating TVSS modules shall not be acceptable.
2. **Electrical Noise Filter** – Each unit shall include a high-performance EMI/RFI noise rejection filter. Noise attenuation for electric line noise shall be 50 dB at 100 kHz using the MIL-STD-220A insertion loss test method. Products not able to demonstrate noise attenuation of 50 dB at 100 kHz shall be rejected.
3. **Extended Range Filter** – The Surge Protective Device shall have a High Frequency Extended Range Tracking Filter in each Line to Neutral mode with compliance to UL 1283 and NEMA LS1. The filter shall have published high frequency attenuation rating in the attenuation frequencies.

Attenuation Frequency	50kHz	100kHz	500 kHz	1MHz	10MHz	100MHz
Insertion Loss (Ratio)	40	316	316	89	200	79
Insertion Loss (dB)	32	50	50	39	46	38

4. **Internal Connections** – No plug-in component modules or printed circuit boards shall be used as surge current conductors. All internal components shall be hardwired with connections utilizing low impedance conductors and compression fittings.
5. **Standard Monitoring Diagnostics** – For each surge suppression unit, Cat. A, B and C, provide unit function status indicators. These indicators shall be mounted in the face of the equipment panel. Provide green L.E.D. illuminated for normal operation, red L.E.D. for troubled/fault or reduction of surge suppression capacity. Provide an audible alarm with silence switch to alarm at unit on malfunction for category “C” units only. Provide a resettable surge counter for each Cat. “C” unit to indicate each suppression operation of the unit.

C. Minimum Repetitive Surge Current Capability as per ANSI/IEEE C62.41 and ANSI/IEEE C62.45 – 1992

- D. The suppression filter system shall be repetitive surge tested in every mode utilizing a 1.2 x 50usec, 20kV open circuit voltage. 8 x 20usec, 10kA short circuit current Category C3 bi-wave at one minute intervals without suffering either performance degradation or more than 10% deviation of clamping voltage at specified surge current. The minimum repetitive surge current capability as per ANSI/IEEE C62.41 and ANSI/IEEE C62.45 – 1992 shall be:

- a. Service Entrance: 12000 impulse per mode.
- b. Distribution Panelboard: 10000 impulse per mode.
- c. Branch Location Panelboard: 9000 impulse per mode.

9. SYSTEM APPLICATION

- A. The TVSS applications covered under this section include distribution and branch panel locations, bus plugs, motor control centers (MCC), switchgear, and switchboard assemblies. The

branch panel located TVSS shall be tested and demonstrate to be suitable for ANSI/IEEE C62.41 Category C1 environments.

- B. Surge Current Capacity – The minimum total surge current 8 x 20 microsecond waveform that the device is capable of withstanding shall be as shown in the following table:

Minimum total Surge Current and Withstand Capability with compliance to ANSI/IEEE C62.41 and NEMA LS1			
Application	Per Phase	Per Mode	Surge Withstand Capabilities ANSI/IEEE C3 Wave (10kA)
Service Entrance Locations (Switchboards Switchgear, MCC, Main Entrance)	250kA	125kA	12000
High Exposure Roof Top Locations (Distribution Panelboards)	160kA	80kA	10000
Branch Locations (Panelboards, MCC;s, Busway)	120kA	60kA	9000

- C. Lighting and Distribution Panelboard Requirements:

1. The TVSS application covered under this section includes lighting and distribution panelboards. The TVSS units shall be tested to demonstrate suitability for ANSI/IEEE C62.41 Category C1 environments.
2. The TVSS shall not limit the use of Through-feed lugs, Sub-feed lugs and Sub-feed breaker options.
3. The TVSS shall be immediately installed on the load side of the main breaker.
4. The panelboard shall be capable of re-energizing upon removal of the TVSS.
5. A direct bus bar connection shall be used to mount the TVSS component to the panelboard bus bar to reduce the impedance of the shunt path.
6. The TVSS panelboard shall be constructed using a direct bus bar connection (cable connection between bus bar and TVSS device is not acceptable). TVSS units that use a cable connection do not meet the intent of this specification.
7. The TVSS shall be included and mounted within the panelboard by the manufacturer of the panelboard.
8. The TVSS shall be of the same manufacturer as the panelboard.
9. The complete panelboard including the TVSS shall be UL67 listed.

- D. Retrofit Installation (externally mounted suppressor). Maximum conductor lead length between breaker and suppressor shall not exceed 14 inches. Comply with the manufacturer's recommended installation and wiring practices.

- E. Switchgear, Switchboard, MCC and Busway/Bus Plug requirements:

1. The TVSS application covered under the section is for switchgear, switchboard, MCC and Bus Plug locations. Service entrance located TVSS shall be tested and suitable for ANSI/IEEE C62.41 Category C3 environments.

2. The TVSS shall be of the same manufacturer as the switchgear, switchboard, MCC and Bus Plug.
3. The TVSS shall be factory installed inside the switchgear, switchboard, MCC and Bus Plug at the assembly point by the original equipment manufacturer.
4. Locate suppressor on load side of main disconnect device, as close as possible to the phase conductors and ground/neutral bar.
5. Provide a 30-amp disconnect. The disconnect shall be directly integrated to the suppressor and assemble bus using bolted bus bar connections.
6. The TVSS shall be integral to switchgear, switchboard, MCC and Bus Plug as factory standardized design.
7. All monitoring diagnostics features shall be visible from the front of the equipment.

10. ENCLOSURES

- A. All enclosed equipment shall have NEMA 1/3R general purpose enclosures, unless otherwise noted. Provide enclosures suitable for locations as indicated on the drawings and as described below:
 1. NEMA 1/3R rainproof enclosures intended for outdoor use primarily to provide protection against rain, sleet, and damage from external ice formation.
 2. NEMA 12 dust-tight enclosures intended for indoor use primarily to provide protection against circulating dust, falling dirt and dripping non-corrosive liquids. (Panelboards Only)
 3. NEMA 4 watertight stainless steel intended for indoor or outdoor use primarily to provide protection against windblown dust and rain, splashing rain, hose-directed water, and damage from external ice formation. (Side Mounted Units Only)

11. FACTORY TESTING

- A. Standard factory tests shall be performed on the equipment under this section. All test shall be in accordance with the latest version of NEMA and UL standards.

12. INSTALLATION

- A. The Contractors shall install all equipment per the manufacturer's recommendations and the contract drawings.

13. WARRANTY

- A. The manufacturer shall provide a full ten (10) year warranty from the date of shipment against and TVSS part failure when installed in compliance with manufacturer's written instructions and any applicable national or local code.

14. DATA COMMUNICATIONS AND TELEPHONE LINE SURGE PROTECTION

- A. SCOPE

1. This section describes the materials and installation requirements for transient voltage surge suppressors for the protection of low voltage telephone data, and signal conductors. This includes systems such as facility entrance for fire/security alarms, sound systems, access control systems, nurse call systems, computers, networks (LANs), CCTV, CATV, loop circuits, buss systems, key/PBX, motor controls, and various other electronic based systems that are powered and/or communicate via metallic wire.
2. Arrestors shall be UL listed, properly grounded per NEC and shall be located at the service entrance point for each cable installed by a utility company or at the point for building entry for Contractor-installed cables leading from antennas. Also provide surge arrestors of the proper type for any copper cables that are installed between buildings by the Contractor, if such a condition occurs within the project.

B. QUALIFICATIONS

1. The manufacturer of the data communication protectors shall be the manufacturer of AC power line surge protection (16671 Part A and B).
2. This specification is based on the Cutler-Hammer DATACOM protectors for function and quality. Products in compliance with the specification and manufactured by others will be considered only if pre-approved by the engineer ten (10) days prior to the bid date.

C. REFERENCE STANDARDS

1. The specified systems(s) shall be designed, manufactured, tested and installed in compliance with National Electric Code (NEC) National Fire Protection Association (NFPA 20, 70, 75, 78), Underwriters Laboratory (UL 497, 497A, 497B) and CCITT International Standards for Communication Circuits.

D. REQUIREMENTS

- A. The Contractor shall furnish and install surge suppression devices for all electronic based systems.
- B. The system parameters of the electronic system requiring protection shall include but not be limited to:
 1. Application/Communication
 2. Maximum series current
 3. Signal speed
 4. Peak voltage (DC)
 5. Shielding requirements
- C. All communication conductors leaving and entering a building shall be protected with surge suppression as defined by the National Electric Code (NEC).

END OF SECTION

SECTION 16721

FIRE ALARM SYSTEM

1. GENERALA. SCOPE AND RELATED DOCUMENTS

1. The work covered by this section of the specifications includes the furnishing of all labor, equipment materials and performance of all operations in connection with the installation of the Fire Alarm System devices as shown on the drawings and as herein specified and as required by the applicable codes.
2. The requirements of the conditions of the Contract, Supplementary Conditions and General Requirements, apply to the work specified in this section.
3. The complete installation shall conform to the applicable sections to NAPA-71, NAPA-72A, B, C, D, Local, State Code Requirements, National Electrical Code (Article 760) and the American with Disabilities Act (ADA). The requirements of any local fire department and the Authority Having Jurisdiction shall also be observed in the system installation and device layout.
4. The work included in this section shall be coordinated with related work specified elsewhere in these specifications.

B. QUALITY ASSURANCE

1. Each and all items of the Fire Alarm System shall be listed as a product of a SINGLE fire alarm system manufacturer under the appropriate category by the Underwriters' Laboratories, Inc. (UL), and shall bear the "U.L." label. All control equipment shall be listed under UL category UOJZ as a single control unit. Partial listing shall **NOT** be acceptable.
2. In addition to the UL-UOJZ requirement listed above, the system controls shall be UL listed for Power Limited Applications per NEC 760. All circuits must be marked in accordance with NEC Article 760-23.
3. Where Fire Alarm circuits leave the building, additional transient protection must be provided for each circuit. Devices must be UL listed under standard #497B (Isolated Loop Circuit Protectors).

C. GENERAL

1. Furnish and install additional fire alarm devices, for the expansion areas that are compatible with the existing fire alarm system as described herein and as shown on the plans; to be wired, connected, and left in first class operating condition. In general, systems shall include a automatic fire detectors, horns, bells, flashing lights, Raceways, all wiring, connections to devices and mechanical controls, outlet boxes, junction boxes, and all other necessary material for a complete operating system.

2. Through the use of panel control switches, the existing fire alarm control panel shall allow for loading or editing any special instructions or operating sequences as required. The system shall be capable of on-site programming to accommodate system expansion and facilitate changes in operation. No special tools, modems, or an off-board programmer shall be required to program the system. All instructions shall be stored in a resident non-volatile programmable memory within the fire alarm control unit. Loss of primary and secondary power shall not erase the instructions stored in memory.
3. All peripheral devices shall be the standard product of a single manufacturer and shall display the manufacturer's name of each component. Any catalogue numbers specified under this section are intended only to identify the type, quality of design, materials, and operation features desired.
4. Equipment submissions must include a minimum of the following:
 - a. Complete descriptive data indicating UL listing for all system components.
 - b. A copy of any state or local Fire Alarm System equipment approvals.

D. OPERATION

1. The system alarm operation subsequent to the alarm activation of any manual station or automatic detection device shall be as follows:
 - a. The appropriate initiating device circuit red LED shall flash on the control panel (and the remote annunciator) until the alarm has been silenced at the control panel (or the remote annunciator). Once silenced, this same LED shall latch on. A subsequent alarm received after silencing shall flash subsequent zone alarm LED on the control panel.
 - b. An internal tone-alert signal shall occur within the control panel and the graphic annunciator until silenced.
 - c. All alarm indicating appliances shall sound in a temporal code pattern until silenced by the Alarm Silence Switch at the control panel or the remote annunciator.
 - d. A supervised signal to notify the local fire department or an approved central station (as required by local codes) shall be activated.
2. The alarm indicating appliances may be silenced, by authorized personnel upon entering the locked control cabinet and operating the Alarm Silence Switch (or by use of the key operated switch or keypad entry of digital code at the remote annunciator). A subsequent alarm received from another device (or zone) alarm shall reactivate the signals.

E. PERIPHERAL DEVICES

1. Manual Pull Stations

- a. Manual stations shall be a single action station.
- b. Construction is to be of high impact, red lexan with raised white lettering and a smooth high gloss finish.
- c. Stations shall be keyed alike with the fire alarm control panel. Stations which utilize screwdrivers, allen wrenches, or other commonly available tools shall NOT be accepted.
- d. When the station is operated, the handle shall lock in a protruding manner to facilitate quick visual identification of the activated station.

2. Horns and Audio Visual Units

- a. Alarm horns shall be polarized and shall be operated by 24 VDC.
- b. Each horn assembly shall include separate wire leads for in/out wiring for each leg of the associated signal circuit. T-tapping of signal device conductors to signal circuit conductors shall NOT be accepted.
- c. The audio/visual units shall be semi-flush mounted with back boxes and flush trim ring.
- d. The white lexan lens shall have "FIRE" in red lettering on the sides and shall be pyramidal in shape to allow for side viewing.
- e. Audio/Visual units are to have the capability of selecting the candela intensity of the visual strobe. The unit shall have the capability of selecting between 15, 30, 75, or 110 candelas.
- f. Units shall meet A.D.A. requirements.

3. Visual Flashing Lamps

- a. Visual indicating appliances shall be UL listed and be capable of either ceiling or wall mounting.
- b. The LEXAN lens shall be pyramidal in shape to allow better visibility. Visual units shall be of the stand alone type or be incorporated as part of the Horn unit.
- c. Audio/Visual units are to have the capability of selecting the candela intensity of the visual strobe. The unit shall have the capability of selecting between 15, 30, 75, or 110 candelas.
- d. Units shall meet A.D.A. requirements.

F. INSTALLATION

1. Provide and install the system in accordance with the plans and specifications, all applicable codes and the manufacturer's recommendations. All wiring, if installed in conduit, shall be in a completely separate conduit system. All wiring, if not installed in conduit, shall be rated for such applications such as plenum-rated cables where installed in plenum spaces, etc.
2. All junction boxes shall be labeled "Fire Alarm". Wiring color code shall be maintained throughout the installation.
3. Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate subcontractors.
4. The Contractor shall clean all dirt and debris from the inside and the outside of the fire alarm equipment after completion of installation.
5. Install all visual notification appliances at 80 inches above the finished floor. Combine audible and visual notification appliances at the same location into a single unit.
6. Ground equipment and conductor and cable shields as specified by the equipment manufacturer. Provide 5-ohm ground at main equipment location. Measure, record and report ground resistance.
7. All submittals for this project shall list names, license numbers, and telephone numbers of two installers employed full time by the manufacturer to install and test fire alarm systems in the State of Kentucky.

G. TESTING

1. The completed expansion of the fire alarm system shall be fully tested in accordance with NAPA-72H by the Contractor in the presence of the Owner's representative and Local Fire Marshal.
2. Upon completion of a successful test, the Contractor shall so certify in writing to the Owner and General Contractor.

H. WARRANTY

1. The Contractor shall warrant the fire alarm device wiring and equipment to be free from inherent mechanical and electrical defects for a period of one (1) year from the date of the completed and certified test or from the first beneficial use.

END OF SECTION

SECTION 16740

TELECOM AND DATA RACEWAY SYSTEM

1. GENERAL

- A. Each Electrical Contractor's attention is directed to Section 16010 – General Provisions and Section 16005 – Scope of Electrical Work; and all other contract documents as they may apply to his work.

2. SCOPE OF THE WORK

- A. The Electrical Contractor shall provide the necessary labor, materials and services to provide telephone raceways as indicated on the plans and specified herein. This work shall include, but is not necessarily limited to:
- 1) A single-gang box and a 3/4" conduit routed, from each telecom/data device outlet box locations, to an accessible location above a drop-ceiling (unless otherwise noted).
 - 2) All necessary conduit, boxes, pedestals, etc., as required by the local telephone company.
 - 3) Making arrangements with the local telephone company for all work to be performed by them and payment of all charges made by them. The contractor shall insure that work to be performed by the companies is scheduled and accomplished on a timely basis so as not to delay any other parts of the construction.

3. INSTALLATION

- A. No more than the equivalent of two 90 degree sweeps will be allowed in a run, including offsets. All 90 degree bends are to be long sweep bends.
- B. All pull wire shall be installed and tied off in each empty conduit. Pull wires used outside of facilities shall be stainless steel or copper, #12 AWG. Pull wires used inside facilities shall be nylon.
- C. All communications conduits shall be a minimum of 12" from power conduits or cables. All communications conduits shall also be a minimum of 24" from steam pipes and condensation lines if crossing perpendicular.
- D. All necessary precautions shall be taken by the contractor during construction to prevent the lodging of dirt, plaster, or trash in all conduit, tubing, fittings, and boxes.
- E. All conduit, tubing, and raceways shall be installed in such a manner to insure against collection of trapped condensation. Raceway runs shall be arranged to be void of traps.
- F. Provide nylon pull-strings and blank faceplates for all empty telephone/data outlet boxes.

END OF SECTION

SECTION 6

CONTRACT NO. "I-1"

CONTRACT AND BOND FORMS

AGREEMENT

PAYMENT BOND

PERFORMANCE BOND

CERTIFICATE OF INSURANCE

NOTICE OF AWARD

NOTICE TO PROCEED

CHANGE ORDER

PARTIAL PAYMENT REQUEST

CERTIFICATE OF SUBSTANTIAL COMPLETION

FORM OF WAIVER AND RELEASE OF LIEN
(General Contractor)

FORM OF WAIVER AND RELEASE OF LIEN
(Sub-Contractor)

AGREEMENT BETWEEN OWNER AND CONTRACTOR

THIS AGREEMENT is by and between the **Big Sandy Water District** ("Owner") and ("Contractor"), doing business as (an individual, corporation, or partnership). Owner and Contractor in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 –WORK

Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: **Contract No. "I-1" – Office Building.**

ARTICLE 2 – THE PRODUCT

2.01. The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows: **Contract No. "I-1" – Office Building.**

ARTICLE 3 - ENGINEER

3.01. The Project has been designed by **Sisler-Maggard Engineering, PLLC**, who is to act as the 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 *Days to Achieve Substantial Completion and Final Payment*

A. The Work will be substantially completed within **150** days after the date when the Contract Time commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within **150** days after the date when the Contract Time commence to run.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. 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 requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner **\$500** for each day that expires after the time specified in Paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner **\$500** for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A, 5.01.B, and 5.01.C below:

- A. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in this paragraph 5.01.A:

As provided in Paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 9.07 of the General Conditions. Unit prices have been computed as provided in Paragraph 11.03 of the General Conditions.

BID SCHEDULE

Total Cost

TO BE FILLED IN AFTER BIDS AND AS PART OF FINAL CONTRACT DOCUMENTS

Contractor agrees to perform all of the Work described in the Specifications and shown on the Plans for the bid price of: _____ Dollars and _____ Cents (\$_____). The Unit Price shall govern. The Owner will make corrections in extensions and additions to determine the Total Bid Amount for Award.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

A. Contractor shall submit Applications for Payment in accordance with Article 14 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 20th day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of 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 in the General Requirements:

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 Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions:
 - a. 95 percent of Work completed (with the balance being retainage); and
 - b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions.

6.03 Final Payment

A. Upon receipt of the final Application for Payment accompanied by Engineer's recommendation of payment in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay Contractor as provided in Paragraph 14.07 of the General Conditions the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages.

ARTICLE 7 – INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the maximum legal rate.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

- A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
- B. Contractor has visited the Site 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 federal, state, and local 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 contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions.
- E. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.
- F. Contractor does not consider that any 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 Documents.
- 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 correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.
- I. 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.
- J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

- A. The Contract Documents consist of the following:
 - 1. Advertisement for Bids
 - 2. Instructions to Bidders
 - 3. Agreement (pages 1 to 6 inclusive).
 - 4. Performance bond (pages 1 to 3, inclusive).
 - 5. Payment bond (pages 1 to 3, inclusive).
 - 6. Bid bond with Power of Attorney (pages 1 to 2, inclusive)
 - 7. Certificate of Insurance
 - 8. General Conditions (pages 1 to 66, inclusive).
 - 9. Supplementary Conditions (pages 1 to 15, inclusive).
 - 10. Special Conditions (pages 1 to 12, inclusive).
 - 11. Specs. as listed in the table of contents of the Project Booklet

12. Drawings consisting of 21 sheets with each sheet bearing the following general title:

Contract No. "I-1" Office Building and dated **May 2019**.

13. Addenda (numbers ___ to ___, inclusive).
14. Exhibits to this Agreement (enumerated as follows):
a) Contractor's Bid (pages 1 to 5, inclusive) with Certifications.
b) Subcontractor's List
c) Manufacturer's List
15. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
a. Notice of Award (1 page)
b. Notice to Proceed (1 page)
c. Work Change Directives.
d. Change Order(s).
e. Certificate of Substantial Completion

- 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 Paragraph 3.04 of 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. 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, moneys that may become due and moneys that are 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 partners, successors, assigns, and legal representatives to the other party hereto, its partners, 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 Other Provisions: NONE

IN WITNESS WHEREOF, Owner and Contractor, Engineer, and Agencies. All portions of the Contract Documents have been signed, initialed, or identified by Owner and Contractor or identified by Engineer on their behalf. Contractor have signed this Agreement in six copies. One counterpart each has been delivered to Owner

This Agreement is dated _____. This Agreement shall not be effective unless and until Agency's designated representative concurs.

OWNER: Big Sandy Water District

CONTRACTOR

By: Paul E. Thomas

By: _____

Title: Chairman

Title: _____

[CORPORATE SEAL]

[CORPORATE SEAL]

Attest: _____

Attest: _____

By: David Salisbury

Title: Secretary

Title: _____

Address for giving notices:

Address for giving notices:

Big Sandy Water District

18200 State Route 3

Catlettsburg, KY 41129-9325

Agent for service of process:

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

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Principal,
(Corporation, Partnership or Individual)

and _____
(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

Big Sandy Water District
(Name of Owner)

18200 S. R. 3, Catlettsburg, Ky. 41129
(Address of Owner)

hereinafter called OWNER, and unto all persons, firms, and corporations who or which may furnish labor, or who furnish materials to perform as described under the contract and to their successors and assigns in the total aggregate penal sum of _____ Dollars (\$ _____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the PRINCIPAL entered into a certain contract with the OWNER, dated the ____ day of _____, 2019, a copy of which is hereto attached and made a part hereof for the construction of: **Contract "I-1" – Office Building.**

NOW, THEREFORE, if the PRINCIPAL shall promptly make payment to all persons, firms, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extensions or modifications thereof, including all amounts due for materials, lubricants, oil, gasoline, coal, and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and for all labor cost incurred in such WORK including that by a SUBCONTRACTOR, and to any mechanic or materialman lienholder whether it acquires its lien by operation of State or Federal law; then this obligation shall be void, otherwise to remain

in full force and effect.

PROVIDED, that beneficiaries or claimants hereunder shall be limited to the SUBCONTRACTORS, and persons, firms, and corporations having a direct contract with the PRINCIPAL or its SUBCONTRACTORS.

PROVIDED, FURTHER, that the said Surety for value received stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder of the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no suit or action shall be commenced hereunder by any claimant: (a) Unless claimant, other than one having a direct contract with the PRINCIPAL (or with the GOVERNMENT in the event the GOVERNMENT is performing the obligations of the OWNER), shall have given written notice to any two of the following: The PRINCIPAL, the OWNER, or the SURETY above named within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the PRINCIPAL, OWNER, or SURETY, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer. (b) After the expiration of one (1) year following the date of which PRINCIPAL ceased work on said CONTRACT, is being understood, however, that if any limitation embodied in the BOND is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

PROVIDED, FURTHER, that it is expressly agreed that this BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this BOND and whether referring to this BOND, the contract or the loan documents shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no financial settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in 6 (six) counterparts,
(number)

each one of which shall be deemed an original, this the _____ day of _____, 2019.

ATTEST:

(Principal)

(Principal Secretary)

(SEAL)

BY: _____(s)

(Witness as to Principal)

(Address)

(Address)

(Surety)

ATTEST:

BY: _____

Attorney-in-Fact

(Witness to Surety)

(Address)

(Address)

NOTE:Date of BOND must not be prior to date of CONTRACT. If CONTRACTOR is a partnership, all partners shall execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in Kentucky.

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

_____, hereinafter called Principal, and
(Corporation, Partnership or Individual)

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

Big Sandy Water District

(Name of Owner)

18200 S. R. 3, Catlettsburg, Ky. 41129

(Address of Owner)

hereinafter called OWNER in the total aggregate sum of _____
_____ Dollars (\$_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the ____ day of _____, 2019 a copy of which is hereto attached and made a part hereof for the construction of:

Contract "I-1" – Office Building

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the SURETY and during the one year guaranty period, and if the PRINCIPAL shall

satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then his obligation shall be void otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, the Contract or the Loan Documents shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no financial settlement between the OWNER and the PRINCIPAL shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied. The OWNER are the only beneficiaries hereunder.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each
(Number)

one of which shall be deemed an original, this the _____ day of _____, 2019.

ATTEST:

(Principal)

(Principal Secretary)
(SEAL)

BY: _____(s)

(Witness as to Principal)

(Address)

(Address)

ATTEST:

(Surety)

(Surety Secretary)
(SEAL)

BY: _____(s)

(Witness to Surety)

(Attorney-in-Fact)

(Typed Name)

(Address)

(Phone)

NOTE: Date of BOND must not be prior to date of CONTRACT.

If CONTRACTOR is a partnership, all partners shall execute BOND.
IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the Project is located.

CERTIFICATE OF INSURANCE

TO BE FURNISHED

BY SUCCESSFUL BIDDER

NOTICE OF AWARD

TO: _____

PROJECT Description: The project includes but is not limited to, the construction of:

Contract "I-1" – Office Building.

The OWNER has considered the BID submitted by you for the above described WORK in response to its Bids received _____ 2019, and Instructions for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$_____.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance BOND, and Payment BOND and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your Bid Bond. The Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this ____ day of _____, 2019.

Big Sandy Water District
OWNER

BY: _____
Paul E. Thomas

TITLE: Chairman

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged

by _____

this the _____ day of _____, 2019.

By: _____

Title: _____

NOTICE TO PROCEED

TO: _____, 2019
(Contractor)

ADDRESS:

OWNER'S PROJECT NO. 15030
PROJECT Contract "I-1" – Office Building

OWNER'S CONTRACT NO. "F-1"

You are hereby notified to commence WORK in accordance with the Agreement dated _____, 2019 on or before _____, 2019 and you are to complete the WORK within **150** consecutive calendar days thereafter. The date of completion of all WORK is therefore _____, 2019.

Big Sandy Water District
Owner

By: _____
Name: Paul E. Thomas
Title: Chairman

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by

this the _____ day of _____, 2019.

By: _____
Name: _____
Title: _____



Date of Issuance:
Owner:
Contractor:
Engineer:
Project:

Effective Date:
Owner's Contract No.:
Contractor's Project No.:
Engineer's Project No.:
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: _____

PARTIAL PAYMENT REQUEST

**DISC WILL BE FURNISHED
TO SUCCESSFUL BIDDER
AT TIME OF CONTRACT AWARD**

CERTIFICATE OF SUBSTANTIAL COMPLETION

OWNER's Project No: _____ ENGINEER's Project No.: 15030
Project Contract "I-1" – Office Building

CONTRACTOR
Contract For Contract "I-1" – Office Building

This Certificate of Substantial completion applies to all Work under the Contract Documents or to the following specified parts thereof:

ALL

To Big Sandy Water District
OWNER

And To _____
CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within ____ days of the above date of Substantial Completion.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance, and warranties shall be as follows:

RESPONSIBILITIES:

OWNER: ALL

CONTRACTOR: NONE

The following documents are attached to and made a part of this Certificate:

NONE

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 Documents.

Executed by ENGINEER on _____

Sisler-Maggard Engineering, PLLC
ENGINEER

By: _____
Joseph F. Sisler, P.E., P.L.S., President

CONTRACTOR accepts this Certificate of Substantial Completion on _____ 2019

CONTRACTOR

By: _____

OWNER accepts this Certificate of Substantial Completion on _____ 2019

Big Sandy Water District
OWNER

By: _____
Paul Thomas, Chairman

FORM OF WAIVER AND RELEASE OF LIEN

(General Contractor)

TO WHOM IT MAY CONCERN:

WHEREAS, the undersigned has performed or furnished, is performing, or furnishing, or will perform or furnish labor or material, fuel, equipment, tools, etc., in connection with the construction of Contract No. "I-1" Office Building

_____ for Big Sandy Water District
_____ at Boyd County, Catlettsburg, Ky.

NOW, THEREFORE, THESE PRESENTS WITNESS, that the undersigned, for a good and valuable consideration to the undersigned well and truly paid at or before the signing and delivery hereof, the receipt whereof is hereby acknowledged, does hereby waive, release and relinquish any and all claims, liens and rights and claims of liens which the undersigned now has, or may hereafter have, on or against the said premises and the building, plant, equipment and machinery of their Owner, Big Sandy Water District _____, or on or against Big Sandy Water District _____, on account of labor performed or to be performed or material, fuel, equipment, tools, etc., furnished or to be furnished by the undersigned for use in or in connection with the construction and erection of said project; so that Big Sandy Water District _____, its successors and assigns, shall and may have, hold and enjoy the same freed and discharged now has or might or could have if these presents had not been made.

IN WITNESS WHEREOF, the undersigned has hereunto set his hand and seal this _____ day ____ of _____, 2019

Name of General Contractor

By _____
Signature of Officer or Partner

Title or Officer

WITNESS:

- *Insert name of building or project
- **Insert address of building project
- ***Insert name of Owner

FORM OF WAIVER AND RELEASE OF LIEN

(Sub-Contractor)

TO WHOM IT MAY CONCERN:

WHEREAS, the undersigned has performed or furnished, is performing, or furnishing, or will perform or furnish labor or material, fuel, equipment, tools, etc., in connection with the construction of **Contract "I-1" – Office Building** at Boyd County Catlettsburg, Kentucky.

NOW, THEREFORE, THESE PRESENTS WITNESS, that the undersigned, for a good and valuable consideration to the undersigned well and truly paid at or before the signing and delivery hereof, the receipt whereof is hereby acknowledged, does hereby waive, release and relinquish any and all claims, liens and rights and claims of liens which the undersigned now has, or may hereafter have, on or against the said premises and the building, plant, equipment and machinery of their Owner, **Big Sandy Water District**, or on or against **Big Sandy Water District**, its successors and assigns, or on or against the General Contractor Big Sandy Water District, his or its heirs, executors, administrators, successors and assigns, under the laws of the Commonwealth of Kentucky, on account of labor performed or to be performed, or material, fuel, equipment, tools, etc., furnished or to be furnished by the undersigned for use in or in connection with the construction and erection of said building; so that the said **Big Sandy Water District**, its successors and assigns, shall may have, hold and enjoy same freed and discharged from all liens, claims and demands whatsoever which the undersigned now has or might or could have if these presents had not been made.

IN WITNESS WEREOF, the undersigned has hereunto set his hand and seal this _____ day of _____, 2019.

Name of Sub-Contractor

By _____
Signature of Officer or Partner

Title or Officer

WITNESS:

- *Insert name of building or project
- **Insert address of building project
- ***Insert name of Owner
- ****Insert name of General Contractor

SECTION 7

CONTRACT NO. "I-1"

BID FORMS AND BID BONDS

**BID FORMS INCLUDING
SUBCONTRACTORS & MANUFACTURERS LIST**

BID BOND WITH POWER OF ATTORNEY

BIDDER'S QUALIFICATIONS STATEMENT

RURAL DEVELOPMENT FORMS

COMPLIANCE STATEMENT – RD 400-6
NOTICE OF REQUIREMENTS FOR CERTIFICATIONS OF NON-SEGREGATED FACILITIES
CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS – 1940-Q
EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION – EEO-1
USDA – CERTIFICATION REGARDING DEBARMENT AND SUSPENSION – AD-1048
INSTRUCTIONS FOR CERTIFICATION
USDA – EQUAL OPPORTUNITY AGREEMENT – RD 400-1
CONTRACTOR'S CERTIFICATE CONCERNING LABOR STANDARDS AND PREVAILING WAGE
REQUIREMENTS

**Forms presented in this Section 7 must be used. No Substitutes will be allowed.
An extra set of the above forms will be furnished to each plan holder for preparation
of bids.**

All of the above forms must be submitted with bids on each contract.

BID FORM

BIG SANDY WATER DISTRICT

CONTRACT NO. "I-1" – OFFICE BUILDING

BIDDER'S PROPOSAL

Proposal of _____ (hereinafter called "BIDDER"), organized and existing under the laws of the State of _____, doing business as (a partnership, or a corporation, or an individual) _____, to **Big Sandy Water District** (hereinafter called "OWNER").

In compliance with the Advertisement for Bids, BIDDER hereby proposes to furnish all equipment, materials, and labor for the work required to construct the **Contract No. "I-1" – Office Building** in strict accordance with the Contract Documents, within the time set forth therein, and at the prices stated below.

BID SCHEDULE

ITEM NO.	ITEM DESCRIPTION	UNIT QUANTITY		UNIT COST	TOTAL COST
1	Building Complete	1	L.S.		
2	Stone Base (SEE SITE PLAN) Detail "C"	500	S.Y.		
3	Asphalt Paving on existing stone base (SEE SITE PLAN) Detail "B"	300	S.Y.		
4	Asphalt Paving including stone base (SEE SITE PLAN) Detail "A"	52	S.Y.		
TOTAL ITEMS BID (1-4)					

BIDDER agrees to perform all of the Work described in the Specifications and shown on the Plans for the bid price of : _____ Dollars and _____ Cents (\$ _____). Amount shall be shown in both words and figures. The Unit Price shall govern. The Owner will make corrections in extensions and additions to determine the Total Bid Amount for Award.

No bid will be considered unless all **Items 1 thru 4** in the Bid Schedule are priced, and only one contract will be awarded.

The quantities of each item on the bid, as finally ascertained at the close of the contract, will determine the total payments to accrue under the contract.

No bid will be considered unless all items in the Bid Schedule are priced, and only one contract will be awarded.

The bid will be awarded in the aggregate total of the Bid Schedule.

The above price shall include all labor, materials, overhead, profit, insurance, and other costs necessary to cover the finished work of the several kinds called for including incidentals not set out as specific bid items and in accordance with Basis for Payment (Section 01740 of Specifications). The price per foot for pipe installation includes all labor, materials, excavation backfill, clean-up, seeding, testing etc., for a finished product.

By submission of this Bid, the BIDDER certifies, and in the case of a joint Bid, each party thereto certifies as to its own organization, that this Bid has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this bid, with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence work under this Contract on or before a date to be specified in the Notice to Proceed and to fully complete the project within 150 consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of \$ 500.00 for each consecutive calendar day thereafter.

Accompanying this Proposal is a certified check or standard Bid Bond in the sum of _____ Dollars (\$ _____) in accordance with the Information for Bidders to the OWNER that the amount of the bid security deposited with this Bid fairly and reasonably represents the amount of damages the OWNER will suffer due to the failure of this BIDDER to fulfill his agreements as provided in this Proposal.

BIDDER acknowledges receipt of the following Addenda:

Addenda #1	Dated	Addenda #5	Dated
Addenda #2	Dated	Addenda #6	Dated
Addenda #3	Dated	Addenda #7	Dated
Addenda #4	Dated	Addenda #8	Dated

BIDDER agrees that the OWNER reserves the right to delete the whole or any part of the Project from the Contract.

BIDDER understands that the OWNER reserves the right to reject any or all Bids and to waive any informalities in the Bidding.

BIDDER agrees that this Bid shall be good and may not be withdrawn for a period of 90 (ninety) calendar days after the actual date of bid opening.

Within ten (10) calendar days after receiving written notice of the acceptance of this Bid by the OWNER, the Bidder will execute and deliver to the OWNER 6 (six) copies of the Agreement and such other required Contract Documents.

BIDDER: _____

BY: _____

TYPED NAME: _____

TITLE: _____

(Seal - If bid is by a corporation)

ADDRESS: _____

DATE SIGNED: _____

PHONE NO.: _____

FAX NO.: _____

SUBCONTRACTORS- Contract No. "I-1" – Office Building

Proposed subcontractors are listed below for each branch of work included in the proposed Contract. (All Subcontractors are subject to the approval of the Owner. Failure to submit a completed list may be cause for rejection of the Bid.)

BRANCH OF WORK

NAME AND ADDRESS OF SUBCONTRACTOR

BRANCH OF WORK	NAME AND ADDRESS OF SUBCONTRACTOR

TO CONTRACTORS: THIS FORM MUST BE USED

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):

**BIG SANDY WATER DISTRICT
18200 State Route 3
Catlettsburg, KY 41129**

BID

Bid Due Date:

Project (Brief Description Including Location):

CONTRACT "I-1" – OFFICE BUILDING

BOND

Bond Number:

Date (Not later than Bid due date):

Penal sum

_____ (Words)

_____ (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER

SURETY

Bidder's Name and Corporate Seal (Seal)

Surety's Name and Corporate Seal (Seal)

By: _____
Signature and Title

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

Attest: _____
Signature and Title

Attest: _____
Signature and Title

Note: Above addresses are to be used for giving required notice.

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 Surety's liability.
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 by 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 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 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.

BIDDER'S QUALIFICATIONS

The Bidder's Qualifications are required by the Owner to be submitted as set forth herewith:

1. Name of Firm : _____
2. This Firm is Corporation or _____Partnership or _____Proprietorship.
3. A permanent place of business is maintained at:

Street	City	State	Zip Code
--------	------	-------	----------

4. The following construction plant and equipment will be made available for use on this contract:

5. In the event the contract is awarded the undersigned, surety bonds will be furnished by:

6. Experience of Contractor on other similar work:

Total Contract	Client Name & Address	Phone	Reference
----------------	-----------------------	-------	-----------

Contract No. _____

Type _____ \$ _____

Contract No. _____

Type _____ \$ _____

Contract No. _____

Type _____ \$ _____

Contract No. _____

Type _____ \$ _____

7. We now have the following jobs under contract and bonded:

Total Contract	Percent Completed	Client Name & Address	Phone	Name of Reference
----------------	-------------------	-----------------------	-------	-------------------

Contract No. \$ _____

Location _____

Contract No. \$ _____

Location _____

Contract No. \$ _____

Location _____

Contract No. \$ _____

Location _____

8. FINANCIAL STATEMENT: SEE ATTACHED BALANCE SHEET

Statement of Assets and Liabilities as of _____, 2018.

This Statement should be prepared by applicant, his bookkeeper, or accountant. Audit report by CPA or licensed accountant may be required.

ASSETS	LIABILITIES
--------	-------------

Cash in Bank
Cash on Hand

Notes Payable
(a) Banks
(b) Material men
(c) Other

Accounts Receivable (Including Retentions)

(a) Completed Contracts
(b) Uncompleted Contracts

Accounts Payable
Unbilled Job Costs

(a) Sub-Contractors

(b) Material men

Other Accounts Receivable	
Marketable Securities	Billings in Excess of Job Costs
Materials in Stock Not Included in Items above	Current Debt (Due in 1 Year)
(a) For Jobs underway	(a) Equipment
(b) Other	(b) Real Estate
Income Tax	
(a) Current	
Automobiles	
Sub-Total Current Assets	Sub-Total Current Liabilities
Notes Receivable	Equipment Debt-Over 1 year
Cash Value Life Insurance	Real Estate Debt-Over 1 year
Equipment at Book Value	
Real Estate at Book Value	
(a) Business	
(b) Homestead	
(c) Investment	
Automobiles	
Furniture & Fixtures	Capital Stock Surplus & Undivided Profits
Total Assets	Total Liabilities

TOTAL ASSETS MUST EQUAL TOTAL LIABILITIES

Respectfully Submitted: _____

Company Name

Signature Address

Name Typed

Title Date

Phone Fax

ATTEST: _____

COMPLIANCE STATEMENT

This statement relates to a proposed contract with _____

(Name of borrower or grantee)

who expects to finance the contract with assistance from either the Rural Housing Service (RHS), Rural Business-Cooperative Service (RBS), or the Rural Utilities Service (RUS) or their successor agencies, United States Department of Agriculture (whether by a loan, grant, loan insurance, guarantee, or other form of financial assistance). I am the undersigned bidder or prospective contractor, I represent that:

1. I have, have not, participated in a previous contract or subcontract subject to Executive Order 11246 (regarding equal employment opportunity) or a preceding similar Executive Order.
2. If I have participated in such a contract or subcontract, I have, have not, filed all compliance reports that have been required to file in connection with the contract or subcontract.

If the proposed contract is for \$50,000 or more and I have 50 or more employees, I also represent that:

3. I have, have not previously had contracts subject to the written affirmative action programs requirements of the Secretary of Labor.
4. If I have participated in such a contract or subcontract, I have, have not developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make an arrangement regarding such reports that is satisfactory to either the RHS, RBS or RUS, or to the office where the reports are required to be filed.

I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide for my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and wash rooms, restaurants and other eating areas time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications for proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods): (See Reverse).

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays the valid OMB control number. The valid OMB control number for this information collection is 0575-0018. The time required to complete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

**NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR
CERTIFICATIONS OF NON-SEGREGATED FACILITIES**

A certification of Nonsegregated Facilities, as required by the May 9, 1967, order (32F.R. 7439, may 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding \$ 10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Date _____

(Signature of Bidder or Prospective Contractor)

Address (including Zip Code)

CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS

The undersigned certifies, to the best of his or her knowledge and belief that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant or loan, the undersigned shall complete and submit Standard Form – LLL, “Disclosure of Lobbying Activities,” in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including contracts, subcontracts, and subgrants under grants and loans) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

(name)

(date)

(title)

o0o

EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION

**FOR
BIG SANDY WATER DISTRICT
CATTLETTSBURG, KENTUCKY
CONTRACT No. "I-1"
OFFICE BUILDING
PROJECT NO. 15030**

I, _____, _____,
(print name) (title)

of _____,
(firm)

hereby certify that my firm is an equal opportunity employer and is in compliance with all applicable local, state, and federal Equal Employment Opportunity laws.

Respectfully submitted,

By: _____
(Signature required)

(Name printed or typed)

Title: _____

Date: _____

STATE OF]
] SS
COUNTY OF]

I, the undersigned notary public within and for the state and county aforesaid, do hereby certify that the foregoing instrument of writing was this day produced to me in said state, and county by _____, and was acknowledged and delivered by him/her to be his/her act and deed.

WITNESS by my hand this _____ day of _____, 20__.

My Commission expires _____, 20__.

Notary Public (signature)

Notary Public (Name typed or printed)

U.S. DEPARTMENT OF AGRICULTURE

**Certification Regarding Debarment, Suspension, Ineligibility
and Voluntary Exclusion - Lower Tier Covered Transactions**

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 7 CFR part 3017, Section 3017.510, Participants' responsibilities. The regulations were published as Part IV of the January 30, 1989, Federal Register (pages 4722-4733). Copies of the regulations may be obtained by contacting the Department of Agriculture agency with which this transaction originated.

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE)

- (1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

- (2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Organization Name

PR/Award Number or Project Name

Name(s) and Title(s) of Authorized Representative(s)

Signature(s)

Date

Instructions for Certification

1. By signing and submitting this form, the prospective lower tier participant is providing the certification set out on the reverse side in accordance with these instructions.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this form that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transaction," without modification, in all lower tier covered transaction and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

EQUAL OPPORTUNITY AGREEMENT

This agreement, dated _____ between _____

(herein called "Recipient" whether one or more) and United States Department of Agriculture (USDA), pursuant to the rules and regulations of the Secretary of Labor (herein called the 'Secretary') issued under the authority of Executive Order 11246 as amended, witnesseth:

In consideration of financial assistance (whether by a loan, grant, loan guaranty, or other form of financial assistance) made or to be made by the USDA to Recipient, Recipient hereby agrees, if the cash cost of construction work performed by Recipient or a construction contract financed with such financial assistance exceeds \$10,000 - unless exempted by rules, regulations or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965.

1. To incorporate or cause to be incorporated into any contract for construction work, or modification thereof, subject to the relevant rules, regulations, and orders of the Secretary or of any prior authority that remain in effect, which is paid for in whole or in part with the aid of such financial assistance, the following "Equal Opportunity Clause":

During the performance of this contract, the contractor agrees as follows:

- (a) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited, to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the USDA setting forth the provisions of this nondiscrimination clause.
- (b) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.
- (c) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the USDA, advising the said labor union or workers' representative of the contractor's commitments under this agreement and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (d) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of all rules, regulations and relevant orders of the Secretary of Labor.
- (e) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, rules, regulations, and orders, or pursuant thereto, and will permit access to his books, records, and accounts by the USDA Civil Rights Office, and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (f) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be cancelled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by Law.
- (g) The contractor will include the provisions of paragraph 1 and paragraph (a) through (f) in every subcontract or purchase order, unless exempted by the rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the USDA may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the USDA, the contractor may request the United States to enter into such litigation to protect the interest of the United States.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0575-0018. The time required to complete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

2. To be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: Provided, that if the organization so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

3. To notify all prospective contractors to file the required 'Compliance Statement', Form RD 400-6, with their bids.

4. Form AD-425, Instructions to Contractors, will accompany the notice of award of the contract. Bid conditions for all nonexempt federal and federally assisted construction contracts require inclusion of the appropriate "Hometown" or "Imposed" plan affirmative action and equal employment opportunity requirements. All bidders must comply with the bid conditions contained in the invitation to be considered responsible bidders and hence eligible for the award.

5. To assist and cooperate actively with USDA and the Secretary in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary, that it will furnish USDA and the Secretary such information such as, but not limited to, Form AD 560, Certification of Nonsegregated Facilities, to submit the Monthly Employment Utilization Report, Form CC-257, as they may require for the supervision of such compliance, and that it will otherwise assist USDA in the discharge of USDA's primary responsibility for securing compliance.

6. To refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by USDA or the Secretary of Labor pursuant to Part II, Subpart D, of the Executive Order.

7. That if the recipient fails or refuses to comply with these undertakings, the USDA may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the organization under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such organization; and refer the case to the Department of Justice for appropriate legal proceedings.

Signed by the Recipient on the date first written above.

Recipient

Recipient

(CORPORATE SEAL)

Name of Corporate Recipient

Attest:

Secretary

By _____
President

**CONTRACTOR'S CERTIFICATION CONCERNING
LABOR STANDARDS AND PREVAILING WAGE REQUIREMENTS**

**CONTRACTOR'S CERTIFICATION CONCERNING
LABOR STANDARDS AND PREVAILING WAGE REQUIREMENTS**

TO (Appropriate Recipient):	DATE
C/O	PROJECT NUMBER (if any)
	PROJECT NAME

1. The undersigned, having executed a contract with _____ for the construction of the above identified project, acknowledges that:
- (a) The Labor Standards provisions are included in the aforesaid contract;
 - (b) Correction of any infractions of the aforesaid conditions, including infractions by any of his subcontractors and any lower tier subcontractors, is his responsibility.

2. He certifies that:
- (a) Neither he nor any firm, partnership or association in which he has substantial interest is designated as an ineligible contractor by the Comptroller of the United States pursuant to Section 5.6(b) of the Regulations of the Secretary of Labor., Part 5 (29 CFR, Part 5) or pursuant to Section 3(a) of the Davis-Bacon Act, as amended (40 U.S. C. 276a-2(a)).
 - (b) No part of the aforementioned contract has been or will be subcontracted to any subcontractor if such subcontractor or any firm, corporation, partnership or association in which such subcontractor has a substantial interest is designated as an ineligible contractor pursuant to any of the aforementioned regulatory or statutory provisions.

3. He agrees to obtain and forward to the aforementioned recipient within ten days after the execution of any subcontract, including those executed by his subcontractors and any lower tier subcontractors, a Subcontractor's Certification Concerning Labor Standards and Prevailing Wage Requirements executed by the subcontractors.

4. He certifies that:
- (a) The legal name and the business address of the undersigned are:
-
- (b) The undersigned is:

(1) A SINGLE PROPRIETORSHIP	(3) A CORPORATION ORGANIZED IN THE STATE OF:
(2) A PARTNERSHIP	(4) OTHER ORGANIZATION (Describe)

(c) The name, title and address of the owner, partners, or officers of the undersigned are:

NAME	TITLE	ADDRESS

(d) The names and addresses of all other persons, both natural and corporate, having a substantial interest in the undersigned, and the nature of the interest are (if none, so state)

NAME	ADDRESS	NATURE OF INTENT

(e) The names, addresses and trade classifications of all other building construction contractors in which undersigned ha a substantial interest (if none, so state):

NAME	ADDRESS	TRADE CLASSIFICATION

Date _____ (Contractor)

By: _____

WARNING

U.S. Criminal Code, Section 1010, Title 18, U.S. C., provides in part: "Whoever makes, passes, utters, or publishes any statement knowing the same to be false..... shall be fined not more than \$5,000 or imprisoned not more than two years, or both