

**S** SAN JACINTO COMMUNITY  
**C** — COLLEGE DISTRICT —

**REQUEST FOR COMPETITIVE SEALED PROPOSALS**

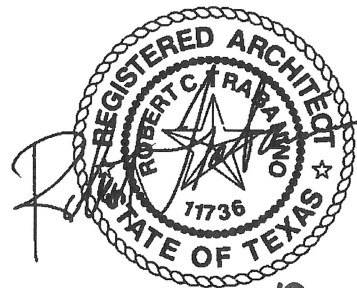
**PROJECT MANUAL**

**MARITIME EXPANSION FIRE TRAINING CENTER  
CSP 20-12**

**MARITIME CAMPUS  
3700 OLD HIGHWAY 146  
LA PORTE, TEXAS 77571**

**CSP ISSUE DATE:  
NOVEMBER 12, 2019**

**ENGINEER  
TEXAS – IBI GROUP  
455 EAST MEDICAL CENTER BLVD – SUITE 500  
HOUSTON, TEXAS 77289  
281-286-6605  
ROBERT TRABANINO**



11-12-2019

**DOCUMENT 00 01 01  
PROJECT TITLE PAGE**

**PART 1 - GENERAL**

PROJECT NAME            Maritime Expansion Fire Training Center

LOCATION                    San Jacinto Community College District  
                                 Maritime Campus, 3700 Old Hwy. 146  
                                 La Porte, Texas 77571

PROJECT NO.              SJCCD Project # CSP 20-12

**MEMBERS OF THE BOARD OF TRUSTEES**

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Larry Wilson, Vice Chairman  
John Moon, Jr., Secretary  
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Marie Flickinger, Member  
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Dr. Laurel V. Williamson - Deputy Chancellor and College President  
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Sandra Ramirez - Vice Chancellor, Human Resources  
Teri A. Crawford - Vice Chancellor, Marketing, Public Relations, and Governmental Affairs  
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Rob Stanicic - Chief Information Officer  
Bryan D. Jones - Associate Vice Chancellor, Facilities and Construction  
Charles Smith - Associate Vice Chancellor, Fiscal Initiatives and Capital Projects  
Mike Harris - Director, Construction  
William Dowell - Director, Facilities and Special Projects

Consultant Firms

Address and Telephone

Texas - IBI Group	455 East Medical Center Blvd Suite, 500 Houston, Texas 77289 281-286-6605
CSF Consulting, L.P. Lee Truong & Yu Engineers, PLLC	Carlos Gutierrez Liwei Yu

**PART 2 – PRODUCTS (Not Used)**

**PART 3 – EXECUTION (Not Used)**

**END OF DOCUMENT**

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23 07 19	HVAC Pipe Insulation
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**END OF DOCUMENT**

**DOCUMENT 00 01 15**  
**LIST OF DRAWING SHEETS**

**PART 1 – GENERAL**

The Drawings listed below, identified by Sheet Number and Title, dated, and further identified by the project number, form a part of the Contract Documents for the Work.

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Sheet Number and Title

	COVER SHEET
G1.00	GENERAL CODE INFORMATION
G1.01	HARRIS COUNTY FIRE CODE REVIEW SHEET
G1.02	LIFE SAFETY PLAN SURVEY
C1.00	GENERAL NOTES
C1.01	DEMOLITION SITE PLAN
C1.02	COMPOSITE SITE PLAN
C1.03	RENOVATION SITE PLAN
C1.04	SITE DETAILS
	COVER SHEET
	HARRIS COUNTY REVIEW SHEET
C2.00	TOPOGRAPHIC SURVEY
C2.04	EXISTING STORM SEWER AND SWQ PLANS
C3.10	SWPP DETAILS
C4.00	DIMENSION CONTROL AND SWPP
C5.00	DRAINAGE PLAN, DRAINAGE AREA MAP & UTILITY PLAN
C6.00	GRADING AND PAVING PLAN
C7.10	PAVING DETAILS
C8.00	CIVIL DETAILS
C9.00	FIRE APPARATUS ACCESS LANE PLAN
L1.0	LANDSCAPE PLAN & DETAILS
S0.00	GENERAL NOTES
S1.00	FOUNDATION PLAN
S2.00	TYPICAL FOUNDATION DETAILS
A2.01	FIRST FLOOR MEZZANINE FLOOR PLANS AND SCHEDULES
A4.01	ROOF PLAN
A5.01	ENLARGED PLANS, SECTIONS AND DETAILS
A6.00	WALL SECTIONS AND PARTITIONS
A7.01	EXTERIOR ELEVATIONS
A9.01	FRAME & DOOR ELEVATIONS, FRAME DETAILS
A10.01	REFLECTED CEILING PLAN
A11.01	INTERIOR FLOOR PLAN
M2.01	1st DECK MECHANICAL PLAN AREA “A1”

E1.01 1st DECK COMPOSITE ELECTRICAL PLAN  
E2.01 1st DECK ELECTRICAL POWER PLAN AREA 'A'  
E2.02 1st DECK ELECTRICAL LIGHTING PLAN AREA 'A1'  
E4.00 ELECTRICAL SINGLE LINE DIAGRAM AND PANEL  
E5.00 SPECIFICATIONS, LEGEND AND DETAILS  
E5.01 ELECTRICAL LIGHTING DETAILS

P1.01 1st DECK COMPOSITE PLUMBING PLAN  
P3.00 PLUMBING DETAILS AND SCHEDULES

**PART 2 – PRODUCTS (Not Used)**

**PART 3 – EXECUTION (Not Used)**

**END OF DOCUMENT**



**DOCUMENT 00 11 13  
ADVERTISEMENT FOR PROPOSALS**

**SAN JACINTO COLLEGE  
REQUEST FOR COMPETITIVE SEALED PROPOSALS  
PROJECT NO. CSP 20-12**

San Jacinto Community College District is soliciting sealed proposals from qualified firms for Maritime Expansion Fire Training Center. A pre-proposal meeting is scheduled for 10:00 A.M. on November 21, 2019 at the Maritime Campus, 3700 Old Highway 146, La Porte, Texas 77571, Building 1, Rooms M-1.247 & M-1.249. Documents are available and proposals may be submitted at <https://sanjac.ionwave.net> until 2:00 P.M. on December 12, 2019. All inquiries should be directed to Karen Irving at karen.irving@sjcd.edu or 281-998-6378.

**END OF DOCUMENT**

**DOCUMENT 00 11 19**  
**REQUEST FOR COMPETITIVE SEALED PROPOSALS**

Competitive Sealed Proposals (CSP) will be accepted for the work identified below in accordance with Proposal Documents thereof and such addenda thereto as may be issued prior to the date of the proposal opening.

OWNER: San Jacinto Community College District (“SJCCD”, “College”, “Owner”)

PROJECT NAME: CSP 20-12 Maritime Expansion Fire Training Center

DATE AND TIME FOR  
NON-MANDATORY

November 21, 2019 10:00 AM. Central Time

PRE-PROPOSAL MEETING: San Jacinto College Maritime Campus  
3700 Old Highway 146, Building 1, Room M 1.247 & M 1.249  
La Porte, Texas 77571

DATE AND TIME FOR  
PROPOSAL SUBMITTAL: Thursday, December 12, 2019  
2:00 P.M. Central Time

LOCATION FOR  
PROPOSAL SUBMITTAL: <https://sanjac.ionwave.net>

LOCATION OF  
PROPOSAL OPENING: San Jacinto College  
District Administration West Building  
4620 Fairmont Parkway, A2.208  
Pasadena, Texas 77504

Note: Competitive Sealed Proposals (CSP) will be opened immediately following the time due at the location above.

PROCUREMENT CONTACT: Karen Irving  
Facilities Buyer  
E-mail karen.irving@sjcd.edu, Ph. 281-998-6378, Fax 281-998-6322

**1. PROJECT DESCRIPTION**

**1.1. GENERAL**

This project is for the expansion of the Maritime Campus to add a 2,100 square foot garage that will serve as the Fire Training Center. This training center will house fire training equipment and an apparatus.

**1.2. PROJECT ESTIMATE**

Current construction estimate for work is approximately One Million One Hundred Thousand Dollars (\$1,100,000).

### 1.3. SCHEDULE

Work is scheduled to start on or after February 2020 and shall be completed by August 2020.

## 2. REQUIREMENTS

- 2.1. Sealed proposals will be accepted for the work identified in Division 00 11 13 Advertisement for Proposals and in accordance with Proposal Documents thereof and such addenda thereto as may be issued prior to the date of the proposal opening.
- 2.2. Sealed proposals received by the College shall be submitted at <https://sanjac.ionwave.net> prior to the opening time.
- 2.3. Proposals will not be received after the opening time.
- 2.4. Proposals received by the College will be opened immediately following the time due at the location, date, and specified time specified above or, if modified, as stated in any subsequent Addenda.
- 2.5. **Obligation** This request for competitive sealed proposals does not obligate SJCCD to award a contract or pay any costs incurred by the proposer in the preparation and/or submittal of a proposal.
- 2.6. **Waiver** BY SUBMITTING A BID OR PROPOSAL, PROPOSER AGREES TO AND DOES HEREBY WAIVE ANY AND ALL CLAIMS IT HAS OR MAY HAVE AGAINST SAN JACINTO COMMUNITY COLLEGE DISTRICT, AND ITS TRUSTEES, EMPLOYEES, OR AGENTS ARISING OUT OF OR IN CONNECTION WITH (1) THE ADMINISTRATION, EVALUATION, OR RECOMMENDATION OF ANY BID OR OFFER; (2) ANY REQUIREMENTS UNDER THE SOLICITATION, REQUEST FOR COMPETITIVE SEALED PROPOSALS PACKAGE, OR RELATED DOCUMENTS; (3) THE REJECTION OF ANY PROPOSAL OR ANY PART OF ANY PROPOSAL OR OFFER; (4) WAIVER BY THE SAN JACINTO COMMUNITY COLLEGE DISTRICT OF ANY TECHNICALITIES IN THE PROPOSAL PACKAGE OR ANY PROPOSAL OR OFFER; (5) WAIVER OR CHANGE IN ANY NON-MATERIAL PROVISION OF THE SOLICITATION PACKAGE OR MATERIALS THAT DO NOT ADVERSELY AND SPECIFICALLY AFFECT THE PREVIOUSLY SUBMITTED PROPOSALS OR OFFERS; AND/OR (6) THE AWARD OF A CONTRACT, IF ANY.

SAN JACINTO COMMUNITY COLLEGE DISTRICT, IN ITS SOLE DISCRETION, RESERVES THE RIGHT TO ACCEPT ANY PROPOSAL AND/OR REJECT ANY AND ALL PROPOSALS OR A PART OF A PROPOSAL, WITHOUT REASON OR CAUSE, SUBMITTED IN RESPONSE TO THIS SOLICITATION.

SAN JACINTO COMMUNITY COLLEGE DISTRICT RESERVES THE RIGHT TO REJECT ANY PROPOSAL FOR ANY REASON AND/OR REJECT ANY NON-RESPONSIVE OR CONDITIONAL PROPOSAL.

SAN JACINTO COMMUNITY COLLEGE DISTRICT RESERVES THE RIGHT TO WAIVE ANY INFORMALITIES, IRREGULARITIES, AND/OR TECHNICALITIES IN THIS SOLICITATION, THE PROPOSAL DOCUMENTS, AND/OR ANY PROPOSALS RECEIVED OR SUBMITTED.

2.7. SJCCD is an equal opportunity educational institution, which does not discriminate on the basis of race, color, religion, national origin, gender, age or disability.

2.8. Under the provisions of the Texas Government Code Sec. 2269, the San Jacinto Community College District will select a contractor to provide construction services as described in this Request for Competitive Sealed Proposals that, in the opinion of the evaluators, will offer the best value for the College.

2.9. **PAYMENT BOND AND PERFORMANCE BOND:** A Statutory Payment Bond and a Statutory Performance Bond, *each in the amount equal to or greater than 100% of the Contract Sum*, conditioned upon the faithful performance of the Contract will be required. These bonds will be required and must be submitted at the time of Contract execution by the Contractor.

**2.10. PROPOSED CSP SCHEDULE**

*NOTE: This schedule may be modified or changed at the sole discretion of SJCCD.*

<b>DATE</b>	<b>ACTION</b>
Tuesday, November 12, 2019	CSP issued.
Thursday, November 21, 2019	<b>Non-Mandatory</b> pre-proposal meeting 2:00 p.m. Central Time, Maritime Campus, 3700 Old Highway 146, Building 1, Rooms M-1.247 and M-1.249, La Porte, Texas 77571.
Tuesday, December 3, 2019	Deadline for submission of substitutions, questions and/or clarifications regarding CSP. Questions shall be in writing and submitted by 5:00 p.m. Central Time in order to be considered.
Wednesday, December 4, 2019	Issuance of final addenda, if necessary.
Thursday, December 12, 2019	Proposals will be received on or before 2:00 p.m. Central Time in <a href="https://sanjac.ionwave.net">https://sanjac.ionwave.net</a> . Proposals will be opened immediately following.
Friday, December 13, 2019	Documents 00 45 16.13 (for each subcontractor) to be submitted by 2:00 p.m. Central Time to: <a href="mailto:karen.irving@sjcd.edu">karen.irving@sjcd.edu</a> .
Tuesday, January 21, 2020	Recommendation of contract award to the Board Building Committee.
Monday, February 3, 2020	Recommendation of contract award to the Board of Trustees and approval of contract award. Award will be announced after approval received.

END OF DOCUMENT

**DOCUMENT 00 21 16**  
**INSTRUCTIONS TO PROPOSERS**

**PART 1 - DEFINITIONS**

- 1.1. Procurement Documents include the Proposal Requirements and the proposed Contract Documents. The Proposal Requirements consist of the Proposals Documents, Instructions to Proposers, the proposal form and other sample proposal and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.
- 1.2. Definitions set forth in the General Conditions of the Contract between the Owner and Contractor or that are in other Contract Documents are applicable to the Procurement Documents.
- 1.3. Addenda are written or graphic instruments issued by the Procurement Contact prior to the execution of the Contract that modify or interpret the Procurement Documents by additions, deletions, clarifications or corrections.
- 1.4. A Proposal is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Proposal Documents.
- 1.5. The Base Proposal is the sum stated in the Proposal for which the Proposer proposes to perform the Work described in the Procurement Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Proposals.
- 1.6. An Alternate, if applicable, is an amount stated in the Proposal to be added to or deducted from the amount of the Base Proposal if the corresponding change in the Work, as described in the Proposal Documents, is accepted.
- 1.7. A Unit Price, if applicable, is an amount stated in the Proposal as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Procurement Documents.
- 1.8. A Proposer is a person or entity that submits a Proposal and who meets the requirements set forth in the Procurement Documents.
- 1.9. A Sub-Proposer is a person or entity that submits a proposal to a Proposer for materials, equipment or labor for a portion of the Work.
- 1.10. The Owner is the Board of Trustees of the San Jacinto Community College District (SJCCD).
- 1.11. The Designer is the Designer, Engineer, or Design Consultant of Record for each project.  
Project Title: CSP 20-12 Maritime Expansion Fire Training Center  
Designer: Texas – IBI Group

**PART 2 – PROPOSERS REPRESENTATIONS**

- 2.1 The Proposer by making a Proposal represents that:

- 2.1.1. The Proposer has read and understands the Procurement Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Proposal is submitted, and for other portions of the project, if any, being proposed concurrently or presently under construction.
- 2.1.2. The Proposal is made in compliance with the Procurement Documents.
- 2.1.3. The Proposer has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Proposer's personal observations with the requirements of the proposed Contract Documents.
- 2.1.4. The Proposal is based upon the materials, labor, equipment and systems required by the Procurement Documents without exception.

## **PART 3 - PROCUREMENT DOCUMENTS**

### **3.1 Documents**

- 3.1.1 All solicitation documents can be obtained on <https://sanjac.ionwave.net>.
- 3.1.2 Proposers shall use complete sets of Procurement Documents in preparing Proposals; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Proposal Documents.

### **3.2 Interpretation Or Correction of Proposal Documents**

- 3.2.1 The Proposer shall carefully study and compare the Procurement Documents with each other, and with other work being proposed concurrently or presently under construction to the extent that it relates to the Work for which the Proposal is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.
- 3.2.2 Proposers and Sub-Proposers requiring clarification or interpretation of the Procurement Documents shall make a written request which shall reach the Procurement Contact **no later than 5:00 p.m. Central Time on December 3, 2019.**
- 3.2.3 Interpretations, corrections and changes of the Procurement Documents will be made by addendum. Interpretations, corrections and changes of the Procurement Documents made in any other manner will not be binding, and Proposers shall not rely upon them.

### **3.3 Substitutions**

- 3.3.1 The materials, products and equipment described in the Procurement Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.
- 3.3.2 No substitution will be considered prior to receipt of proposals unless the Procurement Contact has received a written request for approval **no later than 5:00 p.m. Central Time on December 3, 2019.**

Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work including changes in the work of other contracts that

incorporation of the proposed substitution would require shall be included. The burden of proof of the merit of the proposed substitution is upon the Proposer. The College's decision of approval or disapproval of a proposed substitution shall be final.

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

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

### **3.4 Addenda**

3.4.1 If and when any part of this package must be revised, amended, corrected, extended, withdrawn, or changed in a manner that impacts the process or outcome, the Procurement Contact will issue an amendment addressing the nature of the change. These changes will be numbered.

3.4.2 Notification of Addenda will be transmitted to all who are known by the Procurement Contact to have received a complete set of Procurement Documents. Separate Addenda will be issued for each project and acknowledged on the appropriate proposal form as noted in 3.4.4.

3.4.3 Copies of Addenda will be made available for inspection wherever Proposal Documents are on file for that purpose.

3.4.4 Each Proposer shall ascertain prior to submitting a Proposal that the Proposer has received all Addenda issued, and the Proposer shall acknowledge their receipt in the Proposals.

### **3.5 Owner's Rights**

3.5.1 The Procurement Documents do not, in any way, obligate the Owner to select a particular, or any, Proposer for the provision of Work outlined in the Procurement Documents. The College reserves the right to select one or more Proposer based on the best, as determined by SJCCD, overall response(s) submitted to the Owner, with due consideration given to demonstrated competence, knowledge, and qualifications to perform the Work set forth in the Procurement Documents, and the reasonableness of the proposed fee to perform the services.

### **3.6 Texas Public Information Act; Texas Record Retention Act**

3.6.1 Unless clearly marked as confidential or proprietary, SJCCD considers all information, documentation and other materials requested to be submitted in response to the Procurement Documents to be of a non-confidential and/or non-proprietary nature, unless otherwise conspicuously marked and noted (and considered confidential under the laws of the State of Texas). Accordingly, all documents are presumed and shall be subject to public disclosure under the Texas Public Information Act (Texas Government Code, Chapter 552.001, et seq.) after a contract is awarded.

3.6.2 SJCCD is subject to the Texas Record Retention laws. All documents produced, compiled, and maintained as a part of the contractual relationship and performance must be maintained for the period required under the Texas Record Retention laws.

## **PART 4 - PROCUREMENT PROCEDURES**

### **4.1 Form and Style of Proposals**

4.1.1 Proposals for work described herein must be received through the e-bidding website <https://sanjac.ionwave.net> by the specified date and time. All proposals shall include a cover page in the following format:

San Jacinto Community College District  
CSP # 20-12 and Maritime Expansion Fire Training Center  
December 12, 2019 at 2:00 P.M. Central Time

4.1.2 Proposals shall be submitted on the forms included (when applicable) or responses as requested (see Document 00 45 16).

4.1.3 All blanks on proposal forms shall be legibly executed.

4.1.10 All documents shall be electronically provided on letter-size (8-1/2" x 11") pages.

4.1.4 Sums shall be expressed in both words and figures, and in cases of discrepancy between the two, the amount written in words shall govern.

4.1.5 Interlineations, alterations and erasures must be initialed by the signer of the Proposal.

4.1.6 All requested Alternates should be proposed or listed as "No Bid". If no change in the Base Proposal is required, enter "No Change."

4.1.7 Where two or more Proposals for designated portions of the Work have been requested, the Proposer may, without forfeiture of the proposal security, state the Proposer's refusal to accept award of less than the combination of Proposals stipulated by the Proposer. The Proposer shall make no additional stipulations on the proposal form nor qualify the Proposal in any other manner.

4.1.8 The Proposal shall include the legal name of the Proposer and a designation that the Proposer is a sole proprietor, partnership, corporation or other legal entity. The Proposer shall provide evidence of legal authority to perform within the jurisdiction of the work. The Proposal shall be signed by the person or persons legally authorized to bind the Proposer to a contract. A Proposal by a corporation shall further give the state of incorporation. A Proposal submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Proposer.

4.1.9 To be considered responsive, the complete Proposal shall include all required forms (completely and accurately filled out and executed) and required response to Document 00 45 16.

4.1.11 Response to Document 00 45 16 shall be a maximum of twenty (20) pages (numbered 1-20).

4.1.12 Response to Document 00 45 16 shall have a Cover Sheet showing the project number, project title, the firm name, principal business address, principal Texas business address (if not the same), telephone and e-mail address. The Cover Sheet does not count toward maximum pages.

4.1.13 Proposals shall be prepared simply and economically, providing direct and concise descriptions of the respondent's ability to meet the requirements of this CSP. Emphasis shall be on the quality,



completeness, clarity of content, responsiveness to the requirements, and an understanding of the College's needs.

- 4.1.14 Proposals and any other information presented by respondents in response to this CSP shall become the property of the College.
- 4.1.15 Submittals shall include the following twelve (12) items uploaded as separate attachments in the Response Attachments tab in the e-bidding website: <https://sanjac.ionwave.net>:
1. 00 42 13 Proposal Form
  2. 00 42 13.12 Proposal Supplement Form
  3. 00 45 00.1 Hold Harmless Agreement
  4. 00 45 00.2 Proposal Evaluation Waiver
  5. 00 45 00.3 HB 89 Form
  6. Response to 00 45 16 Proposers Qualifications
  7. Audited Financial Statements (See 00 45 16)
  8. 00 45 19 Affidavit of Non-Collusion
  9. 00 45 20 Conflict of Interest Questionnaire
  10. 00 60 00.13 Felony Conviction Notification
  11. Proof of Insurance Certificate (See 00 62 16)
  12. 00 73 43 Wage Rate Requirements
- 4.1.16 Respondents shall carefully read the information contained in this CSP and submit a complete response to all requirements and questions as directed. Incomplete response packages or failure to comply with all requirements contained in this CSP may result in the rejection of a firm's submittal.

## **4.2 Proposal Security**

- 4.2.1 Not required.

## **4.3 Submission of Proposals**

- 4.3.1 Proposals must be received through the e-bidding website <https://sanjac.ionwave.net> by the specified date and time.
- 4.3.2 Proposals shall be submitted at the designated location prior to the time and date for receipt of Proposals. Proposals cannot be submitted after the specified time and date.
- 4.3.3 The Proposer shall assume full responsibility for timely delivery at the location designated for receipt of Proposals.
- 4.3.4 No oral, telephonic, telegraphic facsimile, or hardcopy Proposals will be considered.

## **4.4 Modification or Withdrawal of Proposal**

- 4.4.1 A Proposal may not be modified, withdrawn or canceled by the Proposer for a period of forty-five (45) calendar days following the time and date designated for the receipt of Proposals, and each Proposer agrees in submitting a Proposal.

- 4.4.2 Prior to the time and date designated for receipt of Proposals, a Proposal submitted may be modified or withdrawn by providing notice to the party receiving Proposals at the place designated for receipt of Proposals. Such notice shall be in writing over the signature of the Proposers. Written confirmation over the signature of the Proposers shall be received, and date and time stamped by the receiving party on or before the date and time set for receipt of Proposals. A change shall be so worded as not to reveal the amount of the original Proposal.
- 4.4.3 Withdrawn Proposals may be resubmitted up to the date and time designated for the receipt of Proposals provided that they are then fully in conformance with these Instructions to Proposers.

## **PART 5 - CONSIDERATION OF PROPOSALS**

### **5.1 Opening of Proposals**

- 5.1.1 Unless stated otherwise in the Request for Competitive Sealed Proposals, the properly identified Proposals received on time will be opened publicly.

### **5.2 Rejection of Proposals**

- 5.2.1 The Owner shall have the right to reject any or all Proposals. A Proposal not accompanied by the data required by the Proposal Documents, including items listed in 4.1.15, or a Proposal that is in any way incomplete or non-responsive is subject to rejection.

### **5.3 Acceptance of Proposals (Award)**

- 5.3.1 It is the intent of the Owner to award a Contract for CSP 20-12 Maritime Expansion Fire Training Center to the Proposer that provides the best value to San Jacinto Community College District provided the Proposal has been submitted in accordance with the requirements of the Procurement Documents and does not exceed the funds available. The Owner shall have the right to waive informalities or irregularities in a Proposal received and to accept the Proposal that, in the Owner's judgment, is in the Owner's own best interests.
- 5.3.2 The Owner shall have the right to accept Alternates in any order or combination thereof.

### **5.4 Prohibited Communications**

- 5.4.1 During the period between when the CSP is made available to all prospective vendors/ proposers and the selection of the Proposer and subsequent Contract, Proposers nor their agents and/or representatives, shall directly discuss or promote their CSP response with any member of the College Board of Trustees or college employees except in the course of college-sponsored inquiries, briefings, interviews, or presentation, unless requested by the College. This prohibition is intended to create a fair and competitive environment for all potential proposers, assure that decisions are made in public, and to protect the integrity of the CSP process. Violation of this provision may result in rejection of the Proposer's response. Except as provided in the above stated exceptions, the following communications regarding a particular invitation for bids, requests for proposal, requests for qualifications, or other solicitation are prohibited:
- .1 Communications between a potential vendor, service provider, proposer, offeror, lobbyist or consultant and any Trustee;

- .2 Communications between a potential vendor, service provider, proposer, offeror, lobbyist or consultant and any SJCCD employee other than expressly and specifically permitted in this CSP;
  - .3 Communications between any Trustees and any member of a selection or evaluation committee regarding this proposal;
  - .4 Communications between any Trustee and administrator or employee regarding this proposal.
- 5.4.2 The communications prohibition shall be imposed on the date that this CSP is made available to all prospective vendors/proposers.
- 5.4.3 The communications prohibition shall terminate when:
- .1 The contract is awarded by the Chancellor or her designee; or
  - .2 The award recommendations are considered by the Board at a noticed public meeting and the Board has voted to award the contract.
- 5.4.4 In the event the Board refers the recommendation back to staff for reconsideration, the communications prohibition shall be re-imposed. The communications prohibition shall not apply to the following:
- .1 Duly noted pre-bid or pre-proposal conferences.
  - .2 Communications with the SJCCD administrator specifically named and authorized to conduct and receive such communications under this CSP, the SJCCD Director of Contracts and Purchasing Services, or SJCCD counsel.
  - .3 Emergency contracts.
  - .4 Presentations made to the Board during any duly noticed public meeting.
  - .5 Nothing contained herein shall prohibit any person or entity from publicly addressing the Board during any duly noticed public meeting, in accordance with applicable Board policies, regarding action on the contract.

## **5.5 Conflict of Interest**

- 5.5.1 Chapter 176 of the Local Government Code requires proposers and consultants contracting or seeking to do business with the Owner to file a conflict of interest questionnaire (CIQ) (Document 00 45 20). The CIQ must be complete and filed with the Proposal. Proposers that do not include the form with the response, and fail to timely provide it, may be disqualified from consideration by the Owner.

## **5.6 Disadvantaged Business Enterprises**

- 5.6.1 The Owner affords Disadvantaged Business Enterprises (DBE's) equal opportunities to submit Proposals and will not discriminate against any firm, company, or person on the grounds of race, color, sex, disability, religion, or national origin in consideration of an award.

## **5.7 No Third Party Rights**

- 5.7.1 The resulting contract, if any, shall be for the sole benefit of the Owner and the Contractor and their respective successors and permitted assigns. Nothing in the resulting contract shall create or be deemed to create a relationship between the parties to the resulting contract and any third person, including a relationship in the nature of a third-party beneficiary or fiduciary.

## **PART 6 - POST-PROPOSAL INFORMATION**

### **6.1 Submittals**

- 6.1.2 Proposers shall submit Document 00 45 16.13 Subcontractor's Qualifications to be received via email to [karen.irving@sjcd.edu](mailto:karen.irving@sjcd.edu) no later than 2:00 p.m. Central Time on Friday, December 13, 2019.
- 6.1.3 The Proposer will be required to establish to the satisfaction of the Architect and the Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Procurement Documents. The experience and performance of sub-Proposers will be considered in the evaluation process.

### **6.2 Eligibility for Award**

- 6.2.1 In order for a Proposer to be eligible to be awarded a contract, the proposal must be responsive to the Procurement Documents and SJCCD must be able to determine that the Proposer is responsible, has the resources and capacity to perform the resulting contract satisfactorily, and offers the best value to SJCCD.
- 6.2.2 Responsive proposals are those that comply with all material aspects of the Procurement Documents and meet all of the requirements set forth in the Procurement Documents. Proposals that do not comply with all the terms and conditions of the Procurement Documents will be rejected as non-responsive.
- 6.2.3 Responsible Proposers must, at a minimum, meet the following requirements:
- .1 Have adequate financial resources, or the ability to obtain such resources as required during the performance of any resulting contract prior to the beginning of work/delivery of goods;
  - .2 Be able to comply with the required performance schedule, taking into consideration all existing business commitments;
  - .3 Have a satisfactory record, as determined by SJCCD, of past performance;
  - .4 Have necessary personnel, management, and technical capacity and capability to perform any resulting contract requirements;
  - .5 Be qualified as an established firm that is regularly engaged in the type of business necessary to fulfill the contract requirements;
  - .6 In accordance with all applicable industry standards, hold any necessary license, certification, or permit required for conducting the business of the vendor and as contemplated by the Procurement Documents;
  - .7 Have experience in competently performing similar contracts to those contemplated by the Procurement Documents;
  - .8 Certify that the firm is not delinquent in any tax owed the State of Texas under Chapter 171, Tax Code; and is not delinquent in taxes owed to the San Jacinto Community College District; signing and submitting the Procurement Documents is so certifying to such non-delinquency; and
  - .9 Be otherwise qualified and eligible to receive an award under applicable laws and regulations.
- 6.2.4 Proposer(s) may be requested to submit additional written evidence verifying that the firm meets the minimum requirements as necessary to perform the requirements of the Procurement Documents and be determined a responsible proposer. Failure to provide any requested additional information may result in the Proposer being declared non-responsive and the proposal being rejected.

- 6.2.5 A person is not eligible to be considered for award of the Proposal Documents, or any resulting contract, or to be a subcontractor of the Proposer or prime contractor if the person assisted in the development of the Procurement Documents or any part of the Procurement Documents or if the person participated in a project related to the Procurement Documents when such participation would give the person special knowledge that would give that person an unfair advantage over other proposers.
- 6.2.6 A person or Proposer shall not be eligible to be considered for this solicitation if the person or Proposer engaged in or attempted to engage in prohibited communications as described in 5.4.1 of the Proposal Documents.
- 6.2.7 Prior to the award of the Contract, the Owner will notify the Proposer in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Proposer. If the Owner or Architect has reasonable objection to a proposed person or entity, the Proposer may at the Proposer's option (1) withdraw the Proposal, or (2) submit an acceptable substitute person or entity with an adjustment in the Base Proposal or Alternate Proposal to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted proposal price or disqualify the Proposer.
- 6.2.8 Persons and entities proposed by the Proposer and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

### **6.3 Appropriated Funds and Other Legal Requirements**

- 6.3.1 The purchase of services or products arising from the Procurement Documents is contingent upon the availability of appropriated funds. SJCCD shall have the right to cancel the resulting contract or any part of the contract at the end of each fiscal year during the term of the contract if funds are not allocated to continue the contract or any part of the contract for the next fiscal year. If funds are withdrawn or do not become available, the Owner reserves the right to cancel the contract by giving the contractor a thirty (30) day written notice of its intention to cancel without penalty. Upon cancellation of the contract, the Owner shall not be responsible for any payment of any service that was performed or product received after the effective date of termination. The Owner's fiscal year begins on September 1 and ends on August 31.
- 6.3.2 The Owner is unable to indemnify any other party in any agreement awarded under the Procurement Documents and the resulting contract shall contain no provision requiring the Owner to indemnify the proposer or any third party.
- 6.3.3 As a public community college district and political subdivision of the State of Texas, the Owner is subject to various federal, state, and local laws, rules and regulations. Any agreement awarded under the Procurement Documents will include a requirement for compliance with such laws rules, and regulations on the part of both parties as applicable.

## **PART 7 - PERFORMANCE AND PAYMENT BONDS**

### **7.1 Bond Requirements**

7.1.1 If stipulated in the Procurement Documents, the Proposer shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising there under. Bonds may be secured through the Proposer's usual sources.

7.1.2 If the furnishing of such bonds is stipulated in the Procurement Documents, the cost shall be included in the Proposal.

## **7.2 Time of Delivery and Form of Bonds**

7.2.1 The Proposer shall deliver the required bonds to the Owner simultaneously with the executed Contract.

7.2.2 Unless otherwise stipulated, Statutory Performance Bond and Statutory Labor and Material Payment Bond shall be furnished in accordance with the General and Supplementary Conditions. Both bonds shall be written in the amount of the contract sum.

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

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

## **PART 8 - FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR**

### **8.1 Negotiations and Contract Award**

8.1.1 The Owner will negotiate the offer(s) it determines most advantageous, if any, considering the overall evaluation factors in the Procurement Documents. If made, the award will be made to the responsive, responsible proposer whose proposal conforms to the Procurement Documents and offers the best value to the Owner, price and other factors considered. The Owner may award a contract, based on initial proposals received, without discussion of such proposals.

8.1.2 No oral statements or verbal acknowledgement of the award to a particular proposer shall create a contractual obligation on the part of the Owner. Any contract between the Owner and the successful Proposer must be in writing and signed by an authorized representative for both the Owner and the selected Proposer.

8.1.3 The Owner reserves the right to award multiple contracts under this solicitation.

8.1.4 Any portion of the Procurement Documents and all portions of the Proposer's response may be incorporated into the final contractual agreement. Before effective, all negotiated agreements must ultimately be reduced to writing and signed by both the Owner and the Proposer.

### **8.2 Form of Document**

8.2.1 The Agreement for the Work will be written on the College's Agreement Form Document 00 52 13, Agreement for Construction Services Between the San Jacinto Community College District and Company Name, the Basis of Payment is a Stipulated Sum.

8.2.2 A separate Agreement will be written for each project.

## **PART 9 - SITE INVESTIGATION**

- 9.1 It is the responsibility of each Proposer to examine the project sites, existing improvements and adjacent property and be familiar with existing conditions before submission of a Proposal.
- 9.2 After investigating the project sites and comparing the Drawings and Specifications with the existing conditions, the Proposer should immediately notify the Architect in accordance with Paragraph 3.2 of these Instructions to Proposers of any conditions for which requirements are not clear; or about which there is any question regarding the extent of the Work involved.
- 9.3 Should the successful Proposer fail to make the required investigation and should a question arise after award of contract as to the extent of the Work involved in any particular case, the interpretation of the Contract Documents will be made in accordance with the General and Supplementary Conditions of the Contract.

## **PART 10 - EVALUATION AND CONTRACT AWARD PROCESS**

- 10.1 Proposals will be opened publicly to identify the names of the Proposers and their respective proposed contract amount. Other contents of the Proposals will be afforded security sufficient to preclude disclosure of the contents prior to award.
- 10.2 The Proposal Evaluation Committee will evaluate the Proposals. The criteria for evaluation and selection of the successful Proposer for this award will be based upon the factors listed below.

## **PART 11 - SELECTION CRITERIA**

### **11.1 COMPETITIVE SEALED PROPOSALS EVALUATION CRITERIA**

Proposals shall be evaluated based on the following criteria. All information required for evaluation shall be contained in the documentation to be submitted with the proposal and within 24-hours of proposals (Refer to Articles 4 and 6 of this section).

<b>Criteria</b>	<b>Explanation of Criteria</b>	<b>Weight Factor</b>
Proposed Amount: See 00 42 13	Proposed Construction Contract Amount of Base Proposal and any alternates selected by SJCCD. Lower price equates to higher score.	30
Section 1 – General: See 00 45 16	Evaluations will be based on responses received on general information regarding Staffing Approach, Management Plan, Proposed Construction Schedule, Current Workload, Resources, and Prime-Contractor/Sub-Contractor Relationships. Quality of information provided equates to a higher score.	35
Section 2 – History: See 00 45 16	Evaluations will be based on responses received on Firm's history and details of similar projects. Quality of information provided equates to a higher score.	10
Section 3 – Safety: See 00 45 16	Evaluations will be based on responses received on Firm's safety record and safety program. Quality of information provided equates to a higher score.	10
Section 4 – Financial: See 00 45 16	Evaluations will be based on Firm's bonding capacity, and responses received on requested information. More favorable financial records equate to a higher score.	5
Section 5 – Audited Financial Statements: See 00 45 16	Evaluations will be based on Firm's Audited Financial Statements to include the past two (2) complete years. More favorable financial statements equate to a higher score.	5
Section 6 – References: See 00 45 16	Evaluations will be based on responses received from references. Positive comments equate to a higher score.	5

11.2 After opening the Proposals, the Proposal Evaluation Committee will evaluate and rank each Proposal with respect to the published selection criteria described under Paragraph 11.1. After opening and ranking, an award may be made on the basis of the initially submitted Proposal, without discussion, clarification or modification, or the Committee may discuss with selected Proposer, offers for cost adjustment and other elements of the Proposal. In conducting such discussions, other than the data read at the Proposal opening, the Evaluation Committee shall not disclose any information derived from the Proposals submitted by competing firms.

11.3 If the Evaluation Committee determines that it is unable to reach a satisfactory agreement with the first ranked Proposer, the Owner will terminate discussions with that Proposer. The Evaluation Committee will then proceed with negotiations with each successive Proposer as they appear in the order of ranking until an agreement is reached, or until the Evaluation Committee has rejected all Proposals. After termination of discussions with any Proposer, the Evaluation Committee will not resume discussions with Proposer.



- 11.4 Following Owner's approval of the order of ranking of Proposers and Owner's contract award action, the Proposers will be notified by electronic mail.
- 11.5 The Owner reserves the right to accept or reject any or all alternates or to accept any combination of alternates considered advantageous to the Owner.
- 11.6 The award or rejection action regarding this Proposal is at the sole discretion of the Owner and the Owner makes no warranty regarding this proposal that a contract will be awarded to any Proposer.
- 11.7 The Owner agrees that if the Contract is awarded, it will be awarded to the Proposer offering the best value to San Jacinto Community College District.
- 11.8 The Owner is not bound to accept the lowest priced Proposal, if that Proposal is judged not to be the best value for SJCCD as determined by the Evaluation Committee.

END OF DOCUMENT

**DOCUMENT 00 31 43**  
**PERMIT APPLICATION**

**PART I- GENERAL**

1.1 REQUIREMENTS

- A. For all construction projects, the local jurisdiction where a campus of the San Jacinto Community College District is located will be final authority on all permits. The Central Campus is located within the jurisdictions of the Cities of Pasadena and La Porte, Texas. The North Campus is located in unincorporated Harris County. The South Campus is located in the jurisdictions of the City of Houston, Texas and Harris County. The Maritime Center is located within the jurisdictions of the City of Pasadena ETJ and Harris County.
- B. Generally, permitting will be required for all new construction and renovation projects, regardless of size or scope.
- C. In minor Physical Plant directed projects, permitting will be required when a new circuit is installed or a new plumbing line is installed.
- D. The Contractor is responsible for securing all required permits.
- E. The Contractor will include the cost of a Construction permit in the cost of the project.
- F. Contractor is responsible for the posting of all Permits.
- G. Applicable permits will be obtained before the start of construction.

**PART 2-PRODUCTS (Not Used)**

**PART 3-EXECUTION (Not Used)**

END OF DOCUMENT

**DOCUMENT 00 42 13  
PROPOSAL FORM**

**PART 1 - GENERAL**

This form shall be completed and submitted by all Offerors. Forms that are incomplete or illegible may be declared invalid.

Company: \_\_\_\_\_

Tax ID: \_\_\_\_\_

*Business Classification:*

Corporation: [\_\_\_\_\_] Partnership: [\_\_\_\_\_] Individual/Sole Proprietorship: [\_\_\_\_\_]

*Other Classification (select if applicable):*

HUB (Historically Underutilized Business): [\_\_\_\_\_]

SBE (Small Business Enterprise): [\_\_\_\_\_]

MWBE (Minority and Women-owned Business Enterprise): [\_\_\_\_\_]

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Phone No: \_\_\_\_\_ E-mail: \_\_\_\_\_

Submitted by: \_\_\_\_\_ Title: \_\_\_\_\_

**PROJECT:** CSP 20-12 Maritime Expansion Fire Training Center

**TO:** Board of Trustees  
San Jacinto Community College District

We, the undersigned propose to enter into a Contract with the San Jacinto Community College District to provide all labor, materials, tools, equipment, bonds, insurance, permits, services and utilities necessary for the construction of this project in accordance with the Contract Documents, for the Stipulated sum(s) set forth in this Proposal.

We have carefully reviewed and understand Document 00 11 19, Request for Competitive Sealed Proposals and Document 00 21 16, Instructions to Proposers, the Drawings and Specifications, examined the site in detail, and have acquainted ourselves with the existing and anticipated conditions that might affect the Work, and accept the Drawings and Specifications as being satisfactory and adequate for the construction of the Work. The undersigned agrees to the following:

1. Hold Base Proposal open for acceptance for 45 days.
2. Accept right of Owner to reject any or all Proposals, to waive formalities and to accept a Proposal that the Owner considers most advantageous.
3. Enter into and execute the contract, if awarded, for the Base Proposal and accepted Alternates or Unit Price totals.

4. Complete work in accordance with the Contract Documents within the stipulated contract time.
5. By signing, the undersigned affirms that, to the best of their knowledge, the Proposals have been arrived at independently, are submitted without collusion with anyone to obtain information or gain any favoritism that would in any way limit competition or give an unfair advantage over respondents in the award of this proposal.

We understand that if our Proposal is accepted, a Contract will be prepared in accordance with the Construction Agreement between the San Jacinto Community College District and the Contractor as described in the Agreement Document 00 52 13. Also, we will successfully complete the Work, and provide insurance as required by these documents, Performance Bond and Labor and Material Payment Bond, each in the full amount of the Contract as stated in the Contract Documents. This Proposal includes the cost of insurance, bonds and the listed Allowances.

**PART 2 - ADDENDA**

We hereby acknowledge receipt of \_\_\_\_\_ (total number) Addenda(s) for the project and have included their provisions in this Proposal.

**PART 3 - COMPLETION**

If awarded the Contract for Construction, we agree to begin work within \_\_\_\_\_calendar days after written Notice to Proceed (NTP), and to substantially complete all work by August 2020. The estimated NTP date February 4, 2020.

We acknowledge that liquidated damages in the amount of \$500 per day may be assessed if the Work is not substantially complete at the time of the agreed dates. Liquidated Damages are addressed in Section 6 of the General Conditions, Document 00 72 13.

\_\_\_\_\_  
Initials                      Date

**PART 4 - BASE PROPOSAL**

Base Proposal is a not-to-exceed total of pricing submitted under the Line Items Tabs through <https://sanjac.ionwave.net>. Line Items Tabs shall prevail in the case of any discrepancies between Proposal Form and Line Items.

\$ \_\_\_\_\_ (Amount written in words)                      \$ \_\_\_\_\_ (Amount in figures)

**PART 5 – ALTERNATE PROPOSALS**

Not applicable

**PART 6 - SUBCONTRACTORS**

The Owner reserves the right to approve all subcontractors. A list of proposed subcontractors shall be submitted on Document 00 42 13.12 Proposal Supplement at the time of proposal and 00 45 16.13 Subcontractor’s Qualifications shall be submitted no more than 24 hours after receipt of Proposals in accordance with Subparagraph 6.1.2 of Instructions to Proposers.

**PART 7 – TRENCH SAFETY SYSTEMS**

We, the undersigned, include the amount of \$ \_\_\_\_\_ in the Base Proposal for Trench Safety Systems.

**PART 8 – ALLOWANCES**

Irrigation \$10,000  
Contractor’s contingency \$50,000  
Owner contingency \$45,000

We acknowledge that all Allowances identified above are included in the Base Proposal, and that the dollar amounts of Allowances are unaffected by Alternates. Allowances are further defined in the Project Manual, Section 01 21 00.

\_\_\_\_\_  
Initials                  Date

**PART 9 – UNIT PRICES**

Not applicable

The undersigned certifies that the amounts contained in this Sealed Proposal have been carefully checked and are submitted as correct and final.

\_\_\_\_\_  
Authorized Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Type of Organization

\_\_\_\_\_  
Date

**DOCUMENT 00 42 13.12  
PROPOSAL SUPPLEMENT**

**PART 1- GENERAL**

This form shall be completed and submitted by all Proposers at the time the proposal is submitted. It does not take the place of the Subcontractors Qualification Form, Document 00 45 16.13. Forms that are incomplete or illegible may be declared invalid.

Company: \_\_\_\_\_

Submitted by: \_\_\_\_\_ Title: \_\_\_\_\_

Date: \_\_\_\_\_ Telephone Number: \_\_\_\_\_

**PROJECT:** CSP 20-12 Maritime Expansion Fire Training Center

**LIST OF PROPOSED SUBCONTRACTORS:**

If awarded the contract for this project, the undersigned proposed to employ the following firms for the principal parts of the work as noted in each category (add others as needed):

SUB-CONTRACT WORK	NAME OF SUB-CONTRACTORS
1. Site Work	_____
2. Concrete	_____
3. Mechanical	_____
4. Pre Engineered Metal Building	_____
5. Plumbing	_____
6. Electrical	_____
7. Landscaping	_____
8. Drywall	_____
9. Fencing	_____
10. Doors/Frames/Hardware	_____
11. Pre-finish Fiber Cement Siding	_____

All subcontractors must be listed.

The Owner reserves the right to approve all subcontractors. The signer of this document understands that a subcontractor may not be substituted without the written approval of the San Jacinto Community College District.

**PART 2 – PRODUCTS (NOT USED)**

**PART 3 – EXECUTION (NOT USED)**

END OF DOCUMENT

**DOCUMENT 00 45 00.1  
HOLD HARMLESS AGREEMENT**

The Contractor shall defend, indemnify, and hold harmless, San Jacinto Community College District and all of its Trustees, officers, agents and employees for and against all suits, actions or claims of any character brought for or on account of any injuries or damages (including death) received or sustained by any person or property on account of, arising out of, or in connection with, any negligent act or omission of Contractor or any agent, employee, subcontractor or supplier of Contractor in the execution or performance of the Contract for CSP 20-12 Maritime Expansion Fire Training Center.

The Contractor shall also defend, indemnify and hold harmless, San Jacinto Community College District and all of its Trustees, officers, agents and employees, from and against claims by any subcontractor, supplier, laborer, material man or mechanic for payment for work or materials provided on behalf of the Contractor in the performance of the Contract and all such claimants shall look solely to the Contractor and not San Jacinto Community College District for satisfaction of such claims.

The Hold Harmless Agreement shall be binding upon the undersigned and its successors, legal representatives, heirs and assigns.

Date: \_\_\_\_\_

Contractor: \_\_\_\_\_

Signature: \_\_\_\_\_

Typed Name: \_\_\_\_\_

Typed Title: \_\_\_\_\_

**CERTIFICATION**

STATE OF TEXAS           §

§

COUNTY OF HARRIS       §

This document was acknowledged before me on the \_\_\_\_\_ day of \_\_\_\_\_,  
\_\_\_\_\_.

By \_\_\_\_\_, \_\_\_\_\_ of \_\_\_\_\_, a

Texas \_\_\_\_\_ on behalf of said \_\_\_\_\_.

\_\_\_\_\_  
Notary Public, State of Texas

**DOCUMENT 00 45 00.2  
PROPOSAL EVALUATION WAIVER**

**By submitting a Proposal, the Proposer indicated below agrees to waive any claim it has or may have against San Jacinto Community College District (Owner), Engineers, Consultants and their respective employees arising out if in connection with the administration, evaluation or recommendation of any proposal. The Proposer further agrees the Owner reserves the right to waive any requirements under the proposal documents or the Contract Documents, acceptance or rejection of any proposals, and recommendations.**

**NOTE: The Statement or Affirmation Must Be Notarized.**

**STATEMENT OR AFFIRMATION**

The undersigned affirms that he/she is duly authorized to execute this waiver by the person(s) or business entity making the proposal

Firm's Name: \_\_\_\_\_

Address: \_\_\_\_\_

Proposer's Name: \_\_\_\_\_

Position/Title: \_\_\_\_\_

Proposer's  
Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Subscribed and sworn to me on this \_\_\_\_\_ of \_\_\_\_\_, \_\_\_\_\_.

\_\_\_\_\_  
Notary Public

My Commission expires \_\_\_\_\_

**NOTE: THIS FORM MUST BE EXECUTED AND SUBMITTED WITH PROPOSAL**

END OF DOCUMENT



\*\*\*All applicable companies doing business with SJCCD are **REQUIRED**  
by Texas state law to complete this form.\*\*\*



**00 45 00.3**  
**HB 89 Form**

**PROHIBITION ON CONTRACTS WITH COMPANIES BOYCOTTING ISRAEL**

Subject to the Texas Legislature’s H.B. No. 89 relating to state contracts with and investments in companies that boycott the state of Israel, and consistent with the amendments and requirements of Subtitle F, Title 10, Chapter 2270 of the Texas Government Code, the below identified company (otherwise “Company” in order to do business with San Jacinto Community College (hereinafter “College”) verifies that:

1. Said Company does not boycott Israel; and
2. Said Company will not boycott Israel during the term of any contract with the College.

*Pursuant to Section 2270.001, Texas Government Code:*

1. *“Boycott Israel” means refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes; and*
2. *“Company” means a for-profit organization, association, corporation, partnership, joint venture, limited partnership, limited liability partnership, or any limited liability company, including a wholly owned subsidiary, majority-owned subsidiary, parent company or affiliate of those entities or business associations that exist to make a profit. This term does not include a sole proprietorship.*

**This requirement applies only to a contract that:**

1. **Is with a company with ten or more full-time employees; and**
2. **Has a value greater than \$100,000.**

Company Name: \_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

**DOCUMENT 00 45 16**  
**PROPOSER'S QUALIFICATIONS**

**PROJECT NO. CSP 20-12 MARITIME EXPANSION FIRE TRAINING FACILITY**

Response to Document 00 45 16 shall include the following (See 00 21 16 – Instructions to Proposers, Part 4 – Procurement Procedures for more details):

- **Cover Sheet:**  
Cover sheet should include the project number, project title, the firm name, principal business address, principal Texas business address (if not the same), telephone and e-mail address.
- **Response to Sections:**  
Response to Sections 1 – 4 shall be a maximum of twenty (20) pages (numbered 1-20). Sections must be in order and clearly labeled. The Cover Sheet does not count toward maximum pages.
  - Response to Sections 5 – 6 must be submitted separately through the e-bidding website (<https://sanjac.ionwave.net>).

**SECTION 1 – GENERAL**

A. Staffing Approach:

1. Identify the proposed Project Manager, Superintendent, Cost Estimator, Field Engineer, Scheduler, Quality Control Manager, Safety Manager and Foremen by name and title.
2. Provide an organization chart that supports your staffing approach.
3. Provide resumes for all proposed personnel. Describe clearly the current assignment for named staff including project name, client name and anticipated project completion date.

B. Management Plan

1. Describe your management plan and project methodology including discussion of the following:
  - a. Items you will address in pre-construction planning
  - b. Approach to site logistics and staging
  - c. Phasing and sequencing of work around existing campus operations
  - d. Proposed utilization of work forces in the evenings, weekends, holidays and summer breaks.
  - e. Safety strategies
  - f. Procurement
  - g. Cost accounting and reporting (cost control system)
  - h. Document control system
  - i. Management of Sub-contractors performing portions of the work.
2. Describe methods for coordinating submittals with the architect/engineer.
3. Describe how you will approach the development of a sequence of work.

- 4 Describe how you will develop a phasing solution that minimizes disruptions to the educational process and assure overall safety of students and staff.
- 5 Describe your team members' (prime and subcontractors) technology capability via the Internet using electronic mail and other web-enabled applications.
- 6 Describe whether or not your firm and sub-contractors have computer aided design systems. If you or your sub-contractors utilize CAD, describe if you will utilize those systems for preparation of and coordination of shop drawings.

C. Proposed Construction Schedule:

Provide a Critical-Path Method (CPM) schedule depicting how you anticipate substantially completing all work by August 2020. Milestone dates for each project phase should be included in the overall schedule. CPM schedule should show overlap of activities between any phases to demonstrate efficiency.

D. Prime-Contractor/Sub-Contractor Relationships:

Provide a team organization chart depicting the relationship between the prime contractor and the proposed subcontractors. Demonstrate clear ability and experience of the firm and the PM to manage subcontractors. If the prime contractor is a joint venture or association of two or more firms, provide a clear explanation of the split of responsibilities. Qualification information submitted shall be applicable only to the company entity or branch that will perform this Work.

## **SECTION 2 – HISTORY**

- A. Provide a brief history of the company and key officers, directors and employees. Stipulate how long the organization has been in continuous business and performing similar work included in this project. List other fully staffed offices or branches of the organization. List the names, titles and tenure with the organization of the key officers, directors and employees.
- B. Provide a list of a minimum of three (3) projects of similar size, scope, and complexity that include performance as the primary contractor or major subcontractor and are currently being performed, or have been performed over the last five (5) years. These projects shall reflect work performed by proposed staff identified in Section 1 – A. Staffing Approach. Define whether the work is being or was performed as the Prime contractor or as a Subcontractor. Provide the name of the firm's employee who managed the project. Include project name and address, project description (identify major elements of projects and/or unique features), project size, number of square feet, your firm's team and other key personnel involved in the project.

## **SECTION 3 – SAFETY**

- A. In bullet format, list your firm's Experience Modification Rate (EMR) for the three (3) most recent annual insurance-year ratings, your firm's annual OSHA Recordable Incident Rates (RIR) for all work performed during the past three (3) calendar years, and total lost time per year due to incidents for the past three (3) years.
- B. Briefly describe the firm's approach for anticipating, recognizing and controlling safety risks, and note the safety resources that the firm provides for each project's Safety program.

## SECTION 4 – FINANCIAL

- A. In bullet format, provide your firm's total bonding capacity, available bonding capacity and current backlog.
- B. Attach a letter of intent from a surety company indicating your firm's ability to bond for the entire construction cost of the project. The surety shall acknowledge that your firm may be bonded, at a minimum, for the amount of your Base Proposal as submitted in document 00 42 13.
- C. Provide details of any past or pending litigation or claims your firm may be involved in that may affect your performance under a Contract with the College. Identify if your firm is currently in default on any loan agreement or financing agreement with any bank, financial institution, or other entity. Please specify date(s), details, circumstances, and prospects for resolution.
- D. Respond whether your organization has ever defaulted or failed to complete any work awarded or has ever paid liquidated damages or a penalty for failure to complete a contract on time. If so, stipulate where and why.

## SECTION 5 – AUDITED FINANCIAL STATEMENTS

Include your firm's audited financial statements as an attachment in the e-bidding website (<https://sanjac.ionwave.net>). Audited financial statements must include the past **two (2) complete years** including your organization's latest balance sheet and income statement showing the following items:

1. Current Assets (e.g., cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory, and prepaid expenses)
2. Net Fixed Assets
3. Other Assets
4. Current Liabilities (e.g., accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries, and accrued payroll taxes)
5. Other Liabilities (e.g., capital, capital stock, authorized and outstanding shares par values, earned surplus, and retained earnings)
6. Total Revenue
7. Total Expenses
8. Net Income

Audited financial statements may be marked as Confidential.

If audited financial statements are not available, unaudited but reviewed financial statements may be submitted for consideration but may be scored lower. Audited or reviewed financial statements must be accompanied by a letter from a third-party accounting or consulting firm to receive any scoring. Failure to provide two (2) complete years will result in zero (0) score for this requirement.

## **SECTION 6 – REFERENCES**

Include Reference information on the **Attributes tab** in the e-bidding website (<https://sanjac.ionwave.net>). Reference information must be submitted directly into the e-bidding website. Attachments and/or notes regarding attachments will not be considered. References shall be provided for each of the projects listed in Section 2 – History. Project name, reference name, and reference email address is required for each individual.

- A. Provide Owner references for each of the projects listed in Section 2 – History. The reference listed must have direct knowledge of the firm’s work on the project and be able to speak about the project’s budget, schedule, completion, and quality of workmanship.
- B. Provide Architect/Engineer references for each of the projects listed in Section 2 – History who served as the day-to-day liaison during the construction phase.

All references must include a valid email address. All references will be contacted by email. Evaluations will be based on responses received from references. It is advisable to notify your references ahead of time that a reference will be requested by email.

END OF DOCUMENT

**DOCUMENT 00 45 16.13  
SUBCONTRACTOR'S QUALIFICATIONS**

**PROJECT NO. CSP 20-12 MARITIME EXPANSION FIRE TRAINING CENTER**

**PART 1 – GENERAL**

This Document shall be submitted by 2:00 PM on Friday, December 13, 2019) to:  
[karen.iring@sjcd.edu](mailto:karen.iring@sjcd.edu).

Prime Contractor's Name: \_\_\_\_\_

Subcontractor's Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone No: \_\_\_\_\_ Fax No: \_\_\_\_\_ E-mail: \_\_\_\_\_

- A. The following major Subcontractors and Suppliers are identified as members of the project team. In the order listed, prepare an individual submittal providing all information requested for each subcontractor supplier.

- Site Work
- Concrete
- Mechanical
- Pre Engineered Metal Building
- Plumbing
- Electrical
- Landscaping
- Drywall
- Fencing
- Doors/Frames/Hardware
- Pre-finish Fiber Cement Siding

- B. Have you previously worked together?  Yes  No

If yes, name project(s):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

C. Volume of Work completed in last five (5) years (through December 31):

2018 \$ \_\_\_\_\_  
2017 \$ \_\_\_\_\_  
2016 \$ \_\_\_\_\_  
2015 \$ \_\_\_\_\_  
2014 \$ \_\_\_\_\_

D. Using the following format on a separate sheet, list major construction projects this subcontractor has completed in the last five (5) years. Other projects of particular significance may also be listed, particularly if work was done under this Prime Contractor.

Name of Project	Location of Project	
Contract Amount	Percent Complete	Completion Date
Owner Contact Name	Telephone Number	E-mail Address
Designer Contact Name	Telephone Number	E-mail Address

E. Certification:

I hereby certify that all forgoing statements contained herein are true and correct

Name of Organization: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_ Date: \_\_\_\_\_

**PART 2 – MATERIALS (Not Used)**

**PART 3 – EXECUTION (Not Used)**

END OF DOCUMENT

**DOCUMENT 00 45 19.13  
NON-COLLUSION AFFIDAVIT FORM**

By submission of this bid or proposal, the undersigned certifies that:

- A. The competitive proposal has been independently arrived at without collusion with any other bidder or with any other competitor;
- B. This bid or proposal has not knowingly disclosed and will not be knowingly disclosed, to any other bidder or competitor or potential competitor, prior to the opening of the bids, or proposals for this project.
- C. No attempt has been or will be made to induce any other person, partnership or corporation to submit or not submit a bid or proposal.
- D. The undersigned certifies that he is fully informed regarding the accuracy of the statements contained in this certification, and that the penalties herein are applicable to the bidder as well as to any other person signing in his behalf.

\_\_\_\_\_  
Authorized Agent (Print Name)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Company Address

\_\_\_\_\_  
City

\_\_\_\_\_  
State

\_\_\_\_\_  
Zip

END OF SECTION





**CONFLICT OF INTEREST QUESTIONNAIRE**  
**For vendor doing business with local governmental entity**

A complete copy of Chapter 176 of the Local Government Code may be found at <http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.176.htm>. For easy reference, below are some of the sections cited on this form.

**Local Government Code § 176.001(1-a):** "Business relationship" means a connection between two or more parties based on commercial activity of one of the parties. The term does not include a connection based on:

- (A) a transaction that is subject to rate or fee regulation by a federal, state, or local governmental entity or an agency of a federal, state, or local governmental entity;
- (B) a transaction conducted at a price and subject to terms available to the public; or
- (C) a purchase or lease of goods or services from a person that is chartered by a state or federal agency and that is subject to regular examination by, and reporting to, that agency.

**Local Government Code § 176.003(a)(2)(A) and (B):**

(a) A local government officer shall file a conflicts disclosure statement with respect to a vendor if:

\*\*\*

(2) the vendor:

(A) has an employment or other business relationship with the local government officer or a family member of the officer that results in the officer or family member receiving taxable income, other than investment income, that exceeds \$2,500 during the 12-month period preceding the date that the officer becomes aware that

- (i) a contract between the local governmental entity and vendor has been executed; or
- (ii) the local governmental entity is considering entering into a contract with the vendor;

(B) has given to the local government officer or a family member of the officer one or more gifts that have an aggregate value of more than \$100 in the 12-month period preceding the date the officer becomes aware that:

- (i) a contract between the local governmental entity and vendor has been executed; or
- (ii) the local governmental entity is considering entering into a contract with the vendor.

**Local Government Code § 176.006(a) and (a-1)**

(a) A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with a local governmental entity and:

- (1) has an employment or other business relationship with a local government officer of that local governmental entity, or a family member of the officer, described by Section 176.003(a)(2)(A);
- (2) has given a local government officer of that local governmental entity, or a family member of the officer, one or more gifts with the aggregate value specified by Section 176.003(a)(2)(B), excluding any gift described by Section 176.003(a-1); or
- (3) has a family relationship with a local government officer of that local governmental entity.

(a-1) The completed conflict of interest questionnaire must be filed with the appropriate records administrator not later than the seventh business day after the later of:

(1) the date that the vendor:

- (A) begins discussions or negotiations to enter into a contract with the local governmental entity; or
- (B) submits to the local governmental entity an application, response to a request for proposals or bids, correspondence, or another writing related to a potential contract with the local governmental entity; or

(2) the date the vendor becomes aware:

- (A) of an employment or other business relationship with a local government officer, or a family member of the officer, described by Subsection (a);
- (B) that the vendor has given one or more gifts described by Subsection (a); or
- (C) of a family relationship with a local government officer.

**Conflict of Interest Questionnaire - EXAMPLE PAGE**  
**\*\*\*Please complete the official form on the next page\*\*\***  
**All individuals or companies being paid by SJCCD are REQUIRED to complete this form.**

**CONFLICT OF INTEREST QUESTIONNAIRE**  
**For vendor doing business with local governmental entity**

**FORM CIQ**

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.  
 This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).  
 By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. See Section 176.006(a-1), Local Government Code.  
 A vendor commits an offense if the vendor knows that the vendor's filing of this statement is an offense under this section is a misdemeanor.

**OFFICE USE ONLY**

Date Received

**1** Name of vendor who has a business relationship with local governmental entity.

**2**  Check this box if you are filing an update to a previously filed or completed questionnaire with the appropriate filing authority not later than the 7th business day after the date you became aware that the originally filed questionnaire was incomplete.

If you have an outside personal relationship or business arrangement with someone who works at SJCCD, list their name here. If there is no pre-existing relationship, write N/A here.

**3** Name of local government officer about whom the information is being provided.

\_\_\_\_\_

Name of Officer

**4** Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.

If you have a personal relationship or business arrangement with anyone at SJCCD, please describe it in this section and answer questions A and B.

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?

Yes       No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

Yes       No

**5** Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.

Check if applicable

Complete this section if applicable.

**6**  Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

**7** Signature and date required from ALL VENDORS

\_\_\_\_\_

Signature of vendor doing business with the governmental entity      Date

**S** SAN JACINTO COMMUNITY  
**C** — COLLEGE DISTRICT —

**DOCUMENT 00 52 13  
SAMPLE AGREEMENT**

**SAN JACINTO COMMUNITY COLLEGE DISTRICT**

**AGREEMENT DOCUMENTS**

**FOR**

**CONTRACTOR**

**SJCCD PROJECT #XX-XX  
PROJECT TITLE**

**CONTRACTOR NAME  
ADDRESS**

**AGREEMENT BETWEEN  
SAN JACINTO COMMUNITY COLLEGE DISTRICT  
AND  
CONTRACTOR NAME  
FOR A STIPULATED SUM**

**PROJECT NO.** XX-XX

**THIS** Agreement for a Stipulated Sum ("Agreement") is made by and between San Jacinto Community College District (hereinafter "SJCCD", "College", or "Owner"), a public community college district organized under Chapter 130 of the Texas Education Code, whose main office address is at 4624 Fairmont Parkway, Pasadena TX 77504, and Contractor a Business Type whose address is Address (otherwise "Contractor") (individually SJCCD or the Contractor shall be referred to herein as "Party" and collectively as "Parties"), effective as of Date ("Effective Date").

**RECITALS**

**WHEREAS**, SJCCD has need of construction services to complete the Project, which is mission critical to SJCCD; and

**WHEREAS**, in accordance with Section 2269 of the Texas Government Code, SJCCD issued a solicitation for construction services; and

**WHEREAS**, Contractor submitted a response to SJCCD's solicitation; and

**WHEREAS**, Contractor has demonstrated competence, to perform construction management at risk services and to complete the Project as set forth and required under this Contract (as hereinafter defined); and

**WHEREAS**, at its meeting on Date, the SJCCD Board of Trustees ("Board") approved procurement of construction services from the Contractor in accordance with the terms and conditions set forth in the Action Item presented to the Board; and

**WHEREAS**, the Board authorized the SJCCD Chancellor to enter a contract with Contractor for such services; and

**WHEREAS**, Contractor desires to and has agreed to perform such services; and

**WHEREAS**, SJCCD finds that it is within its mission and purpose to procure such services and enter the Contract, including this Agreement.

**NOW THEREFORE**, for the mutual covenants and promises and other good and valuable consideration, the receipt and sufficiency of which are acknowledged by the Parties, SJCCD and Contractor, agree to the following:

## **Section 1 - Scope of Work**

The Contractor shall execute the entire Work described in the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others. The Contract Documents are listed below; these form the Contract and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract Documents, in order of priority, are:

- This Agreement (Agreement Between Owner and Contractor for a Stipulated Sum, as may be amended by duly executed and authorized Change Orders), including Insurance Requirements attached as Exhibit A
- General Conditions for Agreement for Construction Services, attached as Exhibit B
- List of Drawings as set forth in Exhibit C
- Project Manual, for which Table of Contents is attached as Exhibit D
- Unit Prices (or other pricing), if any, attached as Exhibit E

## **SECTION 2 - DEFINITIONS**

Certain definitions and descriptions of and related to terms used in the Contract:

**Allowances:** Shall mean the allowance amounts shown in the Contract Documents, together with such further allowances as may be developed by the Parties as the Project progresses and subject to any limitations set forth herein.

**Business Day:** Any day that is (a) not Saturday or Sunday; (b) not a public holiday as defined by Chapter 662 of the Texas Local Government Code; and (c) not a day designated as a non-work day by the Board.

**Contract:** The Contract shall mean this Agreement and the other Contract Documents.

**Contract Documents:** The Agreement; any properly agreed amendments to the Agreement; all Addenda issued prior to the Effective Date; the Project Manuals developed for the construction of the Project, any Stage, or a portion thereof and all documents required thereunder; and the Drawings; the Plans and Specifications (as hereinafter defined) developed by Design Team; the most current version of the SJCCD Guidelines for Construction, the Owner's solicitation documents, the Contractor's proposal, the Contractor's bonds and proof of insurance and other documents listed in this Agreement. The Contract Documents form the Contract between Owner and Contractor. Contractor shall perform all of its Services and perform the Work (as defined below) pursuant to the entire Contract. Duties and obligations of Contractor which are described in this Agreement may be expanded or further defined by additional provisions of the other Contract Documents. Conflicts or discrepancies among the Contract Documents shall be resolved in the following order of priority: (1) this Agreement (including any attachments), as may be modified or amended; (2) any Supplementary Conditions; (3) the most current version of the SJCCD Guidelines for Construction; (4) Drawings and Specifications; and (5) other documents forming the Contract Documents and amendments issued after the execution of the Contract. Except as otherwise specified herein, amendments, revisions, and modifications of later date take precedence over those of an earlier date. The Agreement may be amended or modified only by a written modification signed by the Owner, and if the modification results in increase in the Contract sum by \$50,000 or greater, the modification is not effective unless approved by the Board. Drawings govern Specifications for quantity and location, and Specifications govern Drawings for quality performance requirements. If there is a discrepancy in the quantity or quality stated, the Contractor shall be deemed to have estimated the Work on the bases of the greater quantity or better quality.

**Contract Time:** The term "Contract Time" shall mean the period of time between the date of the Notice to Proceed on Construction Phase Services and the date established for Substantial Completion in Section 6.

**Day(s):** The calendar day unless otherwise specifically designated.

**Design Consultant or Design Team:** The architect and other design professionals who are licensed in accordance with the Texas Occupations Code, employed by Architect Name which firm is engaged by Owner as independent consultants for design of all or a portion of the Project Improvements and to prepare drawings, plans, and specifications for the construction of the Project (the "Drawings and Specifications"). The licensed design professional assigned to work on the Project shall be those approved by the Owner and not changed without the Owner's written consent. More than one such professional or firm may be employed by Owner. (All such professionals or firms, regardless of number, may be referred to in the singular herein.)

**Drawings:** The graphic and pictorial portions of the Contract Document showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

**Final Completion:** Shall have occurred once Contractor has: 1) confirmed completion of all Subcontractors' performance of the Punch List Work (as hereinafter defined); 2) provided notice to Project Team that the Punch List Work is ready for final inspection; 3) secured, reviewed and certified compliance with the requirements of the Contract Documents; and 4) obtained and transmitted to Owner, Design Consultant's review and approval of all required guarantees, warranties, affidavits, releases, bonds, waivers, manuals, record drawings, maintenance books, and any other items or actions required under the Contract Documents. Nevertheless, this should occur within 90 days of Substantial Completion.

**Guidelines for Construction:** The construction and design requirements and standards of SJCCD, and various building and life safety codes as specified by SJCCD Construction Department and set forth in the most current version of the SJCCD Guidelines for Construction, which are hereby incorporated in the Contract by reference as though set forth herein.

**Owner's Preliminary Project Cost:** As defined in the most current version of the SJCCD Guidelines for Construction.

**Owner's Agent:** [REDACTED], the College's contracted Program Manager, has been engaged by the Owner to serve as the Owner's agent for oversight and management of the construction services associated with the Contract Documents. Notwithstanding the foregoing, the Owner's Agent does not have the authority to approve change orders or sign documents or any other instruments that bind the Owner without the express written consent of the Owner and only under circumstances that would permit delegation of authority under laws applicable to public entities.

**Owner's Contingency Allowance (OCA):** A sum established by the Owner for the Owner's exclusive use to cover additional development of the Work.

**Plans and Specifications:** The same meaning as set forth in the agreement between the Owner and the Design Team, including, without limitation, all drawings; specifications; written requirements for materials, equipment, systems, standards and workmanship for the Work and performance of any related services; and instructions to Construction Manager.

**Project Improvements:** Any Project requiring construction, additions and/or alterations including, but not limited to, all preparatory matters prior to construction such as site preparation or utility tie-ins.

**Project Team:** The Owner, Contractor, Design Consultant(s), Owner's Agent, any separate contractors employed by Owner, and other consultants employed for the purpose of programming, design, and construction of the Project. The constitution of the Project Team may vary at different phases of the Project. The Project Team will be designated by Owner and may be modified from time to time by Owner.

**Subcontractors:** All trade contractors, separate contractors, subcontractors, and/or other personnel entering into contracts ("Subcontracts") with the Contractor for the performance of the Work. The relationship between the Contractor and the Subcontractors shall be that of a general contractor to its subcontractors unless otherwise approved in advance in writing by Owner, or except when Owner enters into a separate contract directly with a subcontractor.

**Substantial Completion:** The requirements as set forth and defined in Exhibit B – General Conditions, Section 6.3. The satisfactory completion of the requirements set forth in the Project Manual is a condition precedent to the Project being considered and certified as having reached Substantial Completion.

**Substantial Completion Date:** The date established in the Agreement setting the date by which Substantial Completion of the Project is to be achieved.

**Work:** The term "Work" means all construction services required by, reasonably inferable from, intended by, and included in the Contract Documents for the Project and each sub-project or Stage, if applicable, whether completed or partially completed, and includes all services, labor, materials, equipment, parts, supplies, skills, supervision, transportation, services, and other facilities and things necessary, proper, or incidental for the Contractor to carry out and complete its obligations under the terms of the Contract Documents. If an item or system is either shown or specified, all material and equipment required for the proper installation of such item or system and needed to make a complete operating installation shall be provided whether or not detailed or specified, omitting only such parts as are specifically excepted by the Owner. Notwithstanding the above, the Contractor shall not be responsible for design, except incidental designing/detailing as required by the Specifications for shop drawing purposes.

### **Section 3 - Addenda**

The following Addenda are incorporated into the Contract documents:

[List]

### **Section 4 - Alternates**

Alternates: The following Alternates, fully described in the Contract Documents, are included as a part of the Agreement:

[List]

### **Section 5 – Unit Prices**

Unit Prices: The following Unit Prices, fully described in the Contract Documents, are included as a part of this Agreement:

[Add Exhibit E if necessary]

### **Section 6 – Contract Time**

The Work to be performed under this Contract shall be commenced within ten (10) days from the date of the Notice to Proceed issued by the Owner; and the Contractor shall achieve Substantial Completion no



later than [REDACTED], subject to adjustments of this Contract Time as provided elsewhere in the Contract Documents. The time set forth for completion of the Work is an essential element of the Contract.

**Section 7 – Contract Sum**

The Owner shall pay the Contractor for performance of the Contract, subject to additions and deductions provided therein, the sum of [REDACTED] (\$ [REDACTED]).

**Section 8 – Contingency and Allowances**

The Contract Sum includes the following Contingency and Allowance Amounts:

[List]

**Section 9 – Liquidated Damages**

Liquidated damages in the amount of \$500.00 per day may be assessed if the Work is not substantially complete at the time of the agreed dates. Liquidated Damages are addressed in Exhibit B - General Conditions, Section 6.6.

**Section 10 – Notices**

Notices: All notices, consents, approvals, demands, requests or other communications provided for or permitted to be given under any of the provisions of this Agreement shall be in writing and shall be deemed to have been duly given or served when delivered by hand delivery or when deposited in the U.S. mail by registered or certified mail, return receipt requested, postage prepaid, and addressed as follows:

**Owner:**

San Jacinto Community College District  
Chuck Smith, Associate Vice Chancellor of Fiscal Initiatives & Capital Projects  
4624 Fairmont Parkway, Suite A1.211  
Pasadena, Texas 77504  
Phone: 281-998-6341  
Email: [charles.smith@sjcd.edu](mailto:charles.smith@sjcd.edu)

**Copy to:**

San Jacinto Community College District  
Director of Contract and Purchasing Services  
4624 Fairmont Parkway, Suite A2.208  
Pasadena, Texas 77504  
Phone: 281-998-6103  
Email: [ann.kokx-templet@sjcd.edu](mailto:ann.kokx-templet@sjcd.edu)

**Contractor:**

Contractor  
Representative  
Address  
Phone:  
Email:

or to such other person or address as may be given in writing by either party to the other in accordance with the aforesaid.

**IN WITNESS WHEREOF**, intending to be bound, the Parties have entered into this Agreement as of the Effective Date.

**SAN JACINTO COMMUNITY COLLEGE DISTRICT**

By: \_\_\_\_\_ Date \_\_\_\_\_  
Teri Zamora  
Vice Chancellor, Fiscal Affairs

**INSERT NAME**

By: \_\_\_\_\_ Date \_\_\_\_\_  
**INSERT NAME**  
**INSERT TITLE**

SAMPLE

**EXHIBIT A  
INSURANCE REQUIREMENTS**

The Contractor shall submit an insurance certificate evidencing the following coverages:

Workers' Compensation

- a. State: Texas – Statutory
- b. Applicable Federal – Statutory
- c. Employer's Liability
  - \$1,000,000 per Accident
  - \$1,000,000 per Disease, Policy Limit
  - \$1,000,000 per Disease, Each Employee

Comprehensive or Commercial General Liability (including Premises – Operations, Independent Contractors; Products and Completed Operations, Broad Form Property Damage, Pollution and Blanket Contractual. X, C, U exclusions to be removed):

- a. Bodily Injury and Property Damage Combined
  - \$1,000,000 Each Occurrence
  - \$1,000,000 Aggregate
  - \$1,000,000 Aggregate per Project
- b. Products and Completed Operations shall be maintained for at least one year after the expiration of the period for the correction of Work and certificates shall be filed annually with the Owner during this period of time:
- c. Personal Injury, with Employee Exclusion deleted:

Business Auto Liability (including owned, non-owned and hired vehicles);

- a. Combined Single Limits: \$1,000,000

Umbrella Liability Insurance:

- a. Limits: One times Contract Sum subject to a maximum of \$25,000,000.
- b. The Umbrella shall provide following form coverage over the workman's compensation, compensative general liability, and comprehensive automobile liability.

Builders Risk/Property Insurance

- a. Limits: Contract Sum
- b. Earlier of Permission to Occupy is granted or Date of Substantial Completion as approved by Owner.
- c. Deductible shall be no greater than 1% of Contract with a maximum of \$50,000 unless otherwise approved by the Owner.
- d. Coverage shall be provided on an "All Risk" form and shall include the perils of flood and windstorm with limits meeting the replacement cost value.

San Jacinto Community College District (SJCCD) shall be an Additional insured on all of the Contractor's insurance policies except for Worker's Compensation insurance. Provision shall be included for Waiver of Subrogation against SJCCD, except for any professional liability coverage and Worker's Compensation coverage.

**EXHIBIT B  
GENERAL CONDITIONS FOR AGREEMENT FOR CONSTRUCTION SERVICES**

Exhibit B is a separate document.

SAMPLE

**EXHIBIT C  
LIST OF DRAWINGS**

To be updated from CSP

SAMPLE

**EXHIBIT D  
PROJECT MANUAL TABLE OF CONTENTS**

To be updated from CSP

SAMPLE

**EXHIBIT E**  
**UNIT PRICES (Or Other Pricing)**

To be updated as needed

SAMPLE

**DOCUMENT 00 60 00.16**  
**FELONY CONVICTION NOTIFICATION**

State of Texas Legislative Senate Bill No. 1, Section 44.034, Notification of Criminal History, Subsection (a) states, "A person or business entity that enters into a contract with a school district must give advance notice to the district if the person or an owner or operator of the business entity has been convicted of a felony. The notice must include a general description of the conduct resulting in the conviction of a felony."

Subsection (b) states, "A school district may terminate a contract with a person or business entity if the district determines that the person or business entity failed to give notice as required by Subsection (a) or misrepresented the conduct resulting in the conviction. The district must compensate the person or business entity for services performed before the termination of the contract."

I, the undersigned agent for the firm named below, certify that the information concerning notification of felony conviction has been reviewed by me and the following information furnished is true to the best of my knowledge. (Check appropriate statement.)

- My firm is a publicly held corporation. This reporting requirement is not applicable.
- My firm is neither owned nor operated by anyone who has been convicted of a felony.
- My firm is owned or operated by the following individual(s) who has/have been convicted of a felony.

Name(s) of felon(s):

---

Description of Conviction(s):

---

---

---

---

VENDOR

---

DATE

---

AUTHORIZED SIGNATURE

---

PRINT/TYPE SIGNATURE

END OF SECTION



**DOCUMENT 00 61 13.13**

**PERFORMANCE BOND**

KNOW ALL MEN BY THESE PRESENTS, that we \_\_\_\_\_ (Contractor) hereinafter called "Principal", and \_\_\_\_\_ (Surety) hereinafter called "Surety", are held and firmly bound unto the San Jacinto Community College District, hereinafter called "Owner", in the amount of: \_\_\_\_\_ Dollars (\$\_\_\_\_\_) for payment whereof the said principal and surety bind themselves and their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has entered into a certain contract with the Owner, dated the \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ for the complete construction on the property of the Owner, located in Harris County, Texas, of the work described as:

**CSP 20-12 Maritime Expansion Fire Training Center**

Which said Contract and Documents referred to therein is herein now referred to and made part hereof as fully and completely as if copied in detail herein.

NOW, THEREFORE, the condition of this obligation is such that if said Principal shall well and truly and faithfully perform all the undertakings, covenants, terms, conditions, and agreements of said Contract, including, but not limited to, the faithful performance of the work required in accordance with the Contract Documents, during the original term thereof and extension thereof which may be granted by the Owner with or without notice to the Surety, and if said Principal shall satisfy all claims and demands incurred under such contract and shall fully indemnify, defend, and save harmless the Owner from all costs, including attorney's fees, which the Owner may incur in the prosecution or defense of any suit or proceeding arising out of the breach or default of the Principal, then this obligation shall be void; otherwise, to remain in full force and effect.

The said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alterations or additions to the terms of the Contract or to the work to be performed thereunder, or of the specifications accompanying the same, shall in anywise affect its obligation on this bond, and it does hereby waive notice of such change, extension of time, alterations or additions to the terms of the Contract or to the work or to the specifications thereunder.

It is expressly provided that if any legal action shall be filed upon this bond, venue shall lie in Harris County, Texas.

Simultaneously with the execution of this Performance Bond, the parties hereto have executed a Payment Bond, reference to which is made for all purposes. Nothing in this Performance Bond shall any way nullify the obligations of the parties as set forth in said Payment Bond.

Provided, however, that this bond is executed pursuant to the provisions of the Texas Government Code Title 10, Chapter 2253 or successor statutes, and liabilities on this bond shall

be determined in accordance with the provisions of said Article to the same extent as if it were copies at length herein.

Provided, however, that nothing in the bond shall be construed to limit the rights of the beneficiaries of this Bond which they might have under general, special or common law of the State of Texas not inconsistent with the terms hereof and not inconsistent with the provisions of Texas Government Code Title 10, Chapter 2253, as amended.

IN TESTIMONY WHEREOF, the parties hereto have executed this instrument on this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

SURETY

PRINCIPAL

\_\_\_\_\_

\_\_\_\_\_

By \_\_\_\_\_

By \_\_\_\_\_

Name \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

Title \_\_\_\_\_

Business Address \_\_\_\_\_

Business Address \_\_\_\_\_

Telephone \_\_\_\_\_

Telephone \_\_\_\_\_

Witness \_\_\_\_\_

Witness \_\_\_\_\_

Name \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

Title \_\_\_\_\_

APPROVED AS TO FORM:

**SAN JACINTO COMMUNITY COLLEGE DISTRICT**

By \_\_\_\_\_

By \_\_\_\_\_

Name \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

Title \_\_\_\_\_

END OF SECTION

**DOCUMENT 00 61 13.16  
PAYMENT BOND FORM**

**San Jacinto Community College District  
CSP 20-12 Maritime Expansion Fire Training Center**

COUNTY \_\_\_\_\_

BOND NO. \_\_\_\_\_

KNOW ALL PERSONS BY THESE PRESENTS: That we \_\_\_\_\_  
(Contractor) hereinafter called "Principal", and \_\_\_\_\_(Surety) hereinafter  
called "Surety", are held and firmly bound unto the San Jacinto Community College District, hereinafter  
called "Owner", in the amount of: \_\_\_\_\_ Dollars  
(\$ \_\_\_\_\_), lawful money of the United States, well and truly to be paid to the State of Texas,  
and we bind ourselves, our heirs, successors, executors, and administrators jointly and severally, firmly  
by these presents.

Whereas, the above bounden principal has entered into the foregoing contract with the State of  
Texas attached hereto, and whereas, under the law said Principal is required before commencing the work  
provided for in said contract to execute a bond in the amount of said contract solely for the protection of  
all claimants, as defined by the Texas Government Code Title 10, Chapter 2253, or successor statutes, in  
the prosecution of the work provided for in said contract supplying labor and materials as defined by law,  
in the prosecution of the work provided for in said contract, for the use of each such claimant.

The condition of this obligation is such that if the above bounden principal, his or its heirs,  
successors, executors, and administrators shall well and faithfully make payment to each and every  
claimant as defined by law, supplying labor and materials as defined by law, in the prosecution of the  
work provided for in said contract and any and all duly authorized changes to said contract that may  
hereafter be made, notice of such changes to the Surety(s) being hereby waived, then this obligation shall  
be null and void, otherwise it shall remain in full force and effect.

WITNESS our hand this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

SURETY

CONTRACTOR

\_\_\_\_\_  
(Print Firm Name and Seal)

\_\_\_\_\_  
(Company Name)

\* By: \_\_\_\_\_

By: \_\_\_\_\_

\_\_\_\_\_  
(Print Name)

\_\_\_\_\_  
(Print Name)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Title)

\* Note: A Power of Attorney, showing that the surety officer or Attorney-in-Fact has authority to sign  
such obligation, must be impressed with the corporate seal and attached behind the Payment Bond.

The ATTORNEY GENERAL OF TEXAS & TEXAS DEPARTMENT OF INSURANCE has approved  
this form.

END OF DOCUMENT

**DOCUMENT 00 62 16**  
**CERTIFICATE OF INSURANCE**

1.1 REQUIREMENTS

- A. All Contractors doing work will be required to carry the minimum amount of liability insurance.
- B. Proof of insurance will be reflected on the **ACCORD™ CERTIFICATE OF LIABILITY INSURANCE** form.
- C. The San Jacinto Community College District will be named as the Certificate Holder.
- D. The General Contractor will be named as the insured, with the Contractor address indicated. This address will be same as shown on the Contract documents.
- E. The San Jacinto Community College District will be the final decider on the suability of a particular insurance carrier.

1.2 REFERENCES

- A. Limits of Coverage are defined in the Agreement Between the Owner and Contractor.

**END OF DOCUMENT**

**DOCUMENT 00 62 76**  
**PAYMENT APPLICATION FORM**

1.1 REQUIREMENTS

- A. Applications for payment will be accompanied by completed Release of Partial Payment form.
- B. Release of Partial Payment form will be provided to the Contractor in Microsoft Excel format.
- C. Form is to be signed by the Contractor, Architect/Engineer before being sent to the District for payment.
- D. All applications for pay will be sent to the Director of Construction for processing.

2.1 REFERENCES

- A. SECTION 01 29 00, this manual
- B. SECTION 00 62 76.1 Release Partial Payment form

END OF SECTION

Release of  
Partial  
Payment

San Jacinto College Community District

4624 Fairmont Parkway Pasadena, Texas 77504

Project ID: \_\_\_\_\_

Invoice #: \_\_\_\_\_

Project Title: \_\_\_\_\_

Date: \_\_\_\_\_

Contractor : \_\_\_\_\_

Architect : \_\_\_\_\_

Contract Completion Date: \_\_\_\_\_

Base Contract Value:	0.00	Previous Retainage	0.00
Approved Change Orders:	<u>0.00</u>	Retainage from this Application	<u>0.00</u>
Total Contract Value:	0.00	Retainage To Date	<b>0.00</b>

Total Completed and Stored To Date: 0.00

Total Completed From Previous Applications: 0.00

Work Completed This Period: 0.00

Less Retainage: 0.00

Amount of this Application: **0.00**

\_\_\_\_\_  
Completed To Date  
\_\_\_\_\_  
Days to Completion

**Attachments:**

*(Attach Certified AIA Document G702 as back up to this Pay Application)*

**Approved By:**

\_\_\_\_\_  
(Contractor)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Designer)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Owner)

\_\_\_\_\_  
(Date)

PO #	_____
REC #	_____
FUND	_____

DOCUMENT 00 62 76.13  
SALES TAX EXEMPTION FORM

01-339 (Beck)  
(Rev. 4-13/8)

**Texas Sales and Use Tax Exemption Certification**

Federal ID # 74-6028285

*This certificate does not require a number to be valid.*

Name of purchaser, firm or agency <b>San Jacinto Community College District</b>	
Address (Street & number, P.O. Box or Route number) <b>4624 Fairmont Parkway</b>	Phone (Area code and number) <b>281-998-6150</b>
City, State, ZIP code <b>Pasadena, Texas 77504</b>	

I, the purchaser named above, claim an exemption from payment of sales and use taxes (for the purchase of taxable items described below or on the attached order or invoice) from:

Seller: \_\_\_\_\_

Street address: \_\_\_\_\_ City, State, ZIP code: \_\_\_\_\_

Description of items to be purchased or on the attached order or invoice:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Purchaser claims this exemption for the following reason:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I understand that I will be liable for payment of all state and local sales or use taxes which may become due for failure to comply with the provisions of the Tax Code and/or all applicable law.

*I understand that it is a criminal offense to give an exemption certificate to the seller for taxable items that I know, at the time of purchase, will be used in a manner other than that expressed in this certificate, and depending on the amount of tax evaded, the offense may range from a Class C misdemeanor to a felony of the second degree.*

Purchaser <b>sign here</b> <i>Brenda Halyer</i>	Title Chancellor	Date <i>10/16/15</i>
--	---------------------	-------------------------

NOTE: This certificate cannot be issued for the purchase, lease, or rental of a motor vehicle.

**THIS CERTIFICATE DOES NOT REQUIRE A NUMBER TO BE VALID.**

Sales and Use Tax "Exemption Numbers" or "Tax Exempt" Numbers do not exist.

**This certificate should be furnished to the supplier.  
Do not send the completed certificate to the Comptroller of Public Accounts.**

**DOCUMENT 00 65 19.1**  
**SUBCONTRACTOR HAZARDOUS MATERIAL CERTIFICATE**

OWNER: San Jacinto Community College District

ARCHITECT: Collaborate Architects

SPECIFICATION SECTION(S): \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS:

\_\_\_\_\_, being first duly sworn, deposes and says that I am the \_\_\_\_\_ of \_\_\_\_\_, the subcontractor/supplier who constructed or provided the section(s) of work referenced above, and that I am duly authorized to certify to the best of my information, knowledge, and belief no asbestos containing, or radon emitting materials have been used in our portion of the project.

Additionally, to the best of my knowledge no PCB, lead, or lead bearing materials have been incorporated into the potable water system materials that have been incorporated into this project.

ATTEST (If Corporation)

\_\_\_\_\_

Name of Subcontractor/Supplier

\_\_\_\_\_  
Secretary                      Signature                      Title

THE STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

Sworn to and subscribed before me on this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

(Seal)

\_\_\_\_\_  
(Notary Public Signature)



**DOCUMENT 00 65 19.16**  
**AFFIDAVIT OF RELEASE OF LIEN**

TO WHOM IT MAY CONCERN:

WHEREAS, \_\_\_\_\_ has been partially paid for labor and materials furnished for use in connection with the repair and renovation of the premises located at San Jacinto College Central Campus, and we have no claims against any person, firm or corporation for labor performed or materials furnished in connection with the furnishing of materials and/or installation of our work on said contract.

In consideration of \_\_\_\_\_ Dollars (\$\_\_\_\_\_), which is sum due for said work, and other goods and valuable consideration, upon the receipt and of which, the undersigned does hereby waive and release any mechanics lien or materialmen's lien or claims of lien, including any constitutional lien or claim thereto, that the undersigned has on the above mentioned real property and/or improvements thereon on account of any work furnished or to be furnished by the undersigned where pursuant to the above mentioned contract or otherwise.

The undersigned further certifies and warrants that there are no known mechanics' or materialmen's liens outstanding as of the date hereof, that all bills incurred by it with respect to the work have been paid in full, and that there is known basis for the filing of any mechanics' or materialmen's liens on the property and/or improvements above described by any person or entity performing the work on behalf of the undersigned; and to the extent permitted by applicable law, the undersigned does hereby waive and release any mechanics' or materialmen's lien or claims of lien of any other such person or entity, and further agrees to indemnify and hold the Owner harmless from said lien or claim.

By: \_\_\_\_\_

Title: \_\_\_\_\_

STATE OF TEXAS  
COUNTY OF HARRIS

Before me, the undersigned authority, on this day personally appeared \_\_\_\_\_ of \_\_\_\_\_, a Corporation, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged which was executed the same for the purposes and consideration therein express, in the capacity therein stated and as the act and deed of said Corporation, and upon being duly sworn, stated the foregoing instrument and that it is true and correct.

GIVEN UNDER MY HAND AND SEAL OF OFFICE THIS \_\_\_\_ DAY OF \_\_\_\_\_, \_\_\_\_\_.

\_\_\_\_\_  
NOTARY PUBLIC in and for the STATE of  
TEXAS

**DOCUMENT 00 72 13**  
**SAMPLE GENERAL CONDITIONS OF CONSTRUCTION AGREEMENT**

**EXHIBIT B**

**GENERAL CONDITIONS FOR AGREEMENT FOR CONSTRUCTION SERVICES BETWEEN  
SAN JACINTO COMMUNITY COLLEGE DISTRICT  
AND  
COMPANY NAME**

This General Conditions for the Construction Contract ("General Conditions" or "General Conditions of the Contract") is by and between San Jacinto Community College District ("SJCCD" or "Owner"), a public community college district organized under Chapter 130 of the Texas Education Code, whose main office address is at 4624 Fairmont Parkway, Pasadena TX 77504, and Company Name a Type of Business whose address is Address ("Contractor") (individually SJCCD or the Contractor shall be referred to herein as "Party" and collectively as "Parties") and made a part of the Contract as defined in that certain Agreement ("Agreement") with an Effective Date of [redacted] [as stated in Agreement].

As used herein, the term "Contractor" shall include a Construction Manager-at-Risk, as applicable. Any capitalized terms used in these General Conditions that are not otherwise defined herein shall have the same meaning as set forth in the Agreement.

**1. INTENT OF CONTRACT DOCUMENTS**

1.1 It is the intent of the Contract Documents to include all work and services, except to the extent expressly specified otherwise, necessary or advisable to construct a functionally complete Project. Any work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be supplied whether or not specifically called for in the Contract Documents. If the Contract Documents include words or terms that have a generally accepted technical or industry meaning, then such words or terms shall be interpreted to have such standard meaning unless otherwise expressly noted in the Contract Documents. Reference to standard specifications, manuals or codes of any technical society, organization or association or to the laws or regulations of any governmental authority having jurisdiction over the Project, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, law or regulation in effect at the time the Work is performed, except as may be otherwise specifically stated herein. Provided, however, in the event the standard specification, manual, code, law or regulation is changed after the Agreement has been executed by the Parties, a Change Order equitably adjusting the Contract Sum (either upward for increased work or downward if requirements are reduced) and/or Contract Time may be issued to the extent that Contractor demonstrates that such change materially impacts the Contract Sum, Guaranteed Maximum Price or Contract Time. The Contract Documents form the Contract for Construction. This Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either oral or in writing, between the Parties with regard to the Project or the subject matter contained in the Contract. The Construction Documents become part of the Contract when accepted by the Owner. All sections of the Project Manual shall be a part of the Contract, including the Proposal signed by the Contractor, and the Request for Proposals for the Project ("RFP"). The Contract may be amended or modified only by a written modification signed by the Owner, and if the modification results in increase in the Contract Sum by \$50,000 or greater, the modification is not effective unless approved by the Owner's Board of Trustees. A modification is (i) a written amendment to the Contract signed by both parties; (ii) a Change Order; (iii) a Construction Change Directive; or (iv) a written order for minor change in the work issued by the Owner.

## General Conditions for Agreement for Construction Services

- 1.2 Contractor acknowledges that it has thoroughly reviewed and inspected the Contract Documents, and accepts each of the foregoing as sufficient and adequate for the performance of the Work. In addition, Contractor agrees to review all Design Documents issued subsequent to the Effective Date hereof and verify that they are sufficient for the Work required to be provided by Contractor hereunder, or to notify Owner within five (5) business days of receipt thereof of all inadequacies, ambiguities or deficiencies therein, failing which Contractor will be deemed to have accepted all such Design Documents as sufficient for the intended purpose.
- 1.3 If, during the performance of the Work, Contractor discovers a conflict, error or discrepancy in the Contract Documents, Contractor shall immediately report it to Owner in writing, and before proceeding with the Work affected thereby, shall obtain a written interpretation or clarification from Owner. Prior to commencing each portion of the Work, Contractor shall first take all necessary field measurements and verify the applicable field conditions. After taking such measurements and verifying such conditions, Contractor shall carefully compare such measurements and conditions with the requirements of the Contract Documents, taking into consideration all other relevant information known to Contractor, for the purpose of identifying and bringing to Owner's attention all conflicts or discrepancies with the Contract Documents. If the Contractor is performing under the Construction Manager-at-Risk method, the Contractor is required to take all reasonable steps to performs the tasks set forth in this Section during the preconstruction services phase.
- 1.4 Drawings are intended to show general arrangements, design and extent of Work and are not intended to serve as shop drawings, which Contractor is responsible to develop and submit for approval as required for the Work. Specifications are separated into divisions for convenience of reference only and shall not be interpreted as establishing divisions for the Work, trades, Subcontracts or extent of any part of the Work. In the event of a discrepancy between or among the drawings, specifications or other Contract Document provisions, Contractor shall be required to comply with the provision that is the more restrictive or stringent requirement upon Contractor, as determined by Owner. Unless otherwise specifically mentioned, all anchors, bolts, screws, fittings, fillers, hardware, accessories, trim and other parts required in connection with any portion of the Work to make a complete, serviceable, finished and first quality installation shall be furnished and installed as part of the Work, whether or not called for by the Contract Documents.
- 1.5 When the Work is governed by reference to standards, building codes, manufacturer's instructions, or other documents, unless otherwise specified, the current edition as of the Contract date shall apply. Requirements of public authorities apply as minimum requirements only and do not supersede more stringent specified requirements. When specific products, systems, or items of equipment are referred to in the Contract Documents, any ancillary devices necessary for proper functioning also shall be provided to the extent that it is customary or a trade practice within Contractor's specialty to provide such ancillary devices.
- 1.6 The Contractor shall perform the Work in accordance with the Contract Documents in a good and workmanlike manner and in an expeditious and economical manner consistent with the interest of the Owner; shall exercise the degree of care, skill, and diligence in the performance of the Work in accordance with and consistent with industry standards for similar projects; shall utilize its best skill, effort, and judgment in diligently performing the Work; and shall furnish efficient business administration and supervision. Workmanship shall be of a quality to produce satisfactory results. This shall include, but not be limited to meaning, that all materials shall be installed in a true and straight alignment, level and plumb; patterns shall be uniform, and joining of materials shall be flush and level, unless otherwise directed by the Owner or the Contract Documents

## 2. INVESTIGATION AND UTILITIES

- 2.1 Contractor shall be solely responsible to inform itself regarding, and investigate all conditions concerning, the nature and location of the Work and the general and local conditions, and

## General Conditions for Agreement for Construction Services

particularly, but without limitation, with respect to the following: those affecting transportation, access and egress, legal disposal, handling and storage of materials; availability and quality of labor; water and electric power; availability and condition of roads; work area; living facilities; climatic conditions and seasons; local and governmental restrictions on such work; physical conditions at the work-site and the Project area as a whole; topography and ground surface conditions; nature and quantity of the surface materials to be encountered; in addition to Section 2.2 below, due diligence investigation of subsurface conditions; fill materials availability and compaction and shrinkage characteristics; equipment and facilities needed preliminary to and during performance of the Work; and all other costs associated with such performance. The Contractor further represents that it has familiarized itself with the local conditions under which the Work is to be performed, the location and character of existing or adjacent work or structures, the Contract Documents, the extent and nature of the Work and materials necessary for carrying out and completing the Work, the general character and accessibility of the Site, the applicable laws (including labor laws), and the accommodations the Contractor may require. Contractor further represents that it has correlated its visible observations with the requirements of the Contract Documents; and subject to the right to rely upon specific information as may be set forth herein, has assumed the risk of such visible conditions. The failure of Contractor to acquaint itself with any applicable conditions shall not relieve Contractor from any of its responsibilities to perform under the Contract Documents, nor shall it be considered the basis for any claim for additional time or compensation.

- 2.2 Contractor shall locate all existing roadways, railways, drainage facilities and utility services above, upon, or under the Project site, said roadways, railways, drainage facilities and utilities being referred to in this Section 2 as the "Utilities". Contractor shall contact the owners of all Utilities to determine the necessity for relocating or temporarily interrupting any Utilities during the construction of the Project. Contractor shall schedule and coordinate its Work around any such relocation or temporary services interruption. Contractor shall be responsible for properly shoring, supporting and protecting all Utilities, as well as contiguous property and structures, at all times during the course of the Work.
- 2.3 If, during the performance of the Work, Contractor or any Subcontractor, sub-subcontractor, agent, employee or anyone else for whom Contractor is legally liable, causes a disruption to any Utilities service to other facilities or customers within the Project area, Contractor shall take all actions necessary and required, and shall be responsible to all other costs necessary, to immediately restore such Utilities service at Contractor's cost. If Contractor fails to take such immediate actions, Owner shall have the right to take whatever actions it deems necessary and required to immediately restore the disrupted services, and all costs incurred by Owner as a result thereof shall be reimbursed to Owner by Contractor within five (5) business days of written demand for same from Owner.
- 2.4 Subject to Contractor's obligations and duties in this Section 2, if Contractor encounters conditions at the Project site which are (i) subsurface or otherwise concealed physical conditions which are unforeseeable and differ materially from those indicated in the Contract Documents; or (ii) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, and which reasonably could not have been discovered by Contractor as part of its scope of site investigative services required pursuant to the terms of the Contract Documents, then Contractor shall provide Owner with written notice thereof before conditions are further disturbed and in no event later than five (5) calendar days after first observance of such conditions. Owner and Design Consultant shall promptly investigate such conditions and, if they differ materially as provided in (i) and (ii) above, cause an increase or decrease in Contractor's cost of, or time required for, performance of any part of the Work, Owner will acknowledge and agree to an equitable adjustment to the Contract Sum or Contract Time, or

## General Conditions for Agreement for Construction Services

both, for such Work to the extent Contractor can demonstrate such adjustment is warranted and equitable and Contractor could not have otherwise compensated for such changed conditions to construct the Work within the Contract Time and for the Contract Sum. If Owner determines that the conditions at the site are not materially different from those indicated in the Contract Document, or not of an unusual nature, or should have been discovered by Contractor as part of its investigative services, and that no change in the terms of the Contract is justified, Owner shall so notify Contractor in writing, stating its reasons. Owner reserves the right to release retainage to all subcontractors whose scope of work has been completed and accepted to the Owner's satisfaction.

### **3. SCHEDULE**

- 3.1 Contractor shall prepare and provide the various schedules as set forth in the Agreement and any other Contract Documents. Said schedules shall include, but not be limited to, an overall progress schedule for the Project which will include the construction Work to be provided by Contractor hereunder (collectively incorporated into the "Project Schedule").
- 3.2 The Project Schedule and all other schedules required hereunder shall be updated by Contractor in accordance with the requirements of the Agreement. The Project Schedule and all updates to it shall be subject to Owner's approval, and Design Team's review and comment. Contractor's submittal of a satisfactory Project Schedule and updates thereto, and Owner's acceptance of same shall be a condition precedent to Owner's obligation to pay Contractor.

### **4. PROGRESS PAYMENTS**

- 4.1 Contractor's monthly Applications for Payment shall be in such form and contain such detail and backup as Owner may reasonably require. All payment documentation shall be submitted in a format approved by the Owner prior to the commencement of any Work. Prior to submitting its first monthly Application for Payment, Contractor shall submit to Owner and Design Consultant, for their review and approval, a Schedule of Values based upon the lump sum compensation to be paid Contractor for construction services hereunder. Under a Construction Manager-at-Risk delivery method, the Schedule of Values shall be a guideline only, and payments shall be made on the basis of actual costs as set forth under the Agreement. The approved Schedule of Values shall be updated to reflect current Change Orders and Construction Change Directives, and submitted each month for approval by, Owner and Design Consultant, along with a completed copy of the Application for Payment form G704 and/or such other form reasonably required by Owner.
- 4.2 During construction, if payment is requested on the basis of materials and equipment not incorporated into the Project, but delivered and suitably stored at the site, 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, charges, security interests and encumbrances, together with evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect Owner's interest therein, and bills of lading confirming delivery in good condition, all of which shall be subject to Owner's satisfaction. Owner has the discretion whether or not to pay for such unincorporated materials. Provided, however, notwithstanding payment by Owner, Contractor shall continue to bear risk of loss for all such materials and equipment until Final Completion of the Work and acceptance by Owner.
- 4.3 Contractor shall submit two (2) each original copies of its monthly Application for Payment to Owner and Design Consultant on or before the 25th day of each month for Work performed during the previous month. Invoices received after the 25th day of each month shall be considered for payment as part of the next month's application. Within ten (10) business days after receipt of each Application for Payment, Design Consultant shall submit to Owner a Certificate for Payment in the amount recommended by Design Consultant as being due and owing Contractor. Owner

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shall pay Contractor that portion of Design Consultant's Certificate for Payment which Owner approves as being due and owing Contractor within thirty (30) business days of Owner's receipt of the approved Certificate for Payment. Notwithstanding the foregoing, no payment by Owner shall be considered past due or not paid when due except in accordance with Section 2251.021 of the Texas Government Code.

- 4.4 During construction, Owner shall retain five percent (5%) of the gross amount of each monthly payment certified by Design Consultant and approved by Owner for payment, as "Retainage" on the Work, to be released following Final Completion in accordance with the terms hereof, any requirements imposed by the surety on the payment bonds, and any requirements of Chapter 2253 of the Texas Government Code. Owner reserves the right release retainage to all subcontractors whose scope of work has been completed and accepted to the Owner's satisfaction.
- 4.5 Each Application for Payment shall be accompanied by "conditional" waivers of lien in a format acceptable to Owner, on behalf of Contractor and all Subcontractors. Owner shall not be required to make payment until and unless waivers are furnished by Contractor. It shall be distinctly understood that by virtue of this Contract, neither the Contractor nor any contractor, subcontractor, sub-subcontractor, consultant, design professional, mechanic, material person, artisan, or laborer, skilled or unskilled, shall ever in any manner have, claim, or acquire any lien upon the buildings or any of the improvements of whatsoever nature or kind so erected or to be erected by virtue of this Contract or upon any of the land on which said buildings or any of the improvements are so erected, built, or situated. It shall be further understood that this Contract is not written for the benefit of third parties nor shall it be construed to create any third party beneficiaries.
- 4.6 In order to facilitate the review of Applications for Payment, the Schedule of Values shall include Contractor's cost for Contractor's fee, bonds and insurance, mobilization, and similar items shall be listed as individual line items. Contractor's costs for various construction items in the Schedule of Values shall be detailed. For example, concrete work shall be subdivided into footings, grade beams, floor slabs, paving, etc. These subdivisions shall appear as individual line items. All parties expressly acknowledge and agree that any and all individual line items on the Schedule of Values in the Contract Sum are not separately and individually guaranteed by the Contractor; rather, only the Contract Sum is guaranteed.
- 4.7 Contractor shall, within ten (10) business days following receipt of payment from the Owner, pay all bills for labor and materials performed and furnished by others in connection with the Work that are owed by the Contractor under and in conformity with the Contractor's contractual and/or legal obligations to such third parties, and shall, if requested, provide the Owner with evidence of such payment. Contractor's failure to make payments without cause within such time shall constitute a material breach of this Contract. Contractor shall include a provision in each of its subcontracts imposing the same payment obligations on its Subcontractor as are applicable to the Contractor hereunder, and if the Owner so requests, shall provide copies to the Owner of such Subcontractor payments. Owner is not obligated to monitor payments to Subcontractors or Sub-subcontractors, and nothing in this section shall create any right on the part of a Subcontractor or Sub-subcontractor against Owner. If the Contractor has failed to make payment promptly to the Contractor's Subcontractors or for materials or labor used in the Work for which the Owner has made payment to the Contractor, the Owner shall be entitled to withhold payment to the Contractor in part or in whole to the extent necessary to protect the Owner. If the Owner becomes aware that Contractor is not current in its legitimate obligations to suppliers, laborers, and/or Subcontractors on the Project, Owner may (but is not obligated to) withhold payment until it receives reasonable proof from the Contractor that this situation no longer exists.

**5. PAYMENTS WITHHELD**

5.1 Design Consultant shall review each Application for Payment submitted by Contractor and shall make recommendations to Owner as to the proper amounts, if any, which may be owed Contractor under the Application for Payment. Design Consultant's payment recommendation shall be evidenced by a Certificate for Payment issued by Design Consultant to Owner. All Certificates for Payment are subject to Owner's review and approval. Both Design Consultant and Owner shall have the right to refuse to certify or approve for payment any amounts, or portions thereof, requested by Contractor in an Application for Payment, or rescind any amount previously certified and approved in a Certificate for Payment, and Owner may withhold any payments otherwise due Contractor under this Contract, or any other agreement between Owner and Contractor, to the extent it is reasonably necessary to protect Owner from any expense, cost or loss attributable to: (a) incomplete, defective or deficient Work not properly remedied in accordance with the terms of the Contract Documents; (b) the filing or reasonable evidence indicating the probability of filing of third party claims against Owner attributable to an act or omission of the Contractor or attributable to the fault or neglect of Contractor; (c) Contractor's failure to make timely and proper payments to all Subcontractors and suppliers; (d) reasonable evidence that the remaining Work cannot be completed for the unpaid Contract Sum balance; (e) reasonable evidence indicating that the remaining Work cannot be completed within the remaining Contract Time; (f) Contractor's failure to satisfactorily prosecute the Work in accordance with the requirements of the Contract Documents; (g) to cover liquidated damages assessed against Contractor up to the time of the Application for Payment and to the time it is reasonably anticipated that Substantial Completion will be achieved; (h) any other failure or material breach of the requirements of the Contract Documents by Contractor. Owner shall have the right, but not the obligation, to take any corrective action Owner deems appropriate to cure any of the above noted items at Contractor's sole expense, including attorney's fees and costs, if such items are not cured by Contractor to Owner's reasonable satisfaction within three (3) days after Contractor's receipt of written notice from Owner. The Owner shall not be deemed in default by reason of withholding payment as provided for herein.

**6. FINAL PAYMENT/LIQUIDATED DAMAGES**

6.1 Subject to and expressly conditioned upon the Contractor's satisfaction of its obligations under the Contract, Owner shall make final payment of undisputed amounts ("Final Payment") to Contractor, consisting of all remaining payment due for the Contract Sum, inclusive of all unpaid Retention, within thirty (30) calendar days, or within the date by which payment is due under Section 2251.021 of the Texas Government Code, after the Work is finally accepted by Owner in accordance with Section 20 hereto; provided that Contractor first, and as an express condition precedent to the accrual of Contractor's right to Final Payment, shall have furnished Owner with: (i) a properly executed and notarized final release conditioned only upon receipt of Final Payment in the form of a duly executed copy of the surety's consent to Final Payment; (ii) unconditional lien waivers for all Work and payments except Final Payment and a conditional release for Final Payment, on behalf of Contractor and all Subcontractors; (iii) all Deliverables as defined in the Project Manual required by the Contract Documents; and (iv) such other documentation that may be required by the Contract Documents or Owner, including, but not limited to, information of any kind requested by the Owner's audit team. To the greatest extent possible, Contractor is expected to support a concept of "continuous punch, continuous audit, continuous close", which will leave few, if any, disputed issues at the time of substantial completion.

6.2 Contractor's and its Subcontractors' respective acceptance of any payment hereunder, including without limitation Final Payment, shall constitute a full waiver of any and all claims by Contractor against Owner arising out of this Contract or otherwise relating to the Project, except those identified in writing by Contractor as unsettled in the final Application for Payment. Neither the acceptance of the Work nor payment made by Owner shall be deemed to be a waiver of Owner's right to enforce any obligations of Contractor hereunder or to the recovery of damages for improper billings, defective Work, or latent defects not discovered or objected to by Owner, Owner's Agent,

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or Design Consultant at the time of final inspection. The presence of the Owner or Owner's representative at the Work site does not imply acceptance or approval of the Work by the Owner.

6.3 The Work as set out herein will not be considered Substantially Complete unless and until, as a condition to Owner's obligation to pay Contractor, and the term Substantial Completion shall mean that the performance of the work is to the point where (1) all Project systems included in the Work are operational; (2) as to such Work, all required governmental inspections and certifications required of Contractor for final use and occupancy have been made and posted; (3) as to such Work, designated initial instruction described in the Contract Documents of Owner's personnel in the operation of systems has been completed; (4) as to such Work, all the required finishes set out in the Contract Documents are in place; (5) the Work can be used by the Owner for its intended purpose; (6) a final completion list has been prepared by Contractor and approved by Owner; and (7) lien waivers, and guarantees for Work completed to that date have been delivered to Owner. A significantly large number of items to be completed or corrected will preclude the Design Consultant from issuing a Certificate of Substantial Completion. The Owner and Design Consultant will be sole judge of the detailed list of items of Work to be completed or corrected at the date of Substantial Completion which list will be no longer than one or two typed pages.

6.4 The Contractor shall keep all required insurance in full force, and utilities on, until the Certificate of Occupancy is issued and accepted by the Owner in writing. The Contractor shall not be responsible for utilities in areas that have been accepted by the Owner.

6.5 In the event that Owner takes partial occupancy prior to the Certificate of Occupancy or Certificate for Safe Occupancy being issued on the Project. Contractor shall obtain an endorsement to Contractor's builder's risk policy to provide extended coverage for partial occupancy if Contractor's builder's risk coverage under the Contract Documents would not otherwise provide such coverage.

### 6.6 **Liquidated Damages**

6.6.1 Failure of the Contractor to complete the Project within the Contract Time will result in damages being sustained by the Owner. Such direct damages are, and will continue to be, impracticable and extremely difficult to determine. Should Contractor fail to achieve Substantial Completion of the Project within the date established for Substantial Completion of the Project in the Agreement and/or Final Completion within the time set forth in these General Conditions, Contractor and the surety shall be liable for and shall pay, as liquidated damages, the sum as referenced in the corresponding Agreement as applicable, for each calendar day of delay, after any authorized time extensions. From the compensation otherwise to be paid to the Contractor, the Owner may retain a sum sufficient to cover liquidated damages which may include, but may not be limited to, consultant fees, supervision, supplementation of forces by the Owner, loss of use, and loss of revenue for each calendar day that the Work remains uncompleted, which sum when presented by the Owner is agreed upon as the proper measure the Owner will sustain per day upon the failure of the Contractor to substantially complete the Work in the time stipulated. Execution of the Contract under these specifications shall constitute agreement by Owner and Contractor that the amounts stated in this paragraph are the minimum value of the costs and damages caused by failure of Contractor to substantially and/or finally complete the Work within the allotted times, that such sums shall not be construed as a penalty, and that such sums may be deducted from payments due Contractor if such delay occurs; except that if the liquidated damages exceed the amount owed to the Contractor under the Agreement, then the Contractor or its surety shall pay any additional damages due. Notwithstanding the foregoing, Owner reserves the right to enforce and/or seek all other remedies and damages available in law or equity for Contractor's failure to perform



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any its other obligations, any other acts or omissions of Contractor, or any other breach or default of Contractor under the Contract Documents.

- 6.6.2 Owner and Contractor agree that late completion of the Work and/ or delay of the Work due to defective or non-conforming Work will result in Owner being damaged in an amount estimated to be the liquidated damages amount to cover such damages to include, but not limited to, the following:
- (a) for rental expenses and other costs for temporary buildings or alternative space obtained by the Owner due to loss of use of the Work or any part of the Work;
  - (b) additional professional services (e.g. architectural, engineering, administrative, and legal) and inspection costs;
  - (c) energy costs by continued use of less energy efficient facilities by Owner;
  - (d) storage costs by reason of Owner having to store materials not ready for display, storage, or use in new facility; and
  - (e) transportation and labor costs by having to handle materials twice because new facility was not ready for display, storage, or use upon original arrival.

### 7. SUBMITTALS AND SUBSTITUTIONS

7.1 Contractor shall carefully examine the Contract Documents for all requirements for approval of materials to be submitted such as shop drawings, cut-sheets, data, test results, schedules and samples, and develop and submit for Owner and Design Consultant's approval, a "Submittal Schedule", to depict the submission date and approval time for each. Contractor shall submit all such materials at its own expense and in such form and manner as required by the Contract Documents, in accordance with the approved Submittal Schedule, in sufficient time for Owner's and Design Consultant's approval and to prevent any delay in the fabrication and delivery of such materials, and the installation thereof. Contractor shall also carefully review and certify for accuracy and completeness all shop drawings and other submittals provided by Subcontractors, and materialmen for completeness and accuracy before forwarding the same to Design Consultant for review and action. Following review, Design Consultant will transmit all such subcontracts back to Contractor who will then issue the same to the affected Subcontractor for fabrication or revision. Contractor shall maintain a suspense control system to promote the expeditious handling of shop drawings and all other submittals. Contractor shall review all requests for clarifications and interpretations submitted by Subcontractors and others to confirm completeness, validity and necessity before submitting to Design Consultant to make interpretations of the Design Documents. Design Consultant will respond to all such requests as provided in Design Consultant Agreement. Contractor shall advise Owner and Design Consultant in writing which submittals or requests for clarification have the greatest urgency, the purpose being to enable Design Consultant to prioritize requests coming from Contractor. Contractor shall advise Owner and Design Consultant in writing when timely response is not occurring on any of the above. Contractor's failure to submit or adhere to a "Submittal Schedule" shall constitute a waiver of any claims by the Contractor arising from alleged delays in the Design Consultant's review of submittals.

7.2 Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular supplier, or where the Drawings and Specifications, certain products, manufacturer's trade names, or catalog numbers are given, such naming or specification of the item is intended to establish the type, function, dimension, appearance, and quality required, and not intended for the purposes of limiting competition. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other suppliers may be accepted, or rejected, by Owner and Design Consultant through submission by Contractor, and approval by Design Consultant and/or Owner, of "Substitution Requests", containing sufficient information to allow Owner and Design Consultant to determine that the substitute material or equipment proposed is equivalent or equal to that named.

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- 7.3 Substitution Requests for review of substitute items of material and equipment will not be accepted by Owner from anyone other than Contractor, and all such Substitution Requests must identify the cost and/or time benefits to be obtained by accepting the proposed substitution. All such Requests, to the extent possible, should be submitted by Contractor to Design Consultant prior to the bid opening, but in any event in sufficient time for review and approval without delay to the Work.
- 7.4 If Contractor wishes to furnish or use a substitute item of material or equipment, Contractor shall submit a Substitution Request to Design Consultant for acceptance thereof, certifying that the proposed substitute shall perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The Substitution Request shall state that the evaluation and acceptance of the proposed substitute will not prejudice Contractor's achievement of Substantial Completion in accordance with the Project Schedule, and whether or not acceptance of the substitute for use 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 the Project) to adapt the design to the proposed substitute, and whether or not incorporation or use by the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the Substitution Request, and additional maintenance, repair and replacement service shall be indicated. The Substitution Request also shall contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs for redesign and claims of other Managers affected by the resulting change, all of which shall be considered by Design Consultant and Owner in evaluating the proposed substitute. Design Consultant may require Contractor to furnish, at Contractor's expense, additional data about the proposed substitute. Any extra costs of Design Consultant's review of Substitution Requests above Owner's actual cost savings due to acceptance of the alternate shall be paid directly to Design Consultant by Contractor and are not included in the Cost of the Work. Except, and to the extent set forth in Change Orders approved by Owner, no substitution submitted by Contractor and approved by Design Consultant and Owner hereunder shall entitle Contractor to additional compensation or additional time to complete the Work.
- 7.5 If a specific means, method, technique, sequence or procedure of construction is indicated in or required by Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence or procedure of construction acceptable to Design Consultant, if Contractor submits sufficient information to allow Design Consultant to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. All costs of Design Consultant's review of such requests above Owner's actual cost savings due to acceptance of the alternate shall be paid directly to Design Consultant by Contractor and are not included in the Cost of the Work. Except, and to the extent set forth in Change Orders approved by Owner, no substitution submitted by Contractor and approved by Design Consultant and Owner hereunder shall entitle Contractor to additional compensation or additional time to complete the Work. The procedures for submission to and review by Design Consultant shall be the same as those provided herein for substitute materials and equipment.
- 7.6 Design Consultant shall be allowed a maximum of ten (10) business days to evaluate each Substitution Request, unless to the extent that Design Consultant notifies Contractor, upon receipt thereof, that a longer period is required. Design Consultant and Owner shall be the sole judges of the acceptability of any substitute. No substitute shall be ordered, installed or utilized without Owner's and Design Consultant's prior written acceptance that shall be evidenced by either a Change Order or an approved submittal. Owner may require Contractor to furnish, at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

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- 7.7 Contractor shall arrange for all job-site facilities in accordance with a listing approved by Owner and necessary to enable Contractor and Design Consultant to perform their respective duties and to accommodate any representatives of Owner which Owner may choose to have present on the job.
- 7.7.1 General Conditions include tangible personal property including, but are not limited to such things as trailers, toilets, computers radios, cell phones, copy machines, fax machines, and any other equipment necessary to carry on the Work. The method of acquiring such general conditions shall be evaluated based on the lowest cost to the Owner over the life of the Project. Purchasing versus leasing for items in excess of \$1,000 shall be considered by Contractor, obtaining at least three (3) proposals for leasing and at least three (3) proposals for purchasing and then analyzing which is least expensive over the usable life of the item. Contractor shall present its evaluation with recommendation to Owner for approval.
- 7.7.2 When Contractor wishes to supply general conditions from its own equipment pool, it shall first evaluate purchasing versus leasing as discussed in subsection 7.7.1 above. If leasing from others is found to be the least expensive approach, then it may lease such general conditions from its own equipment pool at a price not greater than the lowest of the three (3) lease proposals obtained.
- 7.7.3 For all such general conditions purchased which may become the property of Owner at the conclusion of the Work, Contractor shall maintain ownership responsibilities of, and risk of loss for, such facilities or property until Final Acceptance of the Work. Reimbursement for cost of such equipment will be made at the conclusion of the Work at the documented purchase price. At that time Contractor shall provide Owner with a complete inventory for each unit of equipment. The inventory shall describe the equipment and identify the purchase price, serial number, model number and condition. Where said equipment has a title, said title shall be properly transferred to Owner or to its designee.
- 7.7.4 Contractor is responsible for proper care and maintenance of all equipment while in its control, and until turnover to Owner. At the time of transfer to Owner, Owner may refuse acceptance of the equipment if Owner determines, in its sole discretion, that the equipment has not been properly cared for by Contractor or that such acquisition would not otherwise be in the best interest of Owner. In the event the Owner accepts such equipment, Contractor shall transfer title and assign all warranties associated with such equipment to the Owner.
- 7.8 Contractor's administration of the Work shall include providing and maintaining all project reporting documents in the web-based program management system (hereinafter referred to as "AMPS") which is maintained by the Owner's Agent. Contractor (beyond the Owner provided two (2) complimentary licenses) will be responsible for the monthly costs to access the system for themselves and for all of the users that are under their direct or indirect employment (sub-consultants, subcontractors, etc.) and/or for anyone whom Contractor is liable. In addition, Contractor shall perform and provide the following:
- 7.8.1 Maintain a log of daily activities, including manpower records and hours worked by craft, work activities by shift, progress, major equipment on site, weather, delays, major decisions, and similar and related information and data.
- 7.8.2 Maintain a roster of companies on the Project with names and telephone numbers of key personnel.

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- 7.8.3 Establish and enforce job rules governing parking, clean-up, use of facilities and worker discipline.
  - 7.8.4 Provide labor relations management for a harmonious, productive Project.
  - 7.8.5 If applicable, ensure compliance with any provisions of city agreements which pertain to the construction of the Project.
  - 7.8.6 Ensure compliance with all OSHA laws and regulations and other applicable safety laws, rules and regulations, including requirements of the Owner, and issue safety notices (and take other appropriate actions) in the event of violations.
- 7.9 Contractor also shall provide job site administration functions during construction to assure proper documentation, including but not limited to the following:
- 7.9.1 Job Meetings: Contractor shall conduct a preconstruction conference with each Subcontractor after award of the subcontract and prior to the start of its portion of the Work and hold weekly Subcontractor progress, safety, and coordination meetings, as required by Work progress, to provide for the timely completion of the Work. In addition, Contractor shall arrange and conduct regular monthly Project status meetings with Design Team, providing detailed reports of scheduled verses actual progress for all major activities and schedules, including procurement, fabrication, delivery, and design and construction activities Prepare minutes of all meetings required hereunder and distribute to Design Team within three (3) days after meeting.
- 7.10 Contractor shall use the weekly meetings as a tool for the preplanning of Work and enforcing schedules, and for establishing procedures, responsibilities, and identification of authority for all parties to clearly understand. During these meetings, Contractor shall identify the party or parties responsible for following up on any problems, delay items or questions, and Contractor shall note the action to be taken by such party or parties. Contractor shall revisit each pending item at each subsequent weekly meeting until resolution is achieved. Contractor shall attempt to obtain from all present any problems or delaying event known to them for appropriate attention and resolution. In addition, Contractor will provide and perform the following:
- 7.10.1 Shop Drawing Submittals/Approvals: Contractor will review and approve shop drawings and other submittals from Subcontractors and implement procedures for transmittal to Design Consultant of such submittals for action, and closely monitor the review process. Track all submittals against Submittal Schedule.
  - 7.10.2 Document Interpretation: Refer all questions for interpretation of the Contract Documents to Design Consultant in writing. Track progress of questions and responses.
  - 7.10.3 Reports and Project Site Documents: Record the progress of the Work. Submit written progress reports to Design Team, including information on Subcontractors' Work, and the percentage of completion. Keep a daily log available to Design Team and any permitting authority inspectors.
- 7.11 Substantial Completion: Pursuant to the provisions of Section 20.1 of these General Conditions and as otherwise required under the Contract Documents, ascertain when the Work or designated portions thereof are ready for Design Team's Substantial Completion inspections. From the punch lists of incomplete or unsatisfactory items ("Punch List Work") prepared by Contractor and reviewed and supplemented by the Design Team, prepare a schedule for their completion indicating completion dates for Owner's review, and cause all such Punch List Work to be timely completed.

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- 7.12 Final Completion: Monitor the Subcontractors' performance on the completion of the Punch List Work and provide notice to Project Team when the Punch List Work is ready for final inspection. Secure, review and certify compliance with the requirements of the Contract Documents, then transmit to Owner after Design Consultant reviews and approves all required guarantees, warranties, affidavits, releases, bonds, waivers, manuals, record drawings, maintenance books, and any other items or actions required under the Contract Documents as a condition precedent to the Project being considered having reached Final Completion.
- 7.13 Start-Up: With Owner's personnel, develop a schedule and program to direct the testing, and operational check-out and commissioning of all utilities, operations, systems and equipment for readiness, compliance with design specifications and assist in their initial start-up and testing by the Subcontractors. This process shall be coordinated with the Owner's Agent, the Owner's separate inspection contractors and the Contractor.
- 7.14 Record Drawings: Contractor shall monitor the progress of its own forces and its Subcontractors on marked up field prints which shall be incorporated by Contractor into the final as-built drawings.
- 7.15 Contractor shall maintain at the Project site originals or electronic copies of all Project files and records, on a current basis, including, but not limited to, the following administrative records:
- Subcontracts and Purchase Orders
  - Shop Drawing Submittal/Approval Logs
  - Contract Drawings and Specifications with Addenda
  - Warranties and Guaranties
  - Cost Accounting Records
  - Change Order Requests, if any
  - Payment Request Records
  - Meeting Minutes
  - Cost-Estimates
  - Lab Test Reports
  - Insurance Certificates and Bond Contract Changes
  - Change Order Requests and approved Change Orders
  - Permits
  - Technical Standards
  - Design Handbooks
  - "As-Built" Marked Prints continuously updated to reflect current conditions
  - Operating & Maintenance Instruction
  - Daily Progress Reports
  - Monthly Progress Reports
  - Correspondence Files
  - Transmittal Records
  - Inspection Reports
  - Bid/Award Information
  - Punch Lists
  - CPM Schedule and Updates
  - Policy and Procedure Manual

The Project files and records shall be available at all times to Project Team or their designees for reference, review or copying.

- 7.16 Contractor shall provide the following services with respect to the Work, to facilitate the smooth, successful and timely occupancy of the Project by Owner and as a condition precedent before Final Payment is made:
- 7.16.1 Contractor shall provide consultation and Project management to facilitate Owner's occupancy of the Project. The services include Contractor's coordination of the delivery of Owner supplied furniture, fixtures and equipment ("FF&E") for the Project.
- 7.16.2 Contractor shall catalog operational and maintenance requirements and frequency schedules of equipment to be operated by maintenance personnel and convey these to Owner at Substantial Completion per the Specification Division 01 77 00 of the Project Manual. Contractor shall provide Owner's operations and maintenance personnel with operations and maintenance training, as required by Owner's operational team, with

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respect to the equipment and systems being provided as part of the Work. This training will be videotaped by Contractor for subsequent presentation to Owner's operations and maintenance personnel.

- 7.16.3 At Substantial Completion, Contractor shall secure required guaranties and warranties, and shall assemble and deliver same to Owner as required by the Specification Division 01 77 00 of the Project Manual.

### **8. DAILY REPORTS, RECORD CONTRACT DOCUMENTS AND MEETINGS**

8.1 Contractor shall prepare, maintain and submit to Design Consultant and Owner, for their review and approval, the various logs, reports, and schedules set forth in the Contract through the web-based program management system (AMPS). Contractor's complete performance of its obligation to prepare, maintain and submit those logs, reports, and schedules is a condition precedent to Owner's obligation hereunder to make any payments to Contractor; provided, however, these logs, reports and schedules are for information only and shall not constitute nor take the place of, nor be deemed as the equivalent of, "constructive notice" for any notice required to be given by Contractor to Owner or Design Consultant pursuant to the Contract Documents.

8.2 Contractor shall maintain in a safe place at the Project site one record copy and one permit set of the Contract Documents, including, but not limited to, all Drawings, Plans, and Specifications, addenda, amendments, Change Orders, Construction Change Directives, and Field Orders, as well as all written interpretations and clarifications issued by Design Consultant, in good order and annotated to show all changes made during construction. In addition, Contractor will maintain a set of record Contract Documents which Contractor shall continuously update as "As-built" drawings throughout the prosecution of the Work to accurately reflect all current construction, including field changes that are made to adapt the Work to field conditions, changes resulting from Change Orders, Construction Change Directives, and Field Orders, and all concealed and buried installations of piping, conduit and utility services. Contractor shall certify the accuracy of the updated record As-built drawings. In addition to any other requirements set for the in the Contract Documents, as a condition precedent to Owner's obligation to pay Contractor, Contractor shall provide evidence, satisfactory to Owner that Contractor is fulfilling its obligation to continuously update the As-built drawing set. All buried and concealed items, both inside and outside the Project site, shall be accurately located on the record As-built drawings as to depth and in relationship to not less than two (2) permanent features (e.g. survey monuments, interior or exterior wall faces). The record As-built drawings shall be clean and all changes, corrections and dimensions shall be given in a neat and legible manner in red. The record As-built drawings, together with all approved samples and a counterpart of all approved shop drawings shall be available to Owner and Design Consultant for review. Upon Final Completion of the Work and as one of the conditions precedent to Contractor's entitlement to Final Payment, As-built drawings and, samples and shop drawings shall be delivered per the Specifications Division 01 77 00 of the Project Manual to the Design Consultant by Contractor for the Owner.

8.3 Contractor shall advise Owner, its representatives and Design Consultant of their requested or required participation in any meeting or inspection giving each at least one week written notice unless such notice is made impossible by conditions beyond Contractor's fault and control, in which case a minimum of two (2) business days' prior written notice must be given.

### **9. CONTRACT TIME AND TIME EXTENSIONS**

9.1 Contractor shall diligently pursue the Substantial Completion of the Work and coordinate the Work being done on the Project by its Subcontractors, as well as all work of others at the Project site, so that its Work or the work of others shall not be delayed or impaired by any act or omission by Contractor or anyone for whom Contractor is liable. Contractor shall be solely responsible for all construction means, methods, techniques, sequences, and procedures, as well as coordination of all portions of the Work under the Contract Documents, and the coordination of Owner's suppliers and Separate Contractors as described in Section 12 herein.

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- 9.2 Force Majeure: Should Contractor be obstructed or delayed in the prosecution of or completion of the Work as a result of unforeseeable causes beyond the control of Contractor, and not due in whole or in part to Contractor's acts or omissions or to the fault or neglect of any entity for which Contractor is legally liable, and to the extent that Contractor is unable to make up the time caused by such obstruction or delay by prosecuting the Work with reasonable diligence, such delays including but not restricted to acts of God or of the public enemy, acts of government, fires, floods, epidemics, quarantine regulation, strikes, lockouts, unusually severe weather conditions, average not reasonably anticipatable (each and collectively the foregoing "Force Majeure"), or for any other cause whatsoever, Contractor shall issue notice to Owner and Design Consultant in writing within five (5) calendar days after the first day of such delay, stating with specificity the cause or causes thereof, as well as the resulting impact and all actions being taken by Contractor, or what actions should be taken by others, to mitigate such impacts. If Contractor fails to provide such notice as required herein it will be deemed to have waived any and all rights which Contractor may have had to request a time extension or otherwise for an event of Force Majeure.
- 9.3 Provided, however, to the extent Contractor can demonstrate that the Work was delayed as the result of Force Majeure in accordance with Section 9.2, and provided Contractor complied with its obligations therein, Contractor will be entitled to an extension of the time to perform the Work equivalent to the delay demonstrated by Contractor as its total remedy for such delay, but shall not be entitled to any additional payment or fee or delay damages except as provided in the Agreement (as applicable) to complete the Work and such extended General Conditions as may be due as determined by the Owner.
- 9.4 If Contractor encounters on the Project site any materials reasonably believed by Contractor to be petroleum or petroleum related products or other hazardous or toxic substances in violation of applicable laws, Contractor immediately shall (i) stop Work in the area affected and (ii) report the condition to Owner in writing. If the Work is so stopped and hazardous material is found, the Work in the affected area shall not thereafter be resumed except by Change Order, except in the event that such materials were introduced to the site by the Contractor. Any such Change Order shall include, but not be limited to, an adjustment to the Contract Time as appropriate. If no hazardous material is found after the Work is stopped, no Change Order shall be issued or required to resume the Work in the affected area. Further, if the hazardous material was introduced to the site by or generated or caused by Contractor or any of its employees, agents, Subcontractors, or material suppliers, no Change Order will be required or issued for an adjustment in the Contract Time or the Contract Sum, and **CONTRACTOR SHALL BE LIABLE TO AND SHALL INDEMNIFY AND DEFEND OWNER FOR ANY COSTS INCURRED BY OWNER WITH RESPECT TO SUCH HAZARDOUS MATERIAL**. To the extent that this indemnification is not enforceable under applicable Texas law, then the indemnification obligation of the Contractor shall be modified to the minimum extent to render it enforceable. Additionally, to the extent that Contractor is not legally able to indemnify the Owner for acts or omissions of any Subcontractor, agent, material supplier, or other person, Contract shall include in its contracts with such persons a requirement to indemnify the Owner and a provision substantially similar to that contained in these General Conditions of the Contract in such contracts. The indemnification requirements under this Article 9 shall survive expiration or earlier termination of the Contract.
- 9.5 No interruption, interference, inefficiency, suspension or delay in the commencement or progress of the Work from any cause whatsoever, including those for which Owner and Design Consultant may be responsible, in whole or in part, nor Force Majeure, shall relieve Contractor of its duty to perform or give rise to any right to damages or additional compensation from Owner. Contractor expressly acknowledges and agrees that except as provided in 9.3, it shall receive no damages for delay. Otherwise, Contractor's sole remedy, if any, against Owner will be the right to seek an extension to the Contract Time and reasonable extended General Conditions to the extent Contractor can demonstrate such delay and claimed resulting impact, and subject to Sections 9.2 above and 9.6 below; provided, however, the granting of any such time extension shall not be a condition

## General Conditions for Agreement for Construction Services

precedent to the aforementioned "No Damage For Delay" provision. This section shall expressly apply to claims for early completion, as well as to claims based on late completion. Notwithstanding the foregoing, subject to Sections 9.2 above and 9.6 below, if the Work is delayed due to the fault or neglect of Owner or anyone for whom Owner is liable, and such delays have a cumulative total of more than sixty (60) calendar days, Contractor may make a claim for its actual and direct delay damages accruing after said sixty (60) calendar days.

- 9.6 Notwithstanding any other term or provision of the Contract Documents to the contrary, to the extent that any impact or delay demonstrated by Contractor to have incurred to a "critical path" or activity of the Work, through other than Contractor's fault, acts or omissions, or the fault, act or omissions of any entity for which Contractor is legally liable, runs concurrent with a second, independent delay to the same critical path or activity of the Work, which second delay is caused in whole or in part by the fault, acts or omissions by Contractor or by any entity for which Contractor is legally liable, then the two delays will be deemed to be "Concurrent Delays". In the event of Concurrent Delays, Contractor will be entitled, subject to Section 9.2 above, to an extension of the time to perform the Work delayed only to the extent that Contractor can demonstrate that delay(s) occurring through no fault, act or omission of Contractor, and those for which it is legally liable, exceed the delays caused by Contractor and/or those entities for which it is legally liable. An extension of time shall be Contractor's sole remedy in the event of Concurrent Delays under this Section 9.6.

### 10. CHANGES IN THE WORK

- 10.1 Owner shall have the right at any time during the progress of the Work to increase or decrease the scope of the Work through issuance to Contractor of a "Construction Change Directive" (CCD). Contractor shall promptly proceed with the changes set forth, as directed by Owner, in Construction Change Directives. In addition, within seven (7) business days after its receipt of each Construction Change Directive (unless Owner has agreed in writing to a longer period of time), Contractor shall submit an itemized estimate of any cost or time increases or savings it will incur as a result of the Construction Change Directive, based on extensions of the Unit Rates and Labor Rates contained in, and the terms of, the Contract Documents. Except in an emergency endangering life or property, or for minor changes ordered by Design Professional, no addition or changes to the Work shall be made by Contractor until a written Construction Change Directive issued by Owner, and Owner shall not be liable to Contractor for any increased compensation or adjustment to the Contract Time without such written Construction Change Directive. No officer, employee or agent of Owner is authorized to direct any extra or changed work orally.
- 10.2 Included with the monthly Application for Payment, Contractor shall prepare a Change Order to incorporate all Change Orders approved by Owner that month. Such Change Order will be reviewed by Design Consultant and Owner, and executed promptly by the Parties after an agreement is reached between Contractor and Owner concerning the changes and costs therein. The Contract Sum and Contract Time shall be adjusted in the Change Order in the manner as Owner and Contractor shall mutually agree, and Contractors' Schedule of Values shall be adjusted by the amount of the approved Change Orders.
- 10.3 If Owner and Contractor are unable to agree on a Construction Change Order for the requested change, Contractor shall, nevertheless, promptly perform the change as directed by Owner in a written Construction Change Directive. In that event, the Contract Sum and Contract Time shall be adjusted as directed by Owner. If Contractor disagrees with Owner's adjustment determination, Contractor must make a claim pursuant to Section 11 of these General Conditions or else be deemed to have waived all claimed it might otherwise have had on that matter.
- 10.4 In the event a Construction Change Directive is approved by Owner which results in either an increase or decrease to the Contract Sum, a Change Order shall be issued which increases or decreases the Contract Sum by the amount of Contractor's actual and reasonable Direct Costs of the Work (including bond premiums).



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- 10.5 Contractor shall be entitled to a maximum markup of ten (10%) percent for profit and overhead on change order work performed by Subcontractors and Sub-subcontractors. Whether work is performed by the Contractor or the Contractors' Subcontractors, the total markup on any change order work shall not exceed ten (10%) percent. If the Contractor is a Construction Manager-at-Risk, the Contractor's markup shall not exceed the ten 10% inclusive of the Construction Phase Fee.
- 10.6 The total Contract Sum or Guaranteed Maximum Price may not be increased because of the changes unless additional money for increased costs is approved by the Board of Trustees for that purpose from available money or is provided for by authorization of the issuance of time warrants. In the event that any Change Order would result in an increase in the Contract Sum or Guaranteed Maximum Price by \$50,000 or more, such Change Order shall not be effective unless and until approved by the Owner's Board of Trustees at a duly called meeting held in accordance with the Texas Open Meetings Act. The total amount of the cost of all changed under Change Orders may not exceed the amounts permitted under Section 44.0411 of the Texas Education Code.
- 10.7 Owner shall have the right, at any time, to conduct an audit of Contractor's books and records, as well as those of its Subcontractors and suppliers, to verify the accuracy of costs charged by Contractors and/or Contractor's claim(s) with respect to Contractor's costs associated with any Change Order or Construction Change Directive, as well as all costs associated with claims and notices submitted under Section 10.2 and Section 11 hereto. This provision shall not in any way limit the Owner's right to audit the Contractor under a Construction Manager-at-Risk method, as provided in the Agreement.
- 10.8 Owner and/or Design Consultant may direct Contractor to make nonmaterial changes to the Work, so long as such changes do not require or result in any adjustment to the Contract Sum, Contract Time or Project quality, and are generally within the scope of the Work. All such changes must be evidenced by a written order from Design Consultant to Contractor, in the form of Architects Supplemental Information (ASI), or such other form reasonably directed by Owner, with a copy to Owner. Contractor shall comply with all such orders. If Contractor, in good faith, believes that any such ASI issued by Design Consultant entitles Contractor to additional costs then upon receipt of such ASI, Contractor will immediately notify Owner and submit an itemized estimate of any cost on time increases in the form of a Change Proposal Request (CPR) for approval by the Owner.
- 10.9 With the exception of a Contractor's Contingency approved by Owner as part of the Contract Sum or Guaranteed Maximum Price, any expenditures from Contingency or Allowances shall be approved in advance, in writing, by the Owner. Contingency and allowance funds shall be tracked monthly and reported to Owner and reflected in the Schedule of Values. All unused Contingency and Allowance funds shall be credited to Owner upon project close-out, along with any overhead, profit or fee included in the Contract Sum or Guaranteed Maximum Price on such unused amounts.

### **11. CLAIMS AND DISPUTES**

- 11.1 The term "Claim" as used herein shall mean any and all demands made by one Party hereunder against the other Party, whether such demand be for money, time, or the assertion of any right or obligation that arises out of the Contract Documents.
- 11.2 Initial notice of Claims by Contractor must be made in writing to Owner within five (5) calendar days after the first day of the event giving rise to such Claim, setting forth with specificity the nature and impact of the event precipitating the Claim, failing which Contractor shall be deemed to have waived the Claim in its entirety, and all other recourse with regard to such event. Additional written supporting data shall be submitted to Owner within ten (10) calendar days after the occurrence of the event, unless Owner grants additional time in writing. Contractor's failure to submit such information in writing within ninety (90) days of the event giving rise to the Claim, or else Contractor shall be deemed to have waived the Claim. All Claims for additional compensation,

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to the extent demonstrated by Contractor to be valid and approved by Owner, shall be priced in accordance with the provisions of Sections 10.4 and 10.5 hereof, and the Unit Rates and labor rates set forth in Contract Documents and the approved Schedule of Values.

- 11.3 Contractor recognizes and acknowledges that any delay or suspension of the Work could cause Owner significant damages. Consequently, Contractor agrees to proceed diligently with its performance of the Work notwithstanding any pending Claim or dispute, unless otherwise agreed to by Owner in writing. Provided Owner continues to make undisputed payments in accordance with the Contract Documents during the pendency of any Claim, Contractor agrees to neither delay nor suspend the Work, and to limit its recourse for any such Claim or dispute to monetary damages.
- 11.4 Prior to the initiation of any action or proceeding permitted by this Contract to resolve disputes between the Parties, the Parties shall make a good faith effort to resolve any such disputes by negotiation between representatives with decision-making authority, subject to the requirement for Board approval of any settlement by Owner. Failing resolution, and prior to the commencement of depositions in any litigation between the Parties with respect to the Project, the Parties shall endeavor to resolve their claim by mediation. Request for mediation shall be filed in writing with the other Party to the Contract. Mediation shall proceed in advance of legal or equitable proceedings, which shall be saved pending mediation for a period of sixty (60) days from the date of filing, unless stayed for a longer period by agreement of the Parties or court order or unless the delay caused would prejudice the rights of either Party, provided that neither party shall be barred from or delayed in pursuing litigation against the other party if needed to protect a legal right, including without limitation satisfy an applicable statute of limitation.
- 11.5 Any litigation between Owner and Contractor (which term for the purposes of this subsection shall include Contractor's surety), whether arising out of any Claim or arising out of the Contract or any breach thereof, shall be brought, maintained and pursued only in the appropriate courts of competent jurisdiction located in the State of Texas in and for Harris County, Texas. The Parties expressly reject arbitration as a means of binding or non-binding dispute resolution.

## 12. OTHER WORK

- 12.1 Owner may perform other work related to the Project at the site by Owner's own forces; have other work performed by utility owners or through others under direct contracts with Owner ("Separate Contractors"). If the fact that such other work is to be performed is not noted in the Contract Documents, written notice thereof will be given to Contractor prior to starting any such other work. If Contractor believes that such performance by Separate Contractors will involve additional expense to Contractor or require additional time, Contractor shall send written notice of that fact to Owner and Design Consultant within five (5) calendar days of being notified of the other Work. If Contractor fails to send the above required five (5) calendar days' notice, Contractor will be deemed to have conclusively waived any rights it otherwise may have had to seek an extension to the Contract Time or adjustment to the Contract Sum.
- 12.2 Contractor shall afford each utility owner and Separate Contractor, and Owner (if Owner is performing the additional work with Owner's employees), proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate its Work with theirs. Contractor shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. Contractor shall be responsible for all damage to the work of others caused by the performance of its Work. Further, Contractor shall not in any way cut or alter the work of others without first receiving the written consent of that other entity and Design Consultant.
- 12.3 If any part of Contractor's Work depends for proper execution, or the results thereof depend upon the work of any Separate Contractor or utility owner (or Owner), Contractor shall inspect and promptly report to Design Consultant in writing any delays, defects or deficiencies in such work

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that renders it unavailable or unsuitable for such proper execution and results. Such report must be made within five (5) calendar days of the time Contractor first became aware of the delay, defect or deficiency or by the scheduled commencement of Contractor's dependent Work, whichever occurs first. Contractor's failure to report within such five (5) days will constitute an acceptance of the other work as fit and proper for integration with Contractor's Work.

### 13. INSURANCE & BONDS/INDEMNIFICATION

13.1 The insurance required by the Owner for the Contractor to carry under this Contract shall be written for not less than the amounts set forth in Exhibit A to the Agreement.

13.2 The Owner listed on the Title Page of the Project Manual shall be an Additional insured on all of the Contractor's insurance policies required herein except for Worker's Compensation insurance. Provision shall be included for Waiver of Subrogation against Owner, except for any professional liability coverage and Worker's Compensation coverage. Proof of insurance shall be provided to the Owner prior to being awarded the contract and shall be evidenced on (1) an original ACORD Certificate of Insurance 25-S (7/97), (and (2) the applicable endorsements, each with an original signature of the Authorized Representative including copies of policy endorsements (a) listing the District as Additional Insured (except Workers' Compensation), and (b) showing waivers of subrogation in favor of the Owner: CG2010, CG2037, CG2404, CA0070, CA0032, WC0003 or their equivalents. Policy exclusions and/or restrictions should be clearly explained on the Certificate or in an attached letter from the issuing agency. Blank areas on the Certificate should have "not covered" written across the printed areas when coverage is not provided. Upon request by the Owner, Contractor also shall provide a copy of the insurance policies required under this Contract.

13.2.1 Insurance shall be underwritten by a company rated not less than A+ in Best's guide and shall be satisfactory to the owner.

13.2.3 A 30-day notice of cancellation of any non-renewal, cancellation or material change to any of the policies shall be provided to the Owner.

13.3 **Builders Risk/Property Insurance.** The Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, Builders Risk/Property insurance in the amount of the initial Contract Sum as well as subsequent modifications thereto for the entire Work at the site on a replacement cost basis. Insurance Company used shall maintain an AM Best Rating of A-VIII or better. Deductibles shall not exceed \$25,000 without the Owner's written authorization. Such insurance shall be maintained until final payment has been made as provided herein or until no person or entity other than the Owner has an incurable interest in the property required by this Section 13.3 to be covered or Substantial Completion has been agreed to in writing by Owner, whichever is earlier. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work.

13.3.1 Property insurance shall be on an all-risk policy form and shall insure against the perils of fire and extended coverage and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, false work, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Design Consultant's services and expenses required as a result of such insured loss. This insurance is not intended to cover machinery, tools or equipment owned or rented by the Contractor that are utilized in the performance of the Work but not incorporated into the permanent improvements. The Contractor shall, at the Contractor's own expense, provide insurance coverage for owned or rented machinery, tools or equipment. Coverage of other perils shall not be required unless otherwise provided in the Contract Documents.

13.3.2 The property insurance shall include an endorsement allowing Owner occupancy and the insurance shall not be altered on account of partial occupancy prior to final completion.

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- 13.3.3 If the property insurance requires minimum deductibles and such deductibles are identified in the Contract Documents, the Contractor shall pay costs not covered because of such deductibles.
- 13.3.4 This property insurance shall cover portions of the Work stored off the site after written approval of the Owner at the value established in the approval, and also portions of the Work in transit.
- 13.3.5 Before any exposure to loss may occur, the Contractor shall file with the Owner a copy of each policy that includes insurance coverage's required by this Section 13.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire until at least thirty (30) days' prior written notice has been given to the Owner.
- 13.3.6 The Contractor waives all rights against the Owner, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this Section 13.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the settling party as fiduciary. The Owner or Contractor, as appropriate, shall require of the Design Consultant, Design Consultant's consultants, Separate Contractors described in Article 12, if any, and any of their subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of identification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.
- 13.3.7 A loss under the Contractor's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insured, as their interests may appear. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.
- 13.3.8 The Owner shall deposit in a separate account proceeds so received which the Owner shall distribute in accordance with such agreement as the parties in interest may reach. If after such loss no other special agreement is made, appropriate Change Order shall cover replacement of damaged property.
- 13.3.9 The Owner as fiduciary shall have power to adjust and settle a loss with insurers.
- 13.4 **Performance Bond Form and the Payment Bond Forms** showing the Contractor as Obligee shall be included herein and shall be executed and submitted to the Owner in duplicate prior to commencement of the Work. The surety companies must be acceptable to the Owner, meet the requirements of applicable law including the requirements of Chapter 2253 of the Texas Government Code or any statute referenced in such code, and licensed admitted carriers in the State of Texas; and the companies must appear in a current Federal Treasury list as Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies.
- 13.4.1 Each bond shall be of penal sum equal to one hundred percent (100%) of the Contract Sum and shall be compatible with the provisions of the governing authority. The bonds

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shall remain in force throughout the warranty period required under the Contract. The Contractor will not commence construction until the bonds and issuing companies have been accepted as satisfactory with an authorized power of attorney attached.

- 13.4.2 Claims must be sent to the Contractor and the Contractor's Surety in accordance with Chapter 2253 of the Texas Government Code. The Owner will furnish in accordance with such statute, a copy of the Payment Bond as provided therein to claimants upon request. All claimants are cautioned that no lien exists on the funds unpaid to the Contractor on such Contract, and that reliance on notices sent to the Owner may result in loss of their rights against the Contractor and/or its Surety. The Owner is not responsible in any manner to a claimant for collection of unpaid bills, and accepts no such responsibility because of any representation by any agent or employee. No lien shall be placed on Owner's property, it being public property owned by a governmental entity.
- 13.5 Comply with the requirements of Rule 28, TAC Section 110.110, Reporting Requirements for Building or Construction Projects for Governmental Entities.
- 13.6 Workers' Compensation Insurance Coverage (T28S110.110(c) (7))  
Definitions:
- a. Certificate of coverage ("Certificate") is a copy of a certificate of insurance, a certificate of authority to self-insure issued by the commission, or a coverage agreement (DWCC-81), DWCC-82, DWCC-83, or DWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a project, for the duration of the Project.
  - b. Duration of the Project includes the time from the commencement of the Work on the Project until the Contractor's work on the Project has been completed and accepted by the Owner.
  - c. Persons providing services on the Project ("Subcontractor") includes all persons or entities performing all or part of the services the Contractor has undertaken to perform on the Project, regardless of whether that person contracted directly with the Contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity which furnishes persons to provide hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a Project. Services do not include activities unrelated to the Project, such as food/beverage vendors, office supply delivery, and delivery of portable toilets.
- 13.6.1 The Contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all employees of the Contractor providing services on the Project, for the duration of the Project.
- 13.6.2 The Contractor must provide a certificate of coverage to the Owner prior to being awarded the contract.
- 13.6.3 If the coverage period shown on the Contractor's current certificate of coverage ends during the duration of the Project, the Contractor must, prior to the end of the coverage period, file a new certificate of coverage with the Owner showing that coverage has been extended.
- 13.6.4 The Contractor shall obtain from each person providing services on a Project, and provide to the Owner:

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- 13.6.4.1 A certificate of coverage, prior to that person beginning work on the Projects, so the Owner will have on file certificates of coverage showing coverage for all persons providing services on the Project; and
- 13.6.4.2 No later than seven days after receipt by the Contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project.
- 13.6.5 The Contractor shall retain all required certificates of coverage for the duration of the Project and for one year thereafter.
- 13.6.6 The Contractor shall notify the Owner in writing by certified mail or personal delivery, within 10 days after the Contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project.
- 13.6.7 The Contractor shall post on each project site a notice, in the text, form and manner prescribed by the Texas Worker's Compensation, informing all persons stating how a person may verify coverage and report lack coverage.
  - 13.6.7.1 Provide coverage based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all of its employees providing services on the Project, for the duration of the Project.
  - 13.6.7.2 Provide to the Contractor, prior to that person beginning work on the Project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the Project, for the duration of the Project.
  - 13.6.7.3 Provide the Contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate ends during the duration of the Project.
  - 13.6.7.4 Obtain from each other person with whom it contracts, and provides to the Contractor:
    - (a) a certificate of coverage, prior to the other person beginning work on the Project; and
    - (b) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the Project.
  - 13.6.7.5 Retain all required certificates of coverage on file for the duration of the Project and for one year thereafter.
  - 13.6.7.6 Notify the Owner in writing by certified mail or personal delivery, within 10 days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project; and
  - 13.6.7.7 Contractually require each person with whom it contracts, to perform as required by Sections 13.6.7.1 - 13.6.7.7, with the certificates of coverage to be provided to the person for whom they are providing services.
- 13.6.8 By signing this contract or providing or causing to be provided a certificate of coverage, the Contractor is representing to the Owner that all employees of the Contractor who will

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provide services on the Project will be covered by workers' compensation coverage for the duration of the Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the Contractor to administrative penalties, civil penalties, or other actions.

- 13.6.9 The Contractor's failure to comply with any of these provisions is a breach of contract by the Contractor which entitles the Owner to declare the contract void if the Contractor does not remedy the breach within ten calendar days after receipt of notice of breach from the Owner.
- 13.7 The Contractor agrees to deliver to the Owner, within ten (10) calendar days of the date of the Owner-Contractor Agreement and prior to bringing any equipment or personnel onto the site of the Work or the Project site, certified copies of all insurance policies procured by the Contractor under or pursuant to this Section 13.7 or, with the written consent of the Owner and Contractor, Certificates of Insurance in form and substance satisfactory to the Owner evidencing the required coverage's with limits not less than those specified in the Contract Documents whichever is greater. The coverage afforded under any insurance policy obtained under or pursuant to this Section 13.7 shall be primary to any valid and collectible insurance carried separately by any of the Indemnities. Furthermore, all policies and Certificates of Insurance shall expressly provide that no less than thirty (30) days prior written notice (ten (10) days for non-payment of premium) shall be given the Contractor and Owner in the event of material alteration, cancellation, nonrenewal or expiration of the coverage contained in such policy or evidenced by such certified copy or Certificate of Insurance.
- 13.8 In no event shall any failure of the Owner to receive certified copies or certificates of policies required under Section 13.1 or to demand receipt of such certified copies or certificates prior to the Contractor's commencing the Work be construed as a waiver by the Owner of the Contractor's obligations to obtain insurance pursuant to Section 13.
- 13.9 When any required insurance, due to the attainment of normal expiration date or renewal date, shall expire, the Contractor shall furnish to the Owner Certificates of Insurance and amendatory riders or endorsements that clearly evidence the continuation of all coverage in the same manner, limits of protection, and scope of coverage as was provided by the previous policy 30 days prior to the expiration. In the event any renewal or replacement policy, for whatever reason obtained or required, is written by a carrier other than that with whom the coverage was previously placed, or the subsequent policy differ in any way from the previous policy, the Contractor shall also furnish to the Owner with a certified copy of the renewal or replacement policy unless the Owner provide the Contractor with prior written consent to submit only a Certificate of Insurance for any such policy. All renewal and replacement policies shall be in form and substance satisfactory to the Owner and Contractor, and written by carriers acceptable to the Owner and Contractor.
- 13.10 If any policy has aggregate limits, a statement of claims against the aggregate limits is required. Any Aggregate limit under the Contractor's liability insurance, shall by endorsement, apply to this Project separately. The Contractor shall notify the Owner in writing of any reduction in collectible limits (aggregate limits) by an amount in excess of \$500,000, and the Contractor shall promptly procure, at no expense to the Owner, such additional coverage as necessary to restore the valid and collectible limits of such insurance to that required under the Contract Documents.
- 13.11 The Contractor shall cause each Subcontractor to procure insurance reasonably satisfactory to the Owner and Contractor and name each of the Indemnities as additional insured's under the Subcontractor's policies.

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13.12 The Owner reserves the right to review the insurance requirements during the effective period of its Agreement with the Contractor, and provide a written request for the Contractor to make any reasonable and commercially available adjustments to insurance coverage's and/or limits when deemed reasonably prudent by the Owner based upon its unilateral interpretation of changes in statutory law, court decisions or the Owner's potential increase in exposure to loss. In the event the Contractor incurs additional Cost for such requested increases in coverage or limits, the Owner will pay such actual, additional expenditures as Cost of the Work using the process specified in Section 10 for Changes in the Work.

### 13.13 INDEMNIFICATION

13.13.1 TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, THE CONTRACTOR SHALL AND DOES AGREE TO INDEMNIFY, PROTECT, DEFEND, AND HOLD HARMLESS OWNER, AND ITS TRUSTEES, BOARD MEMBERS, OFFICERS, DIRECTORS, OFFICIALS, EMPLOYEES, SUCCESSORS AND ASSIGNEES (COLLECTIVELY, "THE INDEMNIFIED PARTIES") OF, FROM AND AGAINST ALL CLAIMS, DAMAGES, LOSSES, LIENS, CAUSES OF ACTION, SUITS, JUDGMENTS, PENALTIES, AND EXPENSES, INCLUDING REASONABLE ATTORNEY FEES AND COURT COSTS, BUT ONLY TO THE EXTENT ARISING OUT OF, CAUSED BY, OR RESULTING FROM ANY NEGLIGENT, WRONGFUL, OR TORTIOUS ACT OR OMISSION OF THE CONTRACTOR, CONTRACTOR'S SUBCONTRACTORS, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY THEM OR ANYONE THAT THEY CONTROL (COLLECTIVELY, "THE LIABILITIES"). IN THE EVENT OF FAILURE BY THE CONTRACTOR TO FULLY PERFORM IN ACCORDANCE WITH THIS INDEMNIFICATION SECTION, EACH OF THE INDEMNIFIED PARTIES, AT ITS OPTION, AND WITHOUT RELIEVING CONTRACTOR OF ITS OBLIGATIONS HEREUNDER, MAY SO PERFORM, BUT ALL COSTS AND EXPENSES SO INCURRED BY ANY OF THE INDEMNIFIED PARTIES IN THAT EVENT SHALL BE REIMBURSED BY CONTRACTOR TO THE INDEMNIFIED PARTIES, AND ANY COST AND EXPENSES SO INCURRED BY INDEMNIFIED PARTIES, OR ANY OF THEM SHALL BEAR INTEREST UNTIL REIMBURSED BY CONTRACTOR, AT THE RATE OF INTEREST PROVIDED TO BE PAID BY THE JUDGMENT UNDER THE LAWS OF THE STATE OF TEXAS. THIS INDEMNIFICATION SHALL NOT BE LIMITED TO DAMAGES, COMPENSATION, OR BENEFITS PAYABLE UNDER INSURANCE POLICIES, WORKERS' COMPENSATION ACTS, DISABILITY BENEFIT ACTS, OR OTHER EMPLOYEE BENEFIT ACTS.

13.13.2 SUCH OBLIGATION SHALL NOT BE CONSTRUED TO NEGATE, ABRIDGE, OR REDUCE OTHER RIGHTS OR OBLIGATIONS OF INDEMNITY WHICH WOULD OTHERWISE EXIST AS TO A PARTY OR PERSON DESCRIBED IN THIS SECTION 13.13.

13.13.3 NOTHING HEREIN SHALL BE CONSTRUED AS REQUIRING CONTRACTOR OR ANY ONE FOR WHOM OR FOR WHICH CONTRACTOR IS LIABLE FOR FROM INDEMNIFYING, PROTECTING, DEFENDING, OR HOLDING THE INDEMNIFIED PARTIES HARMLESS FOR ANY CLAIM, DAMAGE, LOSS, CAUSE OF ACTION, SUIT, JUDGMENT, PENALTY, OR EXPENSE SOLELY ARISING OUT OF, CAUSED BY, OR RESULTING FROM THE NEGLIGENT, WRONGFUL, OR TORTIOUS ACT OR OMISSION OF OR BREACH OF THE CONTRACT BY AN INDEMNIFIED PARTY.

13.13.4 It is agreed with respect to any legal limitations now or hereafter in effect and affecting the validity or enforceability of the indemnification obligations under this Section 13.13, such legal limitations are made a part of the indemnification obligation and shall operate to amend the indemnification obligation to the minimum extent necessary to bring the provision into conformity with the requirements of such limitations, and as so modified, the indemnification obligations shall continue in full force and effect. The estimate shall include a General Conditions line item allowance for the full value of all insurance deductibles. In the event this deductible allowance is not needed, the entire value (100%) will be returned to the College.



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- 13.14 In claims against any person or entity indemnified under this Section 13.13 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 13.13 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts. **THE PROVISIONS OF THIS INDEMNIFICATION SHALL SURVIVE THE COMPLETION, TERMINATION OR EXPIRATION OF THIS CONTRACT.**

### **14. WAIVER OF SUBROGATION**

- 14.1 The Contractor waives all rights of subrogation against the Owner, the Owner's Agent, and the board trustees and employees, for damages or injuries caused by perils covered by any insurance maintained by a Party hereunder, to the extent such damages or injuries are covered by such insurance, except no Party hereto waives any rights they may have to the proceeds of such insurance held by another Party. Contractor shall require similar waivers from all its Subcontractors.
- 14.2 If any policies of insurance referred to in this Section require an endorsement to provide any waiver of subrogation referenced above, the providers of such policies will cause them to be so endorsed.

### **15. CLEANUP AND PROTECTIONS**

- 15.1 Contractor agrees to keep the Project site clean at all times of debris, rubbish and waste materials arising out of the Work, and to maintain continuous cleaning crews and activities, and will cause the area of the Work to be cleaned at the end of each shift. Such cleanup and protection shall include mowing of grass and pest control to the extent deemed necessary for preservation of the public good. If Contractor fails to keep the Project site clean, Owner has the right, after providing a twenty-four (24) hour written notice, to perform any required clean up and to deduct for the costs of such clean up from the unpaid balance of the Contract Sum. At Substantial Completion of the Work, or any area of the Work, Contractor shall remove all debris, rubbish and waste materials from and about the Project site, as well as all tools, appliances, construction equipment and machinery and surface materials, and shall leave the Project site clean, washed down and in new condition, and ready for occupancy by Owner.
- 15.2 Any existing surface or subsurface improvements, including, but not limited to, pavements, curbs, sidewalks, pipes, utilities, footings, structures, trees and shrubbery, including the work of Separate Contractors or others, not indicated in the Contract Documents to be removed or altered, shall be protected by Contractor from damage during the prosecution of the Work. Any such improvements so damaged shall be restored by Contractor to condition at least equal to that existing at the time of Contractor's commencement of the Work.

### **16. ASSIGNMENT**

- 16.1 Contractor shall not assign this Contract or any part thereof, without the prior consent in writing of Owner, which may be withheld at Owner's discretion, and any unauthorized assignment shall be deemed null and void. If Contractor does, with approval, assign this Contract or any part thereof, it shall require that its assignee be bound to it and to assume toward Contractor all of the obligations and responsibilities that Contractor has assumed toward Owner. Upon notice to Contractor, Owner may assign this Agreement or the benefits hereunder, in whole or in part, as Owner deems prudent in its best interest.

### **17. PERMITS, LICENSES AND TAXES, PREVAILING WAGE RATES**

- 17.1 Except as otherwise provided in the Contract Documents to the contrary, all permits and licenses necessary for the prosecution of the Work shall be procured and paid for by Contractor. Permits and licenses to be acquired by Contractor with the assistance of Design Consultant include, but are not limited to, building, site, and utility permits. If Contractor performs any Work without obtaining, or contrary to, such necessary permits or licenses, Contractor shall bear all costs, penalties, fines

## General Conditions for Agreement for Construction Services

and costs of delays resulting or arising there from. Owner shall fully cooperate with Contractor where necessary. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work. Without limitation, all connection charges or inspection fees as may be imposed by any municipal agency or utility company are included in the Guaranteed Maximum Price and shall be the Contractor's responsibility.

- 17.2 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders and all other requirements of public authorities applicable to performance of the Work. The Contractor shall procure and obtain all bonds, other than long-term maintenance bonds, required of the Owner or the Contractor by the municipality in which the Project is located or by any other public or private body with jurisdiction over the Project. In connection with such bonds, the Contractor shall prepare all applications, supply all necessary back-up material and furnish the surety with any required personal undertakings. The Contractor shall also obtain and pay all charges for all approvals for street closings, traffic control, parking meter removal, and other similar matters as may be necessary or appropriate for the performance of the Work.
- 17.3 The Contractor shall be responsible for timely notification to and coordination with all utility companies regarding the provision of or revising of services to the Project. The Contractor shall inform the Owner at once when the Owner's participation is required. Connections for temporary utilities required for the Work are the responsibility of the Contractor. Payment for temporary services, tap charges, and water meter charges shall be the responsibility of the Contractor. Payment for permanent utility services shall be the responsibility of the Owner. The Contractor shall also obtain all permits and approvals, and pay all fees and expenses, if any, associated with Storm Water Pollution Prevention and Pollution Control Plan (SWPPP) regulations administered by the Texas Commission on Environmental Quality (TCEQ) and local authorities. All of the foregoing expenses paid by the Contractor shall be considered part of the Total Project Cost.
- 17.4 No person employed by the Contractor or any of the Contractor's consultants or Subcontractors may be paid less than the prevailing wage rate, as provided in Texas Government Code Chapter 2258. In compliance with laws of the State of Texas relating to labor (Acts 1933, 43 Leg. P. 91 Chapter 45) the building construction wage rates listed in the Contract Documents have been ascertained and determined by the Owner as the general prevailing rates in the locality of the Owner for the classifications listed. The Contractor and each Subcontractor shall pay to all laborers, workers, and mechanics employed by them in the execution of this Contract not less than such rates for each craft or type of workers or mechanic needed to execute the Contract. If it becomes necessary to employ any person in a trade or occupation not herein listed, such person shall be paid not less than an hourly rate fairly comparable to the rates shown hereinafter. This determination of prevailing wages shall not be construed to prohibit the payment of more than the rates named.
- 17.5 Contractor shall pay all sales, consumer, use and other similar taxes associated with the Work or portions thereof, which are due as the result of Contractor's performance of the Work.
- 17.6 The Owner is tax exempt as a governmental subdivision of the State of Texas under federal and state law. No taxes shall be charged to the Owner. For the purpose of establishing exemption, it is understood and agreed that the Contractor may be required to segregate materials and labor costs at the time a contract is awarded, and will accept a Certificate of Exemption from the Owner. Contractor shall issue Certificates of Exemption to its Subcontractors and suppliers in lieu of said taxes for all such materials and supplies and shall obtain Certificates of Resale from Contractor suppliers. Failure of Contractor to issue Certificates of Exemption or to obtain Certificates of Resale from Contractor suppliers shall make the Contractor responsible for absorbing the tax, without compensation from Owner.

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### 18. TERMINATION FOR DEFAULT

- 18.1 **By Owner:** Contractor shall be considered in material default of the Contract and such default shall be sufficient cause for Owner to terminate the Contract, in whole or in part, as further set forth in this Article, if Contractor: (1) fails to begin the Work under the Contract Documents within the time specified herein; or (2) fails to properly and timely perform the Work as directed by Owner or Design Consultant or as provided for in the approved Project Schedule; or (3) performs the Work unsuitably or unsatisfactorily or neglects or refuses to remove materials or to correct or replace such Work as may be rejected by Owner or Owner's Agent or Design Consultant as unacceptable or unsuitable; or (4) discontinues the prosecution of the Work contrary to the requirements of the Contract Documents; or (5) fails to correct any deficiency or defective Work; or (6) fails to resume Work which has been suspended within a reasonable time after being notified to do so; or (7) becomes insolvent or is declared bankrupt, or commits any act of bankruptcy; or (8) allows any final judgment to stand against it unsatisfied for more than ten (10) days; or (9) allows or causes liens to be filed against the Work or the Project; or (10) makes an assignment for the benefit of creditors; or (11) fails to obey any applicable codes, laws, ordinances, rules or regulations with respect to the Work; or (12) fails to promptly pay its Subcontractors and suppliers; or (13) materially breaches any other provision of the Contract Documents.
- 18.2 If Owner determines that Contractor is in default under this Contract, Owner shall notify Contractor in writing of Contractor's default(s). If Owner determines that Contractor has not remedied and cured the default(s) within seven (7) calendar days following receipt by Contractor of said written notice, then Owner, at its option, without releasing or waiving its rights and remedies against Contractor's sureties, and without prejudice to any other right or remedy it may be entitled to hereunder or by law, may terminate this Contract, in whole or in part, and take possession of all or any portion of the Work and any materials, tools, equipment, and appliances of Contractor, demand assignments of any of Contractor's Subcontracts and purchase orders that Owner may designate, and complete all or any portion of Contractor's Work by whatever means, method or agency which Owner, in its sole discretion, may choose. In such event Contractor agrees and covenants to cooperate fully with Owner's demands. In making either the initial determination that Contractor is in default under this Contract or the subsequent determination that Contractor has failed to satisfactorily cure its default, Owner may rely solely on the determination of Owner's Agent upon Design Consultant's certification to Owner that in Design Consultant's opinion Contractor is in default or has failed to satisfactorily cure its default.
- 18.3 If Owner deems any of the foregoing remedies necessary, Contractor agrees that it is entitled to receive payment of undisputed amounts for only the Work satisfactorily completed and performed up to the date of termination and shall not be entitled to receive any further payments hereunder with respect to the Work which was subject to default. All monies expended and all of the costs, losses, damages and extra expenses, including all management, administrative and other overhead and other direct and indirect expenses (including Owner's Agent, Design Consultant and attorneys' fees) or damages incurred by Owner incident to such completion, shall be deducted from the amount due for Work completed but not yet paid upon termination. If such aforementioned expenditures by Owner exceed the unpaid amount due up to the date of termination, Contractor agrees to pay promptly to Owner on demand the full amount of such excess, including, without limitation, costs of collection, attorney's fees (including appeals), and interest thereon at the maximum legal rate of interest until paid.
- 18.4 The liability of Contractor under this Article 18 shall extend to and include the full amount of any and all sums paid, expenses and losses incurred, damages sustained, and obligations assumed by Owner in good faith under the belief that such payments or assumptions were necessary or required, in completing the Work and providing labor, materials, equipment, supplies, and other items therefore or re-letting the Work, and in settlement, discharge or compromise of any claims, demands, suits, and judgments pertaining to or arising out of the Work hereunder.

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- 18.5 If, after notice of termination by Owner of this Contract, in whole or in part, pursuant to this Section, it is determined for any reason that Contractor was not in default, or that its default was excusable under the terms of the Contract Documents, or that Owner is not entitled to the remedies against Contractor provided herein, then such termination shall be deemed a termination for Owner's convenience and Contractor's remedies against Owner shall be the same as and limited to those afforded Contractor under Section 19.1 below.
- 18.6 **By Contractor:** Contractor may terminate the Contract for the following reasons:
- (a) The Work has been stopped for sixty (60) consecutive days because of court order, of act by any government authority having jurisdiction over the Work, or by order of Owner in accordance with the Contract Documents, provided that such stoppages are not due in whole or part to the acts or omissions of the Contractor, or any employee, consultants, Subcontractors, Sub-subcontractors, or any other person for whose acts or omissions the Contractor may be responsible;
  - (b) Owner's failure to provide Contractor with any information, permits, or approvals that are Owner's responsibility under the Contract Documents that result in the Work being stopped for sixty (60) consecutive days even though Owner has not ordered Contractor in writing to stop and suspend the Work in accordance with the Contract documents;
  - (c) Owner's failure to cure the problem as set forth in the Contract Documents after Contractor has stopped the Work; or
  - (d) Owner has not made payment of undisputed sums due on an approved Application for Payment within the time to cure provided in the Contract.
- 18.7 Upon the occurrence of an event set forth in 18.6 above, Contractor may provide written notice to Owner that it intends to terminate the Contract unless the problem cited is cured, or commenced to be cured, within a reasonable period of time after Owner's receipt of such notice. If Owner fails to cure, or fails to reasonably commence to cure, such problem, then Contractor may give a second written notice to Owner of its intent to terminate. If Owner fails to cure, or reasonably commences to cure, such problem within a reasonable period of time after such notice, then Contractor may declare the Contract terminated for default by providing written notice to Owner of such declaration. In such case, Contractor shall be entitled to recover from the Owner payment not yet made for Work actually and satisfactorily completed and accepted by Owner up to the point of termination and for actual proven unrecoverable loss with respect to materials, equipment, tools, and construction equipment and machinery purchased prior to the time the event in Section 18.6 occurred upon payment by Owner of amounts paid for materials, equipment, tools and machinery under this Section 18.7, all title and rights to such items to transfer to Owner.
- 19. TERMINATION FOR CONVENIENCE AND RIGHT OF SUSPENSION BY OWNER**
- 19.1 Owner shall have the right to terminate this Contract without cause and for convenience, upon five (5) calendar day's written notice to Contractor. Upon written notice from Owner of termination for convenience, the Contractor shall (a) cease operations as directed by Owner in the notice; (b) take actions as directed by the Owner or if not so directed, as necessary, for protection and preservation of the Work; and (c) except for any assignments to Owner as may be directed in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts or purchase orders with respect to the Project. In the event of such termination for convenience, Contractor's recovery against Owner shall be limited to (a) that portion of the Contract Sum earned through the effective date of termination, together with any retainage withheld; and (b) actual, unrecoverable, and substantiated costs incurred prior to notice of termination (items (a) and (b) shall be referred to herein as ("Termination Fee"). The Termination Fee shall not cause the Contract Sum or Guaranteed Maximum Price to be exceeded. The Termination Fee shall not include overhead and profit for Work not executed. In consideration of payment in accordance with this Section, Contractor shall not be entitled to any other or further recovery against Owner, including, but not limited to, indirect damages including without limitation lost profits or any anticipated profit on portions of the Work not performed, or loss of business opportunity or business advantage, and

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Contractor expressly waives and releases Owner from all such indirect, consequential, or any other types of damages.

- 19.2 Furthermore, if the Contract is a multi-year contract funded through Owner's current general funds that are not bond funds, then the Owner's Board of Trustees has the right to non-appropriate adequate monies for the next fiscal year and to terminate the Contract at the end of each fiscal year during the term of the Contract, without the Owner incurring any further liability to Contractor as a result of such termination.
- 19.3 Owner shall have the right to suspend all or any portions of the Work upon giving Contractor two (2) calendar days' prior written notice of such suspension. If all or any portion of the Work is so suspended, Contractor's sole and exclusive remedy shall be to seek an extension to the Contract Time in accordance with the procedures set forth in the Contract Documents. In no event shall Contractor be entitled to any additional compensation or damages. Provided, however, if the ordered suspension exceeds sixty (60) calendar days, Contractor shall have the right, upon five (5) business days' notice to Owner, to terminate the Contract with respect to that portion of the Work which is subject to the ordered suspension. In the event of such termination by Contractor, the Contractor will be entitled to payment for all Work satisfactorily completed as of the effective date of the Notice of Suspension of the Work from Owner, provided such Work had been delivered to Owner or was delivered to Owner within thirty (30) days thereafter. In addition, Contractor will be entitled to the Termination Fee (or pro rata portion in the event of a Suspension of a portion of the Work) as set forth in Section 19.1 of this General Conditions of the Contract as Contractor's complete and total payment and sole and exclusive remedy. In consideration of payment of the Termination Fee, Contractor shall not be entitled to any other or further recovery against Owner, including, but not limited to, indirect, consequential, or other types of damages including without limitation lost profits or any anticipated profit on portions of the Work not performed, or loss of business opportunity or business advantage, and Contractor agrees to expressly waive, and releases Owner from, all such damages.

## 20. COMPLETION

- 20.1 When the entire Work (or any portion thereof designated in writing by Owner) has reached Substantial Completion, Contractor shall notify Owner and Design Consultant in writing that the Contractor considers the entire Work (or such designated portion, phase, or stage) and request that Design Consultant issue a Certificate of Substantial Completion (or Certificate of Partial Substantial Completion). Said written notice from Contractor shall include proposed Punch List Work to be completed or corrected by Contractor in order to achieve Final Completion. Within thirty (30) days thereafter, Owner, Contractor and Design Consultant shall make an inspection of the Work (or designated portion thereof) to determine the status of completion. If Owner and Design Consultant do not consider the Work (or designated portion, phase, or stage) to have reached Substantial Completion, Design Consultant shall notify Contractor in writing giving the reasons therefore. In such case, Contractor shall pay the costs of all additional Substantial Completion inspections. If Owner and Design Consultant consider the Work (or designated portion) Substantially Complete, Design Consultant shall prepare and deliver to Contractor a Certificate of Substantial Completion (or Certificate of Partial Substantial Completion) which shall fix the date Substantial Completion for the entire Work (or designated portion thereof) is actually achieved by Contractor and include Final Completion Punch List Work to be completed or corrected by Contractor before final payment. Provided, however, failure by Design Consultant to include an item on Final Completion Punch List Work does not waive Owner's right to demand completion of the item pursuant to the Contract Documents prior to or after Final Payment. Owner shall have the right to exclude Contractor from the Work and Project site (or designated portion thereof) after the date of Substantial Completion (or Partial Substantial Completion), but Owner shall allow Contractor reasonable access to complete or correct Punch List Work.
- 20.2 Once all Contract Deliverables, as defined in the Project Manual, and documents required for Project close-out, and by the Design Consultant and Owner, which all are required as a condition

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precedent to Owner's obligation to make final payment, have been inspected to determine if all of the Work has been completed and is acceptable to the Owner; the Contractor shall deliver to the Design Consultant a written document per the Close-Out Procedures, Section 01 77 00 of the Project Manual, stating that all Work has been fully completed in accordance with the requirements of the Contract Documents. That written document shall be delivered to Design Consultant by Contractor at the same time it submits its final Application for Payment. If Design Consultant agrees that all requirements that are a condition precedent to final payment have been met, the Design Consultant shall issue a final Certificate for Payment, stating that, to the best of its knowledge, information and belief, and on the basis of its observations and inspections: (i) all of the Work has been completed in accordance with the requirements of the Contract Documents, and that all Deliverables required under the Contract Documents have been received, reviewed and approved as complete and adequate; (ii) the final balance due Contractor, as noted in the final Certificate for Payment, is due and payable; and (iii) all conditions precedent to Contractor's entitlement to Final Payment have been satisfied as contained in the Close-Out Procedures, Section 01 77 00 of the Project Manual. Neither the Final Payment nor the Retainage shall become due and payable until Contractor submits: (1) the final Release and Affidavit, (2) consent of surety to final payment, and (3) if required by Owner, other data establishing payment or satisfaction of all obligations, such as receipts, releases and conditional and unconditional waivers of liens from Contractor and all Subcontractors, to the extent and in such form as may be designated by Owner. Owner reserves the right to inspect the Work and make an independent determination as to the Work's acceptability, even though Design Consultant may have issued its recommendations. Unless and until Owner is completely satisfied, neither the Final Payment nor the Retainage shall become due and payable. Owner reserves the right to withhold sufficient payment to protect Owner's interest with regard to any incomplete or deficient Work.

### **21. WARRANTY**

21.1 As a condition precedent to Final Payment and as a deliverable due hereunder, Contractor shall obtain and assign to Owner all express warranties required by the Contract Documents for materials, labor, equipment and fixtures incorporated into the Project. Contractor expressly warrants to Owner that all materials and equipment to be incorporated into the Work shall be new unless otherwise specified. Further, Contractor expressly warrants to Owner that all Work shall be of good quality, free from all defects and in conformance with the Contract Documents. Contractor further warrants to Owner that all materials and equipment furnished under the Contract Documents shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturers, fabricators, suppliers or processors except as otherwise provided for in the Contract Documents. In addition to all other rights and remedies available to Owner at law or in equity, including any implied warranties Owner may be entitled to as a matter of law, Contractor expressly warrants to Owner that it shall correct, upon receipt of written notice from Owner, any portion of the Work which is found to be defective or otherwise not in conformance with the requirements of the Contract Documents: (a) immediately, but in no event longer than one (1) day following notice of any such defective or nonconforming Work which is affecting, or may affect the operation of Owner's facility; and (b) and, within three (3) days of notice for all other defective or nonconforming Work (collectively "Warranty Obligations"). In the event that any defective or non-conforming work is deemed by Owner, in its sole discretion, to present an immediate threat to safety or security, or in the event Contractor fails to correct defective or nonconforming Work in accordance with the time requirements herein, Owner shall be entitled to correct and fix such defective or non-conforming portions of the Work without losing its Warranty rights and/or remedies to against Contractor with regard to its obligations to correct defective or non-conforming work. Contractor's Warranty Obligations hereunder to correct defective or nonconforming Work shall run for a period of one year (or such longer period of time as may otherwise be specified in the Contract Documents, each, respectively, "the Warranty Period") commencing from the date of Final Completion of the Work. Notwithstanding the foregoing, Contractor shall be liable to Owner for any latent defects for the full limitation period provided in the Texas Civil Practices and Remedies Code. With respect to the correction of any defective or nonconforming Work corrected by either Contractor or Owner,

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Contractor shall be liable for all damage to any part of the Work itself and to any adjacent property which is caused by such corrective work. Contractor shall conduct, jointly with Owner, a warranty inspection at six (6) months and, jointly with Owner and Design Consultant, a warranty inspection at eleven (11) months after the date of final acceptance of the Work by Owner, and shall correct any defective or nonconforming Work discovered in accordance with the time requirements above. The Warranty Period for any defective or nonconforming Work corrected under this Section will be extended for one (1) additional year (or longer if the original warranty was longer under the Contract Documents) from the date the defective or nonconforming Work is corrected. Contractor's Warranty Obligations exclude remedy for damage or defect caused by Owner's abuse, modifications not performed by Contractor (excepting those performed by Owner pursuant to its rights hereunder), improper or insufficient maintenance by Owner (unless such maintenance was performed in accordance with the directions from Contractor), improper operation by Owner (unless such operations were performed in accordance with the directions from Contractor), or normal wear and tear under normal usage.

### **22. TESTS AND INSPECTIONS**

- 22.1 Owner, Design Consultant, their respective representatives, agents and employees, and governmental agencies with jurisdiction over the Project shall have access at all times to the Work, whether the Work is being performed on or off of the Project site, for their observation, inspection and testing. Contractor shall provide proper, safe conditions for such access. Contractor shall provide Design Consultant and Owner's Inspectors and Consultants with timely prior written notice (at least 2 business days) of the readiness of the Work for all required inspections, tests or approvals.
- 22.2 If the Contract Documents or any codes, laws, ordinances, rules or regulations of any public authority having jurisdiction over the Project, or any of the city agreements, requires any portion of the Work to be specifically inspected, tested or approved, except for any testing that Owner is required to obtain from an independent third party under Chapter 2269 of the Texas Government Code, Contractor shall assume full responsibility therefore, pay all costs in connection therewith and furnish Design Consultant the required certificates of inspection, testing or approval. All inspections, tests or approvals shall be performed in a manner and by organizations acceptable to Owner.
- 22.3 If any Work that is to be inspected, tested or approved pursuant to the Contract Documents is covered without such inspection, testing or approval having been satisfactorily obtained by Contractor and without obtaining the prior written concurrence from Design Consultant, such Work must, if requested by Design Consultant, be uncovered for inspection. Such uncovering shall be at Contractor's expense unless Contractor has given Design Consultant two (2) business day's written notice of Contractor's intention to cover the same and has requested written concurrence by Design Consultant and Design Consultant has not acted with reasonable promptness to respond to such notice and request. If the Construction Manager has so notified the Design Consultant and the Design Consultant has failed to act as set forth in this Section 15.06, the Construction Manager shall notify the Owner or the Owner's Agent prior to covering the Work. If any Work is covered contrary to written directions from Design Consultant, such Work must, if requested by Design Consultant, be uncovered for Design Consultant's observation and be replaced at Contractor's sole expense.
- 22.4 Owner shall charge to Contractor, and may deduct from any payments due Contractor, all expenses incurred by Owner in connection with any overtime work to perform inspection and testing unless such overtime work was expressly requested by Owner or required due to scheduled overtime approved by Owner, and Contractor was on schedule based on the Project Schedule. Such overtime work shall consist of any work during the construction period beyond the regular eight (8) hour day and for any work performed on Sunday or holidays.

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- 22.5 Owner shall charge to Contractor, and may deduct from any payments due Contractor, all expenses incurred by Owner in connection with any need for third party testing agencies to make additional trips due to Contractor's failure to have work in an inspectable form at the scheduled time of test or inspection.
- 22.6 Neither observations by Design Consultant or Owner, nor inspections, tests or approvals by others shall relieve Contractor from its obligations to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the cost of replacing defective or nonconforming Work, as well as the costs of acceleration and/or overtime required to regain the Project schedule as the result of such remedial action.
- 23. DEFECTIVE WORK**
- 23.1 Work not conforming to the requirements of the Contract Documents shall be deemed "Defective Work". Contractor shall, as directed by Owner and/or Design Consultant, either correct all Defective Work, whether or not fabricated, installed or completed, or if the Defective Work has been rejected by Owner or Design Consultant, remove it from the site and replace it with non-defective Work. Contractor shall bear all direct, indirect and consequential costs of such correction or removal (as used throughout this Section, "consequential costs") including, but not limited to, the costs of acceleration and/or overtime required to regain the Project Schedule, and fees and charges of Owner's Agent, Design Consultant(s), engineers, attorneys and other professionals, and other such costs as a direct or indirect consequence of the event, of Defective Work, made necessary thereby, and **SHALL INDEMNIFY OWNER AND DESIGN CONSULTANT AND HOLD THEM HARMLESS FOR SAME.**
- 23.2 If Owner or Design Consultant consider it necessary or advisable that covered Work be observed by Design Consultant or inspected or tested by others, Contractor, at Design Consultant's or Owner's request, shall uncover, expose or otherwise make available for observation, inspection or tests as Owner or Design Consultant may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is defective, Contractor shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction (including, but not limited to, fees and charges of engineers, Design Consultants, attorneys and other professionals), and Owner shall be entitled to an appropriate decrease in the Contract Sum. If, however, such Work is not found to be defective, Contractor shall be allowed an increase in the Contract Sum and/or an extension to the Contract Time to the extent that Contractor can demonstrate that such costs and/or delays, if any, are directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction.
- 23.3 Owner shall have the right to order Contractor to stop all or any portion of the Work if at any time Owner reasonably determines that Contractor's performance of the Work is not in compliance with the requirements of the Contract Documents. Such noncompliance shall include, but is not limited to, Contractor's failure to provide adequate labor, materials or equipment to satisfactorily maintain the various project schedules. This right to stop the Work shall be exercised, if at all, solely for Owner's benefit and nothing herein shall be construed as obligating Owner to exercise this right for the benefit of Contractor or any other person.
- 23.4 Should Owner determine, at its sole opinion, it is in Owner's best interest to accept Defective Work, Owner may elect to do so without prejudice to its rights under the Contract Documents. Contractor shall bear all direct, indirect and consequential costs attributable to Owner's evaluation of and determination to accept Defective Work. If such determination is rendered prior to final payment, a Change Order shall be executed evidencing such acceptance of such Defective Work, incorporating the necessary revisions in the Contract Documents and reflecting an appropriate decrease in the Contract Sum. If Owner accepts such Defective Work after Final Payment, Contractor shall promptly pay Owner an appropriate amount determined by Owner to adequately compensate Owner for its acceptance of the Defective Work.



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23.5 If Contractor fails, within a reasonable time after the written notice from Owner or Design Consultant, to correct Defective Work or to remove and replace rejected Defective Work as required by Owner or Design Consultant, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any of the provisions of the Contract Documents, Owner may, after five (5) days written notice to Contractor, correct and remedy any such failure. To the extent necessary to complete corrective and remedial action, Owner may exclude Contractor from any or all of the Project site, take possession of all or any part of the Work, and suspend Contractor's Work related thereto, take possession of Contractor's tools, materials and equipment, appliances, construction equipment and machinery at the Project site and incorporate in the Work all materials and equipment stored at the Project site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Design Consultant and their respective representatives, agents, and employees such access to the Project site as may be necessary to enable Owner to exercise the rights and remedies under this Section. All direct, indirect and consequential costs of Owner in exercising such rights and remedies shall be charged against Contractor, and a Change Order shall be issued, incorporating the necessary revisions to the Contract Documents, including an appropriate decrease to the Contract Sum. Such direct, indirect and consequential costs shall include, but not be limited to, fees and charges of Owner's Agent, Design Consultant(s), engineers, architects, attorneys and other professionals, all court and mediation costs and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of Contractor's Defective Work. Contractor shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by Owner of Owner's rights and remedies hereunder.

### **24. SUPERVISION AND CONTRACTOR'S REPRESENTATIVE**

24.1 Contractor is responsible for supervising, coordinating and performing the Work with such care and skill as would be provided by a Manager with extensive and special expertise in the type of work required under the Contract Documents. Contractor is responsible for completing the Work so that it complies accurately and completely with the requirements of the Contract Documents. Contractor shall manage the Work at all times during its progress with competent, full-time resident Project Superintendent who shall not be replaced without prior written notice to, and approval by, Owner except under extraordinary circumstances. Such Project Superintendent shall remain full-time on the Project until all items of the punch list are completed and accepted by the Owner. Prior to execution of the Contract, the Contractor shall furnish a list to the Owner of all consultants, job-site project managers, Subcontractors, and suppliers involved in the Project. The Contractor's Project Superintendent shall have authority to act on behalf of Contractor. All communications given to the Project Superintendent shall be as binding as if given to Contractor. Owner shall have the right to direct Contractor to remove and replace its Project Superintendent or any other employee of Contractor or any employee of any Subcontractor from this Project if Owner determines that the such person is not fulfilling his/her duties under the Contract Documents. In the event of the removal of the Project Superintendent for any reason the Owner will have the right to approve the proposed replacement. No work shall be performed on the job site unless an OSHA 30 hour trained contractor representative is present at the site.

24.2 Contractor shall maintain sufficient off-site support staff, and competent full time staff and a Project Superintendent at the Project site authorized to act on behalf of Contractor to coordinate, inspect and provide general direction of the Work and progress of the Subcontractors. Contractor shall provide no less than those personnel during the respective phases of construction that are set forth in Exhibit A to the Agreement. Contractor shall not change any of those persons identified in Exhibit A unless mutually agreed to in writing by Owner and Contractor. In such case, Owner shall have the right to approve the replacement personnel.

24.3 Contractor shall supervise and establish and maintain lines of authority for its personnel, and shall provide this information to Owner and all other affected parties, such as the code inspectors of any permitting authority, the Subcontractors, and Design Consultant. Owner and Design Consultant

## General Conditions for Agreement for Construction Services

may attend meetings between Contractor and its Subcontractors; however, such attendance is optional and shall not diminish either the authority or responsibility of Contractor to administer the Subcontracts.

- 24.4 Contractor shall be responsible to Owner for the acts and omissions of its employees and agents and its Subcontractors, their agents and employees, and all other persons performing any of the Work or supplying materials under a contract to Contractor. Contractor shall develop and maintain a program, acceptable to Owner, to assure quality control of the Work. Contractor shall supervise the Work of all Subcontractors, providing instructions to each when their portion of the Work does not conform to the requirements of the Contract Documents, and Contractor shall continue to exert its influence and control over each Subcontractor to ensure that corrections are made in a timely manner so as to not affect the efficient progress of the Work. Should a disagreement occur between Contractor and Design Consultant over the acceptability of the Work, Owner, in its sole discretion, shall have the right to determine the acceptability.
- 24.5 Contractor shall not employ on this Project any person who is not legally authorized to work in the United States or has been convicted of a felony or misdemeanor-level criminal charge regarding sexual abuse or misconduct, nor permit any Subcontractor to assign any employee of it to this Project who is not legally authorized to work in the United States or has been convicted of a felony, or misdemeanor-level criminal charge regarding sexual abuse or misconduct or involving moral turpitude. All of Contractor's and Subcontractor's personnel shall comply with all applicable health, safety, and loss prevention rules of applicable authorities. Contractor shall, at its own expense, remove from the Work any person who fails to comply with such rules and instructions in any material respect.

### 25. PROTECTION OF WORK

- 25.1 Contractor shall fully protect all materials and equipment at the Project and the Work from loss or damage and shall bear the cost of any such loss or damage until turnover to, and acceptance by, Owner. In the event of loss or damage to any of the materials or equipment or the Work, or if Contractor or anyone for whom Contractor is legally liable is responsible for any loss or damage to the Work, or other work or materials of Owner or Owner's Separate Contractors, Contractor shall be charged with the same, and any monies necessary to replace such loss or damage shall be deducted from any amounts due Contractor.
- 25.2 Contractor shall provide all temporary enclosures and climate control, if any, of building areas, including existing facilities, necessary to assure orderly progress of the Work and to protect and secure the Work, equipment and materials at the Project, and existing facilities, and in periods when extreme weather conditions are likely to be experienced.
- 25.3 Contractor shall not permit any unsafe loading of any structure at the Project site, nor shall Contractor subject any part of the Work or adjacent property to any forces that will endanger it.
- 25.4 Contractor shall not disturb any benchmark established by Owner or others with respect to the Project. If Contractor, or its Subcontractors, agents or anyone for whom Contractor is legally liable, disturbs such benchmarks Contractor shall immediately notify Owner and Design Consultant. Owner shall have the benchmarks reestablished and Contractor shall be liable for all costs incurred by Owner associated therewith.

### 26. EMERGENCIES

- 26.1 Contractor shall take immediate action to prevent injury to any person or damage to any property (including the Work and any adjacent property) which otherwise might arise from an emergency event at the Project site. Contractor shall give Owner written notice within twenty-four (24) hours after the occurrence of the emergency if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If Owner determines that a change in the Contract Documents is required because of the action taken in response to an

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emergency, a Change Order shall be issued to document the consequences of the changes or variations. If Contractor fails to provide the twenty-four (24) hour written notice noted above Contractor shall be deemed to have waived any right it otherwise may have had to seek an adjustment to the Contract Sum or an extension to the Contract Time, as the result of costs or delays resulting from such event. Contractor is obligated to promptly report in writing to Owner and all appropriate authorities all accidents relating to the Work that result in any personal injury or property damage.

### **27. USE OF PREMISES**

- 27.1 At all times during the performance of the Work, Contractor shall keep all of its operations (including, but not limited to, the use and storage of all equipment and materials), within the Project site or such other areas as may be permitted by the Contract Documents. Contractor shall neither use the Project site in any manner that is unreasonably burdensome or otherwise inconsistent with Owner's interest, nor encumber the Project with materials or equipment that are not needed for immediately-scheduled Work. Contractor is responsible for any damage to any such area or to the owner or occupant thereof, or any areas contiguous thereto, resulting from the performance of the Work. Contractor shall also comply with all applicable provisions of local ordinances having jurisdiction regarding the Project as such provisions pertain to non-disturbance of the adjacent areas.
- 27.2 Except as required by the Contract Documents or otherwise required in order for Contractor to satisfy its safety and security obligations under the Contract Documents, Contractor shall not erect or install, nor shall it permit any of its Subcontractors, suppliers, subconsultants or any other party for whom it is legally responsible to erect or install, any signage upon the Project site or any other property of Owner unless such signage has been expressly approved in writing by Owner, which approval may be withheld by Owner in its sole discretion.
- 27.3 Contractor acknowledges that Work may be performed at a particular Project site where Owner simultaneously is conducting and continuing its operations upon the same site. In such event, Contractor shall coordinate its Work so as to cause no unreasonable interference with or disruption to Owner's operations. When the Work is to be performed at an existing location which instructional classes and activities are conducted and ongoing, Contractor shall schedule and perform the Work in a manner that does not compromise the safety to students, faculty, and staff, and does not unreasonably disrupt or interfere with the continuing normal routine of the school. Contractor will perform the Work so as not to interfere with classes and the operation of Owner's adjacent buildings and comply with any reasonable requests of Owner to make adjustments to avoid adversely affecting school operations at or near the site.
- 27.4 The completion and turnover of the Project to Owner may be accomplished in "Phases" as set forth in the Project Schedule to allow Owner to occupy the Project in stages, and prepare the facility for operation. Owner may take early occupancy of all or any portions of the Work, at Owner's election, by designating in writing to Contractor the specific portions of the Work to be occupied and the date such occupancy shall commence. If any such specific early occupancy was not expressly identified at the time the Project Schedule was established, and such early occupancy negatively impacts Contractor's cost or time of performance, Contractor shall be entitled to an equitable adjustment to the Contract Sum and the Contract Time to the extent Contractor can demonstrate entitlement thereto, all in accordance with the other terms and conditions of the Contract Documents, including without limitation the applicable notice provisions.

### **28. SAFETY AND SITE SECURITY**

- 28.1 Contractor is responsible for the security and the safety of the Project site, and protection of all persons and property on or about the Project site up until turnover and final acceptance by Owner. Further, it is Contractor's responsibility to provide security for, and protect from damage and/or loss, all material and equipment to be incorporated into the Work which may be stored off the

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Project site. Contractor shall develop and implement, in accordance with the requirements of the Contract Documents, a safety plan for the Work.

- 28.2 Contractor shall comply with all applicable codes, laws, ordinances, rules and regulations of Owner and any public body having jurisdiction over the Work, including all codes, laws, ordinances, rules and regulations. Contractor shall notify owners of adjacent property and of any underground structures or improvements and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation or replacement of their real and personal property. Contractor's duties and responsibilities for the safety and protection of the Work shall continue until such time as final acceptance of the Work by Owner has occurred.
- 28.3 At all times during the performance of the Work at the Project site, Contractor shall have designated, and located on a full time basis at the Project site, a qualified individual whose responsibility shall be to monitor and enforce Contractor's safety and security program at the Project site.
- 28.4 All employees of Contractor, as well as those of all Subcontractors and those of any other person or entity for whom Contractor is legally liable is collectively referred to herein as "Employees". The Contractor and all Employees will abide by all applicable policies, rules, and regulations of the Owner with respect to conduct, including smoking, access to Project Site, parking of vehicles, tree preservation, and entry to any adjacent facilities that are owned by the Owner. Alcohol, drugs and all illegal or controlled substances (except for prescription drugs prescribed to the person possessing such controlled substance), and all weapons, whether or not the owner of such weapon, has a permit for a concealed weapon, and explosives of all types are strictly prohibited on any Owner property. Neither the Contractor nor any Employees shall use, possess, distribute, or sell alcoholic beverages; be under the influence of alcohol or any controlled substance; use, possess, distribute, or sell illicit or non-prescribed controlled substances or drugs or drug paraphernalia; or misuse legitimate prescription drugs while on Owner's property, while performing the Work, or while performing any service under this Contract. Owner has the right to require Contractor to remove Employees from performing the Work any time cause exists to suspect alcohol or drug use or otherwise act in a manner contrary to the requirements of this Section 29.4. In such cases, Employees may only be considered for return to work after the Contractor certifies as a result of a for-cause test, conducted immediately following removal that said Employee was in compliance with this Contract. Contractor will not use any Employees to perform the Work who either refuses to take, or tests positive in any alcohol or drug test. Contractor will comply with all applicable federal, state, and local drug and alcohol related laws and regulations (e.g., Department of Transportation regulations, Department of Defense Drug-free Work-free Workforce Policy, Drug-Free Workplace Act of 1988).
- 28.5 Contractor shall comply with the following:
- 28.5.1 All Owner facilities including buildings under construction are smoke free. Smoking is strictly prohibited except in outdoor designated smoking areas approved by Owner;
- 28.5.2 All of the Contractors' Employees working at the Project will not associate or socialize with any Owner, staff or students;
- 28.5.3 Eating and use of restrooms, telephones and other Owner equipment in Owner facilities and Project buildings under construction is prohibited;
- 28.5.4 Contractor must establish and enforce designated break/eating areas;
- 28.5.5 Contractor shall strictly limit its operations to the designated work areas and shall not permit any Employees to enter any other portions of Owner's property without Owner's expressed prior written consent;

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- 28.5.6 All Employees are prohibited from distributing any papers or other materials upon Owner's property, and are strictly prohibited from using any of Owner's telephones or other office equipment;
- 28.5.7 All Employees shall wear name tags or other personal and company identification, and at all times comply with OSHA regulations with respect to dress and conduct at the Project site; Contractor must provide all safety equipment and emergency supplies.
- 28.5.8 When requested, Contractor shall cooperate with any ongoing Owner investigation involving security, personal injury, economic loss or damage to Owner's facilities or personal property therein;
- 28.5.9 The Employees may not solicit, distribute or sell products while on Owner's property.
- 28.5.10 Friends, family members or other visitors of the Employees are not permitted on Owner's property; and
- 28.5.11 Manager will be responsible to arrange, and coordinate with the local authorities, all required parking and Project access and egress so as to neither impede the Work nor violate local regulations.

### **29. PROJECT MEETINGS**

- 29.1 Prior to the commencement of Work, Contractor shall attend a preconstruction conference with the Design Team and others as appropriate to establish the Project Schedule, procedures for handling shop drawings and other submittals, and for processing Applications for Payment, and to establish Policy and Procedures for the Project. During the prosecution of the Work, Contractor shall attend any and all meetings convened by the Design Team with respect to the Project, when directed to do so by Owner. Contractor shall be responsible for coordinating and facilitating monthly progress meetings per the specifications and have its Subcontractors and suppliers attend all such meetings as required.

### **30. MATERIAL SAFETY DATA SHEET/ASBESTOS/CERTIFICATION**

- 30.1 If any chemicals, materials, or products containing toxic substances, as defined by any applicable local, state and/or federal statutes or regulations, are contained in the products used on site or incorporated into the construction by Contractor or any of its Subcontractors, Contractor shall maintain and post at the Project as required, and provide to Design Consultant and Owner, a Material Safety Data Sheet at the time of each delivery or prior to each new use of such product.
- 30.2 Contractor shall submit to the Owner a letter addressed to the Owner certifying that, to the best of Contractor's knowledge, all materials used in the construction of this Project contain less than 0.10% by weight of asbestos and for which it can be demonstrated that, under reasonably foreseeable job site conditions, will not release asbestos fibers in excess of 0.1 fibers per cubic centimeter. Certification letters shall be dated, shall reference this specific Project, and shall be signed by not less than two (2) officers of the Contractor. Final Payment shall not be made until this letter of certification has been received by the Owner.
- 30.3 Prior to payment of retainage and Final Payment, the Contractor and each subcontractor involved with the potable water system shall furnish a notarized statement certifying that, to the best of their respective knowledge, the potable water system, as installed, is "lead-free."
- 30.4 The Contractor shall certify in writing that no materials used in the Work contain lead or asbestos materials in them in excess of amounts allowed by Local/State standards, laws, codes, rules and regulations; the Federal Environmental Protection Agency (EPA) standards and/or the Federal

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Occupational Safety and Health Administration (OSHA) standards, whichever is most restrictive. The Contractor shall provide this written certification to Owner prior to Final Payment.

### **31. AUDITING RIGHTS**

31.1 Contractor shall keep all records and supporting documentation which concern or relate to the Work, and the cost of the Work, or related to any requirements under the Contract for a minimum of four (4) years from the date of termination of this Contract or the date the Project is accepted by Owner, whichever is later, or such longer period of time as may be required by law, including the record retention laws applicable to the Owner. Contractor shall require all of its Subcontractors to likewise retain all of their Project records and supporting documentation. Owner, and any duly authorized agents or representatives of Owner, shall be provided access to all such records and supporting documentation at any and all times during normal business hours upon request by Owner. Further, Owner, and any duly authorized agents or representatives of Owner, shall have the right to audit, inspect and copy all of Contractor's and any Subcontractor's Project records and documentation as often as they deem necessary. The access, inspection, copying and auditing rights shall survive the termination of this Contract, and shall apply without limitation, to all documents and records relating to claims or suits filed by Contractor or any Subcontractor.

### **32. COMPLIANCE WITH LAWS/EQUAL OPPORTUNITY/NON-SEGREGATION**

32.1 Contractor agrees to comply, at its sole expense, with all federal, state and local laws, codes, statutes, ordinances, rules, administrative orders, regulations and requirements applicable to the Project, including but not limited to those dealing with safety. If Contractor observes that the Contract Documents are at variance therewith, it shall promptly notify Owner and Design Professional in writing.

32.2 During the performance of this Contract, the Contractor agrees as it will not discriminate against any employee or applicant for employment because of race, color, sex, religion, national origin or age; and it will take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, color, sex, religion, national origin or age. Such action shall include, but not be limited to, 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 setting forth the requirements of these non-discrimination provisions.

32.3 By the signing of this Contract, the Contractor signifies that it does not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. It certifies further that it will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it will not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The undersigned agrees that a violation of this certification constitutes a breach of this Contract. As used in this certification, the term "segregated facilities" means any waiting rooms, Work areas, rest rooms 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 on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. The Contractor further agrees that (except where it obtained identical certifications from proposed consultants for specific time period) it will obtain identical certifications from proposed Subcontractors prior to the award of a contract exceeding \$10,000.00 that are not exempt from the provisions of the Equal Opportunity Clause; that it will retain such certifications in its files; and that it will forward the following notice to such proposed Subcontractors (except where the proposed Subcontractors have submitted identical certifications for specific time periods): Notice to Prospective Subcontractors of requirement for certification of nonsegregated facilities. A certification of nonsegregated facilities, as required by the May 19, 1967 Order (32 FR 7439, May 19, 1967) on elimination of

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segregated facilities, by the Secretary of Labor, must be submitted prior to the award of a contract exceeding \$10,000.00 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). The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.11.

- 32.4 The Construction Manager certifies that it is in compliance with Texas House Bill 89 (non-boycott of Israel) and accordingly has submitted the signed verification as part of the solicitation which shall subsequently be attached as Exhibit E.
- 32.5 The Construction Manager certifies that it is in compliance with Texas Senate Bill 252 (not doing business with Iran, Sudan, or any terrorist organization).

### **33. SUBCONTRACTS**

- 33.1 Under a Construction Manager-at-Risk method, Contractor shall, prior to advertising for bids or proposal from subcontractors, review the Design Documents and recommend to Owner how the Work should be divided into trade packages, and the sequence of construction activities. Contractor will recommend the breakdown and composition of bid or proposal packages for award of subcontracts, based on the Owner approved Project Schedule, and shall supply a copy of that breakdown and composition to the Design Team for their review and approval. Contractor shall take into consideration such factors as natural and practical lines of severability, sequencing effectiveness, access and availability constraints, the Project Schedule, construction market conditions, availability of labor and materials, community relations and any other factors pertinent to saving time and costs.
- 33.2 Without relieving Contractor of its obligations with regard to the Project Schedule, Contractor shall be solely responsible for and have control over the Subcontractors. Contractor shall oversee all Change Orders, Construction Change Directive, Field Orders and Request for Proposals with all affected Subcontractors and shall review the costs of those proposals and advise the Owner and Design Consultant of their validity and reasonableness, acting in Owner's best interest, prior to requesting approval of each Change Order from Owner.
- 33.3 Contractor shall submit to Owner, for approval, a list of the names, addresses, licensing information and phone numbers of the Subcontractors which Contractor intends to use for each portion of the Work, as well as identifying those portions of the Work it intends to perform with its own employees. Contractor shall not replace a Subcontractor without the Owner's approval. Contractor shall continuously update the Subcontractor list so that it remains current and accurate throughout the entire performance of the Work. Contractor shall not enter into a Subcontract with any Subcontractor if Owner reasonably objects to that Subcontractor. Contractor shall not be required to contract with anyone to whom it reasonably objects. As part of the Project document file to be maintained by Contractor at the Project site, where applicable, Contractor shall keep on file a copy of the license for every Subcontractor and sub-Subcontractor performing any portion of the Work, as well as maintain a log of all such licenses and a copy of all Subcontracts. All Subcontracts between Contractor and its Subcontractors shall be in writing and are subject to Owner's approval; provided, however, any such approval by Owner, or failure by Owner to approve, does not create any liability with respect to such Subcontractor or Subcontractor's contract on the part of Owner or relieve Contractor of its obligations hereunder nor does any such review and approval or lack thereof create any privity of contract between Owner and any Subcontractor. No Subcontractor shall be considered a third party beneficiary under this Contract between Owner and the Contractor. Further, all subcontracts shall: (1) require each Subcontractor to be bound to Contractor to the same extent Contractor is bound to Owner by the terms of the Contract Documents, as those terms may apply to the portion of the Work to be performed by the Subcontractor; (2) provide for the assignment of the Subcontracts from Contractor to Owner at the election of Owner upon termination of the Contract with Contractor; (3) provide that Owner and Owner's Agent will be an additional indemnified party of the Subcontract; (4) provide that Owner and Owner's Agent will be an additional insured on all insurance policies required to be provided by the Subcontractor except

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workman's compensation; (5) assign all warranties directly to Owner; (6) identify Owner as an intended third-party beneficiary of the Subcontract; and, (7) incorporate all relevant, applicable terms of this Contract into the respective Subcontract, identifying therein any terms and conditions of the proposed Subcontract which may be at variance with the Contract Documents. Each Subcontractor shall similarly include the following terms and obligations in contracts for its sub-Subcontractors.

33.4 Each Subcontractor must agree to provide field on-site supervision acceptable to the Contractor for each trade (e.g., general concrete forming and placement, masonry, mechanical, plumbing, electrical and roofing) included in the subcontract. In addition, the Subcontractor shall assign and name a qualified employee for scheduling direction for its Work.

33.5 Unless otherwise expressly agreed to by Owner in writing, and without limitation on Contractor's obligations under this Section 33, all Subcontracts shall include the following provisions:

### 33.5.1 LIMITATION OF REMEDIES - NO DAMAGES FOR DELAY

That except as otherwise provided, the Subcontractor's exclusive remedy for delays in the performance of the contract caused by events beyond its control, including delays claimed to be caused by Owner or Design Consultant or attributable to Owner or Design Consultant and including claims based on breach of contract or negligence, shall be an extension of its Contract Time, and no additional compensation, in accordance with the applicable terms of this Contract.

In the event of a change in the work the Subcontractor's claim for adjustments in the Contract Sum are limited exclusively to its actual costs for such changes plus no more than an aggregate of ten (10%) percent for all overhead and profit for all Subcontractors of all tiers, in the aggregate.

The Subcontract shall require the Subcontractor expressly agree that the foregoing constitutes its sole and exclusive remedies for delays and changes in the Work and thus eliminate any other remedies for claim for increase in the subcontract price, damages, losses or additional compensation.

33.5.2 Each Subcontract shall require that any claims by Subcontractor for delay or additional cost must be submitted to Contractor within the time and in the manner in which Contractor must submit such claims to Owner under these Contract Documents, and that failure to comply with such conditions for giving notice and submitting claims shall result in the waiver of such claims.

## 34. SUBMITTED RESPONSIVE DOCUMENTS

34.1 The Procurement Documents and submitted responsive documents or portions of each may become, at the Owner's sole discretion, incorporated by reference and a part of this written contract and will be binding on both Owner and Contractor after execution of the contract by both parties.

## 35. OWNERSHIP OF DOCUMENTS

35.1 In the event that the project outlined in this contract requires Contractor to prepare or develop software, educational or other related materials, drawings, models, plans, prints, designs, concepts, or similar documents ("Design Work"), all ownership of the Design Work shall vest in Owner. Owner shall retain all common law, statutory and other reserved rights, including copyright in all Design Work, materials prepared under the contract, or other intellectual property rights (unless previously developed prior to commencement of the contract or engagement and for which the vendor or a third party can show that it already owns the copyright), regardless of form. Such ownership by Owner includes, but is not limited to, any electronic data prepared by Owner, Contractor, or any consultant (including any software developer; educational consultants; Design Consultant, engineer, contractor, or subcontractor). Contractor shall be permitted to retain one



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record set of the materials, drawings, specifications, and other documents and electronic data, of the Design Work for information and reference in connection with the services listed in this contract.

35.2 Neither Contractor nor any developer, consultant, Design Consultant, contractor, subcontractor, or any other person other than Owner shall own or claim a copyright in the Work Product. To this end, Contractor will agree to assign, grant, transfer, and convey to Owner, its successors and assigns, Contractor's entire right, title, interest, and ownership in and to such Work Product, including, without limitation, the right to secure copyright registration. Contractor will confirm that Owner, and its successors and assigns, shall own Contractor's right, title, and interest in and to, including the right to use; reproduce; distribute by sale, rental, lease, or lending, or by other transfer of ownership; to perform publicly; and to display all such Work Product and shall obtain Owner's written approval before any use or reproduction of such. Any approved use shall include credit to the Owner. Contractor shall obtain similar assignments from any and all consultants, contractors, subcontractors, materialmen, and suppliers to the extent permitted and who perform services outlined in this contract, provided, however, that Contractor shall not be required to obtain assignment of any pre-existing intellectual property rights. If Contractor is unable to obtain any of the aforementioned assignments, it shall notify Owner immediately.

35.3 If a claim arises or other formal notice occurs due to Contractor's use of software or other action infringing on a patent, trademark, copyright or other intellectual property right, the party with this knowledge must promptly notify the other party in writing. Contractor shall, at its own expense and option: (I) defend and settle such claim, (II) procure Owner's right to use the software or other appropriate rights of use, or (III) modify or replace the software or offending product to avoid Infringement. In the event Contractor exercises option (I) above, Contractor shall have the sole and exclusive authority to defend and/or settle any such claim or action, provided that Owner is reasonably informed throughout, and Contractor will consult with any attorneys appointed by Owner at Owner's own expense regarding the progress of such litigation.

### 36. NON-WAIVER

36.1 Failure of Owner to insist upon strict performance of any of the terms and conditions hereof, or failure or delay to exercise any rights or remedies provided herein or by law, or failure of Owner to notify Contractor properly in the event of default, or the acceptance of payment or other performance shall not release Contractor from any and all of the obligations of this agreement and shall not be deemed a waiver of any right of Owner to insist on strict performance hereof or any of its rights or remedies as to prior or subsequent default hereunder.

### 37. EMERGENCY CLOSURES

37.1 If Owner is closed for reasons due to weather or health/life safety reasons, notice of such closures will be posted on Owner's home web page at [www.sjcd.edu](http://www.sjcd.edu) and available through local media outlets. It is Contractor's responsibility to track these closures, and Owner bears no responsibility for any expenses incurred or charges made by Contractor for the period while Owner was closed.

### 38. COUNTERPARTS

38.1 The Contract or any of the Contract Documents may be executed in identical counterparts, each of which shall be deemed an original for all purposes, but all of which shall constitute one document.

### 39. APPROPRIATED FUNDS

39.1 The purchase of any service or product under this Contract beyond the initial fiscal year of Owner is contingent upon the availability of appropriated funds. Owner shall have the right to terminate the Contract at the end of the current or end of each succeeding fiscal year if funds are not appropriated by the Owner's Board of Trustees for the next fiscal year that would permit continuation of the Contract. If funds are withdrawn or do not become available, Owner reserves the right to terminate the contract by giving Contractor a thirty (30) day written notice of its intention to terminate without penalty or any other further obligations on the part of Owner or

## General Conditions for Agreement for Construction Services

Contractor. Upon termination of the Contract, Owner shall not be responsible for any payment of any service or product received that occurs after the end of the current fiscal year or the effective date of termination, whichever is the earlier to occur.

### **40. RELATIONSHIP**

40.1 The Contractor undertakes performance of the services and the Work as an independent contractor. Nothing herein shall create a relationship of employer and employee, joint venture, or partnership between the Owner and the Contractor, its agents, representatives, employees, consultants, the Owner or Subcontractor, for any purpose whatsoever. Nothing herein shall create a relationship of principal and agent between the Owner and the Contractor, its agents, employees, representatives, consultants, Owner, or subcontractor. Neither party shall have the authority to bind or obligate the other as a result of the relationship created hereby. As an independent contractor, the Contractor: (a) shall provide supervision of the Contractor's agents, employees, and consultants; and (b) agrees to perform all of the Contractor's obligations under this Contract in accordance with the Contractor's own methods subject to compliance with this Contract. The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures and for coordinating all portion of the Work under the Contract. Any direction or instruction by the Owner or any of the Owner's authorized representatives shall be considered to have been given exclusively as evidence of the Owner's desire to obtain certain results from the Work, and shall in no way affect the Contractor's status as an independent contractor. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. However, if the Contractor determines that such means, methods, techniques, sequences, or procedures specifically and expressly contained in the Contract Document may not be safe, the Contractor shall give timely written notice to the Owner and Design Consultant and shall have the right to not proceed with that portion of the Work without further written instructions from the Design Consultant. If the Owner or Design Consultant instructs the Contractor to proceed with the specific expressly stated required means, methods, techniques, sequences, or procedures, over his objections and without acceptance of any changes proposed by the Contractor, the Contractor shall not be responsible for any resulting loss or damage.

### **41. ANTITRUST VIOLATION**

41.1 To permit the Owner to recover damages suffered in antitrust violations, Contractor hereby assigns to Owner any and all claims for overcharges associated with this Contract that may be under the antitrust laws of the United States, 15 U.S.C.A., Sec. 1 et seq. (1973). The Contractor shall include this provision in its agreements with each consultant, subcontractor, materialman, and supplier. Each subcontractor shall include such provisions in agreements with sub-subcontractor and suppliers.

### **42. REPRESENTATIONS AND WARRANTIES**

42.1 The Contractor represents and warrants the following to the Owner (in addition to the other representations and warranties contained in the Contract Documents), as an inducement to the Owner to execute this Contract, which representations and warranties shall survive the execution and delivery of the Contract and the Final Completion of the Work that:

- (a) It is financially solvent, able to pay its debts as they mature and possessed of sufficient working capital to complete the Work and perform its obligations under the Contract Documents;
- (b) It is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work and perform its obligations hereunder and has sufficient experience and competence to do so;

**General Conditions for Agreement for Construction Services**

- (c) It is authorized to do business and in good standing in the State where the Project is located and properly licensed by all necessary governmental and public quasi-public authorities having jurisdiction over it, over the Work, and over the Site of the Project;
- (d) The execution of the Contract and its performance thereof is within its duly authorized powers;
- (e) By submission of a proposal, it has carefully examined the plans, specifications, and the Site, and that from its own visual investigations, has satisfied itself as to the nature and location of the Work, the character, quality, and quantity of surface and subsurface materials likely to be encountered, the character of equipment and other facilities needed for the performance of the Work, the general and local conditions and all other materials which may in any way affect the Work or its performance; and
- (f) It acknowledges and understands that the Owner will make no allowance on behalf of the Contractor for any error or negligence on the part of the Contractor for not having visited the Site or not having thoroughly familiarized itself with all of the documents before submitting a proposal.

**IN WITNESS WHEREOF**, intending to be bound, the Parties have entered into this Agreement as of the Effective Date.

**SAN JACINTO COMMUNITY COLLEGE DISTRICT**

By: \_\_\_\_\_ Date \_\_\_\_\_  
Teri Zamora  
Vice Chancellor, Fiscal Affairs

**CONTRACTOR**

By: \_\_\_\_\_ Date \_\_\_\_\_  
INSERT NAME  
INSERT TITLE

**DOCUMENT 00 73 43**  
**WAGE RATE REQUIREMENTS**

**PROJECT:** CSP 20-07 Monument Sign Replacement

This form shall be completed and submitted by all Proposers at the time the proposal is submitted.

**PART 1 – GENERAL**

**1.1 REQUIREMENTS**

- A. All workers on the project will be paid a Prevailing Wage in accordance with Texas Government Code, Chapter 2258.
- B. For the purposes of Prevailing Wage Rate determination, this project is to be considered a public work.
- C. The College has adopted the Prevailing Wage Rate schedule listed in **00 73 43.1** as its official determination.
- D. Per the Agreement between the College and the Contractor, the College reserves the right to verify the wages paid to workers employed by the Contractor or the Sub-Contractors are in accordance with the published rates prevailing at the start of the project.
- E. A contractor or subcontractor who fails to pay the prevailing wage rates in accordance with TGC 2258 shall pay to the College a fine of \$60 for each worker employed for each calendar day or part of the day that the worker is paid less than the wage rates stipulated in the contract. The College is required by law to specify this penalty in the contract. The College has no authority to waive the penalty if incurred.

**PART 2 – PRODUCTS (Not Used)**

**PART 3 – EXECUTION**

In connection with construction of the above-mentioned Project, the undersigned certifies that all workers will be paid a Prevailing Wage in accordance with all requirements listed herein.

Company: \_\_\_\_\_

Submitted by: \_\_\_\_\_ Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## **Prevailing Wage Rate Determination Information**

*The following information is from Chapter 2258 Texas Government Code:*

### **Sec. 2258.021. Right to be Paid Prevailing Wage Rates.**

- (a) A worker employed on a public work by or on behalf of the state or a political subdivision of the state shall be paid:
  - (1) not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the work is performed; and
  - (2) not less than the general prevailing rate of per diem wages for legal holiday and overtime work.
- (b) Subsection (a) does not apply to maintenance work.
- (c) A worker is employed on a public work for the purposes of this section if the worker is employed by a contractor or subcontractor in the execution of a contract for the public work with the state, a political subdivision of the state, or any officer or public body of the state or a political subdivision of the state.

### **Sec. 2258.023. Prevailing Wage Rates to be paid by Contractor and Subcontractor; Penalty.**

- (a) The contractor who is awarded a contract by a public body or a subcontractor of the contractor shall pay not less than the rates determined under Section 2258.022 to a worker employed by it in the execution of the contract.
- (b) A contractor or subcontractor who violates this section shall pay to the state or a political subdivision of the state on whose behalf the contract is made, \$60 for each worker employed for each calendar day or part of the day that the worker is paid less than the wage rates stipulated in the contract. A public body awarding a contract shall specify this penalty in the contract.
- (c) A contractor or subcontractor does not violate this section if a public body awarding a contract does not determine the prevailing wage rates and specify the rates in the contract as provided by Section 2258.022.
- (d) The public body shall use any money collected under this section to offset the costs incurred in the administration of this chapter.
- (e) A municipality is entitled to collect a penalty under this section only if the municipality has a population of more than 10,000.

### **Sec. 2258.051. Duty of Public Body to Hear Complaints and Withhold Payment.**

A public body awarding a contract, and an agent or officer of the public body, shall:

- (1) take cognizance of complaints of all violations of this chapter committed in the execution of the contract; and
- (2) withhold money forfeited or required to be withheld under this chapter from the payments to the contractor under the contract, except that the public body may not withhold money from other than the final payment without a determination by the public body that there is good cause to believe that the contractor has violated this chapter.

## Prevailing Wage Rates – School Construction Trades

Effective: June 12, 2019

Texas Gulf Coast Area

CLASSIFICATION	2019 HOURLY RATE
ASBESTOS WORKER	\$18.00
BRICKLAYER; MASON	\$18.98
CARPENTER; CASEWORKER	\$18.90
CARPET LAYER; FLOOR INSTALLER	\$19.80
CONCRETE FINISHER	\$13.90
DATA COMM/TELE COMM	\$22.58
DRYWALL INSTALLER; CEILING INSTALLER	\$16.40
ELECTRICIAN	\$25.50
ELEVATOR MECHANIC	\$31.50
FIREPROOFING INSTALLER	\$19.17
GLAZIER	\$19.67
HEAVY EQUIPMENT OPERATOR	\$21.00
INSULATOR	\$14.90
IRONWORKER	\$23.00
LABORER, HELPER	\$11.75
LATHERER; PLASTERER	\$18.60
LIGHT EQUIPMENT OPERATOR	\$13.25
METAL BUILDING ASSEMBLER	\$16.33
MILLWRIGHT	\$26.30
PAINTER; WALL COVERING INSTALLER	\$14.67
PIPEFITTER	\$25.17
PLUMBER	\$31.00
ROOFER	\$15.10
SHEET METAL WORKER	\$20.25
SPRINKLER FITTER	\$20.61
STEEL ERECTOR	\$23.33
TERRAZZO WORKER	\$16.42
TILE SETTER	\$15.30
WATERPROOFER; CAULKER	\$14.90

This document was developed by PBK Architects, Inc., in strict accordance with Chapter 2258 of the Texas Government Code.

# Prevailing Wage Rates

## Worker Classification Definition Sheet

CLASSIFICATION	DEFINITION
ASBESTOS WORKER	Worker who removes and disposes of asbestos materials.
BRICKLAYER; MASON	Craftsman who works with masonry products, stone, brick, block, or any material substituting those materials and accessories.
CARPENTER; CASEWORKER	Worker who build wood structures or structures of any material which has replaces wood. Includes rough and finish carpentry, hardware and trim.
CARPET LAYER; FLOOR INSTALLER	Worker who installs carpets and /or floor coverings, vinyl tile.
CONCRETE FINISHER	Worker who floats, trowels, and finishes concrete.
DATA COMM/TELE COMM	Worker who installs data/telephone and television cable and associate equipment and accessories.
DRYWALL; CEILING INSTALLER	Worker who installs metal framed walls and ceiling, drywall coverings, ceiling grids, and ceilings.
ELECTRICIAN	Skilled craftsman who installs or repairs electrical wiring and devices. Includes fire alarm systems and HVAC electrical controls.
ELEVATOR MECHANIC	Craftsman skilled in the installation and maintenance of elevators.
FIREPROOFING INSTALLER	Worker who sprays or applies fire proofing materials.
GLAZIER	Worker who installs glass, glazing, and glass framing.
HEAVY EQUIPMENT OPERATOR	Includes but not limited to: all CAT tractors, all derrick-powered, all power operated cranes, back-hoes, back-fillers, power operated shovels, winch trucks, and all trenching machines.
INSULATOR	Worker who applies, sprays, or installs insulation.
IRONWORKER	Skilled craftsman who erects structural steel framing, and installs structural concrete Rebar.
LABORER, HELPER	Worker qualified for only unskilled or semi-skilled work. Lifting, carrying materials or tools, hauling, digging, clean up.
LATHERER; PLASTERER	Worker who installs metal framing and lath. Worker who applies plaster to lathing and installs associated accessories.
LIGHT EQUIPMENT OPERATOR	Includes but not limited to , air compressors, truck crane drivers, flex planes, building elevators, form graders, concrete mixers less than 14cf), conveyers.
METAL BUILDING ASSEMBLER	Worker who assembles pre-made metal buildings.
MILLWRIGHT	Mechanic specializing in the installation of heavy machinery, conveyance, wrenches, dock levelers, hydraulic lifts, and align pumps.
PAINTER; WALL COVERING INSTALLER	Worker who prepares wall surfaces and applies paint and/or wall coverings, tape, and bedding.
PIPEFITTER	Trained worker who installs piping systems, chilled water piping and hot water (boiler) piping, pneumatic tubing controls, chillers, boilers, and associated mechanical equipment.
PLUMBER	Skilled craftsman who installs domestic hot and cold water piping, waste piping, storm system piping, water closets, sinks, urinals, and related work.
ROOFER	Worker who installs roofing materials, Bitumen (asphalt and coal tar) felts, flashings, all types of roofing membranes, and associated products.
SHEET METAL WORKER	Worker who installs sheet metal products, Roof metal, flashings and curbs, ductwork, mechanical equipment, and associated metals.
SPRINKLER FITTER	Worker who installs fire sprinklers systems and fire protectant equipment.
STEEL ERECTOR	Worker who erects and dismantles structural steel frames of buildings and other structures.
TERRAZZO WORKER	Craftsman who places and finishes Terrazzo
TILE SETTER	Worker who prepares wall and/or floor surfaces and applies ceramic tiles to these surfaces.
WATERPROOFER; CAULKER	Worker who applies water proofing material to buildings. Products include sealant, caulk, sheet membranes, and liquid membranes, sprayed, rolled or brushed.

**SAN JACINTO COLLEGE DISTRICT**  
**DESIGN STANDARDS AND GUIDELINES**  
**Division 01 – General Requirements**

**01 00 00 General Requirements**

- A. The following are provided as Division 01, General Requirements for all San Jacinto College projects. Additional information or modifications required shall be included in the “Special Conditions” document for each project.

**01 10 00 Summary**

- A. This Division 01 expands upon specific administrative and procedural provisions in the Contract and applies broadly to execution of the work of under all other Sections of the specifications.
- B. Information presented in this Division 01 applies to all specification sections not covered by specific exceptions, thereby eliminating the need for repetition and reducing the possibility of conflicts and omissions. Only administrative or procedural requirements that are unique to a specific Section of Divisions 02 through 49 should be covered in those Sections.
- C. Topics not addressed in this Division 01 shall be managed per the Agreement between the Contractor and the Owner for the Work.
- D. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**01 11 00 Summary of Project**

- A. SJCD Project Identification: CSP 20-12 Maritime Expansion Fire Training Center
- B. Project Location: Maritime Technology Center on the Maritime Campus of San Jacinto College at 3700 Old Highway 146, La Porte, Texas 77571.
- C. Owner: San Jacinto College District
- D. Owner's Representative: Charles (Chuck) Smith - Director of Capital Projects
- E. Owner's Project Manager: (Program Manager) Colby Kreft, Rizzo & Associates, LLC, P.O. 9817, The Woodlands, TX 77387
- F. Other Owner Consultants.
  - 1. The Owner has retained the following design professionals to assist the Designer with designated portions of the Contract Documents:
    - a. N/A
  - 2. The Owner has retained the following professional service providers to assist in the completion of the Work to the Owner’s Satisfaction:
    - a. HTS, Inc. Consultants 416 Pickering St. Houston, TX 77091
    - b. Ellis Surveying Services, LLC 2805 25<sup>th</sup> Avenue N. Texas City, TX 77590
- G. Designer/Architect: Texas-IBI Group P.O. Box 891209 Houston, TX 77289 Contact: Chudi Abajue; Email: [chudi.abajue@ibigroup.com](mailto:chudi.abajue@ibigroup.com); Phone: 281-286-6605



- H. Phases: It is anticipated that the work will not require completion by phases. Any phased work required shall be as specifically described in the Contract Documents or as generally described in the Special Conditions for this project.

**01 11 13 Work Covered by Contract Documents**

- A. The Work of Project is defined by the Contract Documents and consists of all materials and activities required to deliver the facilities described in those contract documents issued under or in response to San Jacinto College procurement action CSP 20-12 – Maritime Expansion Fire Training Center.
- B. Project will be delivered under Competitive Sealed Proposal as described under TGC 2269.151 et.seq.

**01 11 16 Work by Owner or under Separate Contracts**

- A. Satisfactory attainment of the Owner's purpose may require preceding, concurrent, or subsequent work by the Owner or Others under separate contract.
- B. Cooperate fully with Owner and/or separate contractors so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner and/or separate contractors. Coordinate the Work of this Contract with work performed by Owner and/or separate contractors.
- C. A 2,100 SF garage is being added to the San Jacinto College Maritime Center. This garage will serve as the Fire Training Center and will house fire training equipment and apparatus.

**01 14 00 Work Restrictions**

- A. Work Restrictions for this project are as described in the Special Conditions for this Project.

**01 14 13 Access to Site and Use of Premises**

- A. Limitations to Site Access and the Use of Premises by the Contractor are as described in the Special Conditions for this Project.
- B. All visitation to the project site by non-project personnel will be on an escorted basis only.

1. Anyone who is not assigned to work at the site on a regular basis shall be considered a visitor.
2. All visits to the site will begin at the Contractor's site office.
3. The College does not have the right to lower any Contractor's safety standards. Non-Contractor personnel involved in the project only acquire unescorted visitation rights after completing the Contractor's safety protocols.
4. Prior permission is required for all construction site visits due to safety, security, liability, and legal reasons. Visits will be coordinated through the San Jacinto College Project Manager, who will escort (or arrange for an escort) for all visitors to the site.
5. All visitors shall sign a release prior to touring a site.
6. The Project Manager or his designee will be allowed to escort a maximum of three visitors to the site at one time.
  - i. Additional visitors will require additional qualified escorts.
  - ii. Any group of visitors larger than six individuals will be considered a "tour". Tour requests will be granted on a case-by-case basis at the discretion of the Director of Capital Projects.
    1. Requests for tours shall be screened and limited in both frequency and numbers of people.
    2. Tours will most often be conducted during non-working hours, along a designated route that has been cleared of hazards and properly protected to avoid potential personal injury.
    3. A designated member of the Project staff shall guide all approved tours.
    4. All tours will begin with a mandatory site safety brief by a Contractor representative.
    5. Requests must be made at least one week in advance of the tour. Two weeks' notice will be required for groups larger than ten individuals.
  - iii. Groups of more than five visitors will receive a mandatory site safety in brief by a Contractor representative.
  - iv. Groups of more than fifteen visitors will only tour the site after it has been made safe and construction activities suspended for the duration of the tour. PPE will not be required for tours when construction is suspended.
6. Except for those tours conducted along sanitized routes during non-working hours, all visitors must wear OSHA/ANSI approved hard hats, safety glasses, shirts with sleeves over the shoulder, trousers, safety vests, and hard-soled shoes when on site. Ear protection, safety gloves, and steel or composite toed shoes may be required for certain situations. No inappropriate clothing or footwear shall be permitted.

#### **01 18 00 Project Utility Sources**

- A. The San Jacinto Community College District owns all utility systems on each of its constituent campuses. (Electric power is transmitted to each campus location over Center Point Energy transmission lines.)

- B. Project Utility Sources approved by the Owner for Contractor's use without charge to the Contractor are as described in the Special Conditions for this Project. Any required Project Utilities not provided by the Owner shall be provided by Contractor as described under Section 01 50 00 "Temporary Facilities and Controls".
- C. For all projects, the Contractor will be responsible for providing fully functional utility connections (electrical, water, sewer, telecommunication, data, natural gas, hydronics, and fire water) only to the extent indicated on the plans.

**01 18 13 Utility Service Connections**

- A. The Contractor shall prearrange a meeting with the Designated Service Provider and Owner whenever it becomes necessary to introduce or energize new services or interrupt any service to make connections, alterations or relocations and shall fully cooperate with the Owner in doing Work thereby causing the least annoyance and interference with the continuous operation of the Owner's business. Following this meeting the Contractor shall submit a work authorization request that will include a detailed description and procedure for each task, schedule for each task, any safety controls being implemented and signoff locations for tasks completed. The work authorization request will be similar to the document identified in 29 CFR 1910.147 App A and must be approved by the San Jacinto College Facilities Services craft supervisor for the intended utility. The work authorization document is considered a submittal subject to the review periods indicated in the contract and must be approved prior to scheduling work.
- B. Any existing utility distribution or internal plumbing, heating, ventilating, air conditioning or electrical disconnections which may affect portions of existing buildings or other construction projects must be coordinated with the Designated Service Provider and Owner to avoid any disruption of operation.
- C. While bidding, the Contractor shall assume that all shutdowns shall occur during afterhours and/or weekends unless specifically stated otherwise in the contract documents. In no case, unless previously approved in writing by Owner, shall utilities be left disconnected at the end of a work day or over a weekend.
- D. Any interruption of utilities shall be reported immediately to the Owner's Project Manager. Such interruptions, whether negligently, intentionally, or accidentally, shall not relieve the Contractor's responsibility for the interruption or from liability for loss or damage caused by such interruption even though such loss or damage was not foreseeable by Contractor or subcontractor, or from responsibility for repairing and restoring the utility to normal service. Repairs and restoration shall be made before the Contractor leaves the project site.

**01 21 00 Allowances**

- A. Certain items are specified in the Contract Documents by allowances. These allowances have been established in lieu of defining additional requirements or to defer the selection of actual materials and equipment to a later date when additional information is available for consideration. If necessary, additional requirements will be issued by Change Order.
- B. Allowances are to be considered a Cost of Work item and do not include Bonds, Insurance, Contractor Overhead, General Conditions, or Fee; each of which shall be handled as indicated in the Contract.
  - 1. All other related costs for the provisioning and installation of allowance items shall be included within the allowance amount.

2. Costs of services not required by the Contract Documents are changes in the Scope of Work and are not included in allowances.
- C. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
1. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
  2. Purchase products and systems selected by Architect and approved by Owner from the designated supplier.
- D. Approvals:
1. Use allowances only as approved by Owner and only by written authorization that indicates the specific amounts to be charged to the allowance line item.
  2. Use only District approved Allowance Expenditure Authorization (AEA) form. (See forms following Section 01 76 00, including Document 01 21 00 – Allowance Expenditure Authorization Form.)
  3. At Project closeout or upon direction by Owner, credit unused amounts remaining in each allowance item to Owner by Change Order, plus any corresponding overhead, profit or fee calculated on such amounts and include in the Contract Sum or GMP.

#### **01 22 00 Unit Prices**

- A. Definition: Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.
- B. Procedures.
1. Unit prices include all necessary material, plus cost for delivery, installation, indirect contractor expense, and profit.
  2. Methods of measurement and payment for unit prices are as specified in individual Specification Sections that require the establishment of unit prices.
  3. Contractor shall provide a Schedule of Unit Prices on the proposal form for incorporation into the Agreement.
  4. Where Unit Prices are required, Contractor shall include on the Proposal the following statement: "The Proposer understands and acknowledges that the unit priced allowances and quantities specified in the plans have been included in the figure submitted as the Base Proposal Figure. The Proposer understands that such unit prices are additive and deductive, and shall apply where such quantities are over or under the quantities estimated."

#### **01 23 00 Alternates**

- A. Definition: An Alternate is an amount proposed by bidders and stated on the Bid Form work defined in the bidding requirements that may be added to or deducted from the base bid amount at the Owner's discretion.

1. Alternates become part of the Work only after notice to Contractor, at which point they become part of the Agreement. Execute accepted alternates under the same conditions as other work of the Contract.
  2. The work required by an Alternate, if accepted, shall conform to the specifications for similar work in every particular and to specified items of work which apply to the Alternates.
  3. Each alternate includes any coordination, revision, or adjustment to adjacent work and miscellaneous devices, accessory objects, or similar items required for a complete and proper installation whether or not indicated as part of alternate.
  4. The cost or credit for each alternate is the net addition to ("ADD") or deduction from ("DEDUCT") the Contract Amount to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.
- B. NOTIFICATION: Immediately following award of the Contract, Owner shall notify Contractor in writing of the status of each alternate, whether accepted, rejected, or deferred for later consideration. Such notification shall include a complete description of any negotiated revisions to alternates.
- C. SCHEDULE: The following Schedule of Alternates is provided. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.
1. Alternate No. NA

#### **01 25 00 Substitution Procedures**

- A. DEFINITION: Substitutions are changes in products, materials, equipment, and methods of construction which differ from those required by the Contract Documents.
- B. PROCEDURE:
1. Requests for Substitution may be made at any time. Justification for substitutions are generally due to changed Project conditions, unavailability of product, or a recognition of clear benefit to the project which was not evident at the time the Contract Documents were prepared.
  2. Requests for Substitution should generally be informally proposed in three-way discussion between the Owner, Architect, and Contractor. If the Owner determines that the proposed Substitution offers a clear benefit to the project, approval to submit a formal Substitution Request will be given.
  3. Requests for Substitution that have been previously discussed with Owner will be submitted to the Designer by Contractor in writing. (See forms following Section 01 76 00 including 01 23 00.1 - Request For Substitution Form)
    - a. Such requests shall include the name of the material or equipment to be substituted and a complete description of the proposed substitutions including such drawings, performance, cost and other data that may be necessary for evaluation by the Designer.
    - b. A statement setting forth all changes in adjacent or related materials, equipment, or other portions of the Work (including changes in the work of other contracts that may be affected) shall be included.

- c. The burden of proof of the merit of the proposed substitution and its benefit to Owner is on the Contractor.
- d. If, upon detailed review, the Designer deems the substitution request has merit, he will approve it in writing and forward the approval document to the Owner for approval.
- e. Substitutions will be approved only when of benefit to the Owner. The Owner's approval or disapproval of a proposed substitution shall be final.
- f. Upon approval of a substitution request, formal Submittals as outline in Section 01 33 00 will be required.

**01 26 13 Requests for Interpretation**

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.
- B. A Request for Interpretation is a document submitted by the Contractor requesting clarification of a portion of the Contract Documents, hereinafter referred to as an RFI.
  - 1. Should Contractor be unable to determine from the Contract Documents the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of Work is described differently at more than one place in the Contract Documents; the Contractor shall request that the Architect make an interpretation of the requirements of the Contract Documents to resolve such matters.
  - 2. Contractor shall comply with procedures specified herein to make Requests for Interpretation (RFIs) on behalf of the Contractor, Subcontractors and Suppliers.
    - a. RFIs shall be prepared and submitted on a form provided by the Architect.
    - b. Each RFI shall be given a discrete, consecutive number.
    - c. Contractor shall sign all RFIs attesting to good faith effort to determine from the Contract Documents the information requested for interpretation.
      - i. Frivolous RFIs shall be subject to reimbursement from Contractor to the College for fees charged by Architect, Architect's consultants and other design professionals engaged by the College.
      - ii. RFIs submitted to request clarification of issues related to means, methods, techniques and sequences of construction or for establishing trade jurisdictions and scopes of subcontracts will be returned without interpretation. Such issues are solely the Contractor's responsibility.
      - iii. RFIs submitted by entities other than the Contractor will be returned without interpretation.
      - iv. RFIs that request interpretation of requirements clearly indicated in the Contract Documents will be returned without interpretation.
      - v. Contractor shall be responsible for delays resulting from the necessity to resubmit an RFI due to insufficient or incorrect information presented in the RFI.

- d. Contractor shall prepare and maintain a log of RFIs, and make copies of the log available to the Owner and Designer not less than weekly after the first RFI is issued.
  3. Designer will return RFIs to Contractor and Owner within seven calendar days of receipt.
- C. RFIs shall not be used:
1. as a means of delaying the work;
  2. for the approval of submittals or substitutions; or
  3. to circumvent the change order process.

#### **01 26 53 Proposal Requests**

- A. Requests to the Contractor for proposals for changes in the Contract Sum and Contract Time for suggested modifications to the work described in the Contract Documents shall only be made following discussion and approval of the anticipated modifications by the Owner.
- B. Requests for Change Proposals should generally originate informally in three-way discussion between the Owner, Architect, and Contractor. If the Owner determines that the proposed modification offers a clear benefit to the goals of the project, approval to submit a formal Change Proposal Request. (See forms following Section 01 76 00, including Document 01 26 53.1 – Change Proposal Request Form)
  1. A statement setting forth all changes in adjacent or related materials, equipment, or other portions of the Work (including changes in the work of other contracts that may be affected) shall be included.
  2. The effect of all such changes will be included in the Contractor's response to the Change Proposal Request.
- C. Change Proposal Requests must be approved in writing by the Owner and only when of benefit to the Owner. The Owner's approval or disapproval of a proposal requests shall be final.

#### **01 31 00 Project Management and Coordination**

- A. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
  1. Uniform General Conditions for Construction Contracts
  2. Supplemental General Conditions for Construction SJC Maritime Campus CSP 20-12
  3. Special Conditions for Construction of CSP 20-12 SC Maritime Expansion Fire Training Center
- B. PROJECT MEETINGS
  1. Prior to notice to proceed with Construction, project meetings shall be held at a location indicated by Owner.
  2. Following issuance of the Notice to Proceed with Construction, schedule and conduct meetings and conferences at Project site unless otherwise indicated. The entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
  3. A Preconstruction Conference shall be conducted prior to starting construction. Such meeting will review the responsibilities and personnel assignments of the authorized

representatives of Owner, Owner's Commissioning Authority, Architect, Architect's consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties.

- a. At this meeting and all subsequent meetings participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work for their employer. (i.e.; Participants will be empowered to make binding decisions on project matters for the firm they represent. Repeated attempts to substitute lackeys for decision makers shall result in letters of non-compliance to the offending entities.)
  - b. All project meetings shall have an Agenda prepared and published in advance of the meeting.
4. Activity Transition Meetings shall be conducted at the Project site before each significant change in construction activity, before each construction activity that requires coordination with other construction, and before each activity that could change the nature of the hazards at the site. Invite Owner will be invited to such meetings, and advise Architect and Owner's Commissioning Authority of meetings as appropriate.
  5. Pre-Installation Meetings shall be conducted at the Project site prior to each construction activity that requires coordination with other construction. (Activity Transition and Pre-Installation Meetings may sometimes be one and the same.)
    - a. Do not proceed with installation if any entity present has unresolved concerns at the conclusion of the conference.
    - b. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
  6. Construction Progress Meetings shall be conducted at regular intervals, but not less than bi-weekly after issuance of the Notice to Proceed.
    - a. In addition to representatives of Owner, Owner's Commissioning Authority and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of activities to be discussed shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
    - b. Prepare and publish an agenda in advance of the Progress Meeting. Include topics for discussion as appropriate to status of Project, which may include:
      - i. Safety.
      - ii. Contractor's Construction Schedule; status against plan and anticipated for three weeks into the future by day and six weeks into the future by week.
      - iii. Present and future needs of each entity present.
      - iv. Status of correction of deficient items.
      - v. Status of RFIs.
      - vi. Status of Submittals.
      - vii. Status of proposal requests.
      - viii. Status of Change Orders.



- ix. Pending claims and disputes.
- x. Status of payment requests.

### **01 31 29 Notification of Architect Requirements**

#### **ARCHITECT /CONSULTANT NOTIFICATIONS**

- A. The Contractor shall notify the Architect and / or Architect's Consultant a minimum 48 hours in advance of certain stages of construction to observe and verify work is being installed in accordance with the Contract Documents. Notification shall be sent by email or other written means. Contractor assumes all responsibility for schedule delays resulting from untimely notification.
- B. Notifications to the Architect shall include, but not necessarily be limited to the following:
  - 01 Mobilization on site.
  - 02 Start of full or partial demolition.
  - 03 Clearing of site / stripping of top soil
  - 04 Placing of each lift of select fill material
  - 05 Installation and cover of underground utilities.
  - 06 Installation of drilled / spread footings
  - 07 Excavation / forming of grade beams
  - 08 Placing of all reinforcing, vapor barriers and concrete.
  - 09 Completion of structural steel erection for metal building.
  - 10 Installation of metal decking.
  - 11 Installation of damp proofing / air barrier
  - 12 Installation and concealment of insulation
  - 13 Installation of standing seam metal roofing.
  - 14 Installation and concealment of sheet metal work / flashing
  - 15 Installation of self-adhered sheet flashing.
  - 16 Installation of building and glazing sealants.
  - 17 Installation of door frames and sectional doors.
  - 18 Installation of exterior glazing framing and glass.
  - 19 Installation of each type of finish flooring.
  - 20 Installation of each type of wall finishes.
  - 21 Installation of walkway covers.
  - 22 Installation of Metal Building systems.
- C. In addition to notifying the Architect, the Contractor shall also notify the Civil Engineer prior to the following stages:
  - 01 Installation and cover of underground site utilities.
  - 02 Installation and cover of manholes and other drainage structures.
  - 03 Installation of lift stations.
  - 04 Installation of storm detention ponds / systems.
- D. In addition to notifying the Architect, the Contractor shall also notify the Structural Engineer prior to the following stages:
  - 01 Installation of drilled / spread footings
  - 02 Pouring of grade beams
  - 03 Placing of all building slab concrete
  - 04 Start and completion of structural steel framing.

- E. In addition to notifying the Architect, the Contractor shall also notify the MEP Engineer prior to the following stages:

- 01 Installation of underground service ductbank(s)
- 02 Installation and cover of underground site electrical.
- 03 Installation and cover of underground building electrical.
  - a.
- 04 Installation of ceiling grid and cover-up.
- 05 Completion of plumbing rough-in.
- 06 Installation of plumbing fixtures
- 07 Installation of HVAC equipment
- 08 Completion of rigid duct installation
- 09 Completion of electrical rough-in
- 10 Installation of all electrical fixtures
- 11 Any and all testing specified for equipment, mechanical, electrical and plumbing systems.
- 12 Refer to MEP specifications for additional information and requirements.

- F. In addition to the above requirements, Architect and Consultant(s) shall be notified of all equipment testing, startup procedures, and Owner demonstrations / training sessions.

#### INCLEMENT WEATHER NOTIFICATION

- A. Owner-Contractor Agreement – Substantial Completion based on calendar days: If the project delivery includes time extensions for interruption or delay of work due to inclement weather, the Contractor shall adhere to the following procedures for consideration of approval of the weather delay time extension requests:
- 01 Provide email notification to the Architect of each regular work day delay within 24 hours of the delay (i.e. following day – latest)
  - 02 Provide email notification to the Architect of any delays resulting from inclement weather on non-work days or holidays not later than the end of the first subsequent work day.
  - 03 Notifications shall include the type of weather, nominal quantity of rain / wind velocity (as applicable) and description of how the event delayed the project.
  - 04 If a single weather event results in a multiple-day delay, provide notification for each day in accordance with the above procedures.
  - 05 The general / supplementary conditions to the Owner-Contractor Agreement requires allowance for average, normal rain days per month which must be accounted for in the Contractor's baseline schedule and / or Proposal calendar days. Provide notifications for all weather event delays, regardless of required rain days included in the Contractor's schedule.
  - 06 Provide a monthly inclement weather summary log with the application for payment. The log shall include actual weather delay days for the month, required anticipated weather days and the net add / gain for the month; as well as, a cumulative summary of all such reports.
  - 07 Provide a monthly updated schedule with the application for payment. The schedule should reflect the weather delay impact on the critical path of the schedule.
- B. Owner-Contractor Agreement – Guaranteed Substantial Completion: If the project delivery includes a guaranteed substantial completion date, there is no allowance for contract time extension due to inclement weather; however, as a matter of record, the Contractor shall adhere to the following procedures recording the weather-related interruption or delays:

- 01 Provide email notification to the Architect of each regular work day delay within 24 hours of the delay (i.e. following day – latest)
- 02 Provide email notification to the Architect of any delays resulting from inclement weather on non-work days or holidays not later than the end of the first subsequent work day.
- 03 Notifications shall include the type of weather, nominal quantity of rain / wind velocity (as applicable) and description of how the event impacted the project schedule.
- 04 If a single weather event results in a multiple-day delay, provide notification for each day in accordance with the above procedures.
- 05 Provide a monthly inclement weather summary log with the application for payment. The log shall include actual weather delay days.
- 06 Provide a monthly updated schedule with the application for payment. The schedule should reflect the Contractor's adjustment to the schedule to make up weather delay days which impact the critical path of the schedule.

**01 32 33 Photographic Documentation**

- A. Take digital construction photographs at regular intervals and of all significant issues.
- B. Take not less than 20 photographs monthly.
- C. For new construction, arrange for aerial photographs of entire job site on not less than a monthly basis.
- D. Archive all photographs in a location accessible by Designer and Owner. Each Photograph will be identified with the date taken, and text describing the subject of the photograph. Generic descriptions such as "Photo 1" will not be used.
- E. Archive digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- F. Circumstances that could require additional photographs include, but are not limited to immediate follow-up when on-site events result in construction damage or losses and photographs to be taken at fabrication locations away from Project site.

**01 33 00 Submittal Procedures**

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
  - 1. Written and graphic information and physical samples that require Architect's responsive action are indicated in individual Specification Sections as "action submittals."
  - 2. Written and graphic information and physical samples that do not require Architect's responsive action are indicated in individual Specification Sections as "informational submittals."
  - 3. Submittals may be rejected for not complying with requirements.
- B. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
- C. Submittal Procedures:
  - 1. The Construction Manager will maintain a submittal log that is updated not less than weekly. Said log shall have a column to record Architect/Engineer (A/E), Commissioning Agent (CxA) and Project Manager (PM) submittal review status. Standard Statuses and abbreviations

- shall be:
- a. Reviewed: AAS (Approved as submitted). The reviewing authority has reviewed and approved the submittal exactly as submitted, without comment.
  - b. Reviewed: CAN (Approved as Noted, or Approved, Coordinate as Noted). The reviewing authority has reviewed and approved the submittal, but wishes the submitter and A/E to be cognizant of some minor coordination, adjustment, or installation concern which is detailed on the returned submittal or coversheet. The Construction Manager will take responsibility for hand-annotating the Issued for Construction Drawing set to ensure that the annotation is incorporated into the final project.
  - c. Reviewed: DNC (Does Not Comply). The reviewing authority has reviewed or attempted to review the submittal, but cannot approve it because the submittal violates the basis of design, is outside the specification, or is otherwise unacceptable. A DNC evaluation from the Reviewer should be interpreted as a requiring A/E interaction with the submitter before the A/E's issuance of an "R&R" or "Rejection" notice to the submitter.
  - d. Reviewed: NAR (No Action Required). The reviewing authority has reviewed the submittal, has no objections to it, but lacks the moral fortitude to expressly approve it.
  - e. Reviewed: R&R (Discrepancies as Noted, Revise and Resubmit). The reviewing authority has reviewed or attempted to review the submittal, but cannot approve it for the specific reasons noted, which the submitter must correct before additional consideration.
  - f. Not Reviewed: ANC (Existence Acknowledged, but No Comment). For whatever reason, the reviewing authority chooses not to review or to take definitive action on a submittal. This status is particularly applicable to the CxA, which may choose to focus its efforts on critical review packages and not touch every package.
  - g. The Owner's expectation is that every instance of CAN, R&R, and DNC, will be discussed by the project team, and that issues requiring a potential compromise in some aspect of the project expectations will be escalated to the Owner's Representative in a timely manner.
2. All comments from Owner's Representative or stakeholders will be sent to the Owner's PM for inclusion in the PM's formal response. Comments from the CxA will be sent to the A/E with a copy to the PM.
    - a. Submittal Comments by Owner & Tenant Reps => Owner's PM for consideration, coordination, & inclusion as appropriate.
    - b. Submittal Comments by Owner's PM => A/E
    - c. Submittal Comments by CxA => A/E, Copy PM
    - d. Submittal Comments by A/E => CM
  3. NO SUBMITTAL MAY BE ACCEPTED BY THE A/E UNLESS IT HAS BEEN REVIEWED BY THE PM OR CxA.
  4. Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing Submittals, Shop Drawings and Project Record Drawings. Limitations on the use of such files by the Contractor, if any, will be include in the Project's Special Conditions.
  5. Coordinate preparation and processing of submittals with the performance of sequential construction activities.
    - a. Submit all submittal items required for each Specification Section concurrently unless

partial submittals are allowed by the approved submittal schedule.

- i. Submit action and informational submittals required by the same Specification Section as separate packages under separate transmittals.
  - ii. Submittals that require concurrent review should be so indicated in those Sections and transmittal coordinated so that processing will not be delayed.
  - iii. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
  - iv. Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
6. Processing Time: Allow time for submittal review, including time for re-submittals, as follows.
- a. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  - b. Initial Review: Allow 10 days for initial review of each submittal unless Architect has previously advised Contractor of a need for additional time due to coordination with subsequent submittals.
  - c. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  - d. Resubmittal Review: Allow 10 days for review of each resubmittal.
  - e. Sequential Consultant Review: Where sequential review of submittals by the Designer's Consultants, Owner, Commissioning Agents, or other parties is indicated, allow 15 days for initial review. Submittals will be returned to the Designer before being returned to the Contractor.
  - f. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 10 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
7. Contents.
- a. Fully illustrate requirements in the Contract Documents and provide such additional information as requested by submittal approving authority. If no specific information has been requested, provide such data as would be required by a "reasonable" individual to make an informed decision on the matter at hand.
    1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings.
    2. Mark each copy of each submittal to show which products and options are applicable.
    3. Include statement of compliance with specified referenced standards, where required.
8. Identification.
- a. Paper and electronic submittals are allowed.

- b. Place a permanent label or title block on each submittal item for identification.
  - 1. Indicate name of firm or entity that prepared the submittal on label or title block.
  - 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
  - 3. Include the following information for processing and recording action taken:
    - a. Project name.
    - b. Date.
    - c. Name of Architect.
    - d. Name of Construction Manager and/or Contractor.
    - e. Name of subcontractor.
    - f. Name of supplier.
    - g. Name of manufacturer.
    - h. Submittal number. Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
- c. Submittals will include a paper or electronic "Transmittal Form" to be provided by the Owner. Post electronic submittals as PDF electronic files directly to Project Web site specifically established for Project.

**01 35 23 Contractor Safety Requirements**

1. GENERAL

- A. Company employed, engaged to perform construction related activities for San Jacinto College, hereafter referred to as "Contractor" shall be defined as all personnel under their control including direct employees and invitees (e.g. sub-subcontractors, vendors, and visitor). San Jacinto College District shall hereafter be referred to as "College".
- B. Contractor shall comply with all Federal, State and Local requirements, requirements of the Contract Documents, Contractor's Safety Manual and Contractor's Site Specific Safety Plan. Contractor shall ensure full compliance with these requirements. Contractor shall include these safety requirements in agreements with all they employ. Entry onto jobsite constitutes acknowledgement by the Contractor, subcontractor employees or invitee, of their obligation to adhere to these safety requirements.

2. CONTRACTOR SPECIFIC REQUIREMENT

- A. The following paragraphs include a non-comprehensive list of areas where the requirements of the Division 01 Guidelines and may exceed OSHA requirements. This list is provided to the Contractor for convenience only and does not relieve the Contractor of any responsibilities outlined in the documents noted in Paragraph 1.

1. Jobsite General Safety Requirements

- i Immediately report any safety concerns and incidents, no matter how minor, to the College Project Team.
  - ii Firearms, weapons, explosives, ammunition, and unauthorized items such as stolen property and drug paraphernalia, are prohibited. Penal Code 30.06 and 30.07 are strictly enforced by the College.
  - iii Smoking permitted in designated areas only. Designated smoking areas will be determined by the Project Team. Some projects may have a “No Smoking” or “No Tobacco” policy. Tobacco use is prohibited outside the confines of the contractors control; College Grounds.
    - 1.
2. Incidents and Violation of Safety Requirements
- i A meeting will be conducted with the Contractor’s supervisor, Management, and the College Project Team. The meeting should conclude in a documented agreement outlining the Contractor’s intended corrective actions and time frame for implementation.
    - 1.
  - ii Contractor may be subject to one or more of the following if found to be non-compliant:
    - a. Written warning
    - b. Individual(s) may be removed from the project for a specified duration
    - c. Individual(s) may be removed from project and/or future Contractor projects
    - d. Re-training (at Contractor expense) for individual(s), crew and/or foreman
    - e. Additional supervision and/or safety requirements to the project at the Contractor’s expense
    - f. Removal of unsafe condition by others at the Contractor’s expense
    - g. College may terminate all or part of the Contract for inadequate safety performance
    - h. Additional remediation items as deemed by the Safety Director or Project Team.
  - iii Contractor shall be responsible for costs and delays associated with, or resulting from, incidents or safety violations caused by the Contractor.
  - iv When violations of the safety requirements are observed, the responsible Contractor shall be informed orally for immediate correction. It is the sole responsibility of the Contractor to devise and implement the correction. If the College deems it is necessary to stop work being performed due to the nature of a violation, work will be halted until the Contractor corrects the violations. Any costs incurred by the stoppage of work due to the violation will be the sole responsibility of the violating Contractor.
3. Designation of Competent Person
- i Contractor shall designate a Competent Person as defined by OSHA, to implement the Safety Program. The name of this individual will be submitted to the College on the Competent Person form. Competent Person must be on site whenever Contractor is working onsite.
4. Contractor Safety Representative
- i Contractor’s designated Corporate Safety Representative is expected to make at a minimum, monthly jobsite visits to audit implementation of the Contractor’s safety and health plan and the safety requirements. This Representative will also be required to attend regular on-site safety meetings, as determined by the College. Contractor will provide a copy of all documented inspections, observations, or report to the College, when requested. Where the nature or size of the contract warrants, the College, at their sole discretion, may require a full-time, onsite qualified Safety Representative.

5. OSHA and State Agency Inspections and Notifications
  - i It is the responsibility of the Contractor to notify the College and OSHA of any reportable injury under the Record-keeping Regulation (29 CFR 1904) which includes all work-related fatalities, inpatient hospitalizations, amputations or losses of any eye.
  - ii If Contractor receives any citation(s), written notification must be provided to the College within 48 hours of such notification.
  - iii It is the responsibility of the Contractor to notify the College and TCEQ of any hazardous material incidents within the time frame required.
  
6. Pre-Construction Meetings
  - i Contractor shall ensure their Project Management and other key personnel, including their Site Supervisor and/or Safety Representative at a minimum, attend a pre-construction meeting with the College Project Management staff where planning for safe execution of the project will be addressed.
  
7. Site Safety Orientation
  - i Prior to starting work on the project, all employees are required to attend a site-specific safety orientation provided by the Contractor. Contractor shall be responsible for scheduling orientation of their employees and visitors with the College. If an individual is found on-site without having received the training, that person will be removed from the project for the remainder of the day.
  - ii The Safety Orientation expires and must be renewed annually.
  
8. Foreman's Site Requirements Review
  - i Contractor's Foremen will complete a review of the safety requirements and expectations with a member of the College Project Team. If the Contractor has additional foremen or changes foreman on the project, these individuals must also complete this review.
  - ii Contractor Foremen is required to have OSHA 30-hour and First Aid/CPR training prior to project assignment.
  
9. Job Hazard Analysis (JHA)
  - i JHA's addressing hazards associated with Contractor's scope of work are required daily as part of the Safety and Health Plan submittal. The Contractor shall also prepare additional JHA's upon request and modify as the work process and/or associated risks change. The JHA will be reviewed by the Contractor and all affected employees prior to starting work or after modification to the JHA. Contractor to submit completed documentation to the College upon request, prior to starting work.
  
10. Silica Written Exposure Plan
  - i Contractor's Competent Person shall conduct a Silica Exposure Hazard Assessment and generate a written Exposure Control Plan prior to commencement of work. Contractor to submit completed documentation to the College when requested.
  
11. Safety Toolbox Talk
  - i Contractor shall require all employees attend all Safety Toolbox talks conducted by Contractor.



## 12. Incident Reporting

- i Contractor shall immediately notify the College of all incidents, personal injuries/illnesses, near miss (defined as an occurrence that has the attributes of an incident yet has no apparent damage to person or property), project losses or damages, hazardous material incidents, and incidents involving the public or their property.
- ii Contractor is required to investigate all incidents incurred by their employees, or incidents that are the result of their operations.
- iii Contractor shall provide the College a written initial incident Investigation Report within 24-hours of the incident occurrence.
- iv The College and their agent(s) may conduct an independent investigation, the Contractor and their employees are expected to fully cooperate with the investigation process including completion of witness statements, photographs, completion of College required documents and any other elements of the incident investigation process. Upon request, Contractors involved in the incident shall participate in an Incident Review Meeting.

## 13. Substance Abuse Policy

- i Contractor shall establish and maintain an effective substance abuse program that, at a minimum, is equivalent to the College Substance Abuse Policy (copy of this program is available upon request). Drug testing is required of Contractor's employees and/or those they employ in the following situation:
  - a. If there is reasonable suspicion the individual is under the influence of drugs or alcohol (immediate testing required);
  - b. If the individual has sustained a work-related injury requiring outside medical attention (immediate testing required);
  - c. If the individual has caused or contributed to another employee being injured in a work-related incident (immediate testing required);
  - d. If the individual has caused or contributed to a work-related incident resulting in, or which has the potential to result in, property damage (immediate testing required);
  - e. If the individual has been involved in an "near miss", defined as an occurrence that has the attributes of an incident, yet has no apparent damage to person or property (immediate testing may be required).
- ii Contractor's employees failing to provide proof of required drug test, refuse the required test, or violate the Contractor's substance abuse policy, will not be permitted on College sites. All costs associated with any substance abuse testing are the responsibility of the Contractor.

## 14. Hazard Communication

- i Contractor will submit a copy of the SDS and Inventory List of chemical(s) or substance(s) intended for use on the worksite when required by the College.
- ii Contractor will be responsible for providing updates to the College
- iii Contractor is responsible for providing employee training as per OSHA Standard 1910.1200
- iv Contractor is responsible for labeling temporary containers not intended for immediate use. Such labeling must meet OSHA requirements as noted in 1910.122.

## 15. Logistics and Traffic Control

- i Contractor shall be required to submit for approval, a Traffic Control Plan and Logistics Plan for material deliveries and debris haul-off routes.
- ii Contractor shall provide signage for deliveries, exits and traffic controls along with flag men as required.

3.

#### 16. Guidelines for Volatile Organic Compound (VOC) Management

- i Preliminary requirements:
  - a. Contractor to provide baseline CPM – highlight painting and coating activities.
  - b. Contractor to provide Safety Data Sheets (SDS) for all painting and coating products
  - c. Contractor to provide annotated floorplans; indicate locations of paint and/or coating activity; calculate estimated concentrations per product data and volume of workspace.
- ii Contractor to provide “Activity Alert” – minimum 60-day advance notice to the College.
- iii 60-Day Evaluation and Determination Process:
  - a. Painting or Coating activity (in 60-day window)? If YES – proceed to Step B; If NO – proceed to Step J
  - b. Will building be occupied during construction? If YES – proceed to Step C; If NO – proceed to Step G
  - c. Any products contain VOC’s? If YES – proceed to Step D; If NO – proceed to Step J
  - d. Contractor to submit SDS and annotated floor plans for painting and/or coating activity.
  - e. College CIH review and evaluate SDS and recommend action as follows:
    - (i) Elimination
    - (ii) Substitution
    - (iii) Engineering Controls
    - (iv) Administrative Controls
  - f. College CIH to notify Contractor requirements for approval to proceed.
  - g. Contractor to submit “VOC Work plan” more than 30 days prior to activity.
  - h. College CIH will review and comment on Contractor’s “VOC Work plan” and return this to the Contractor.
  - i. Contractor will incorporate the College comments into the “VOC Work plan” and resubmit plan for review.
  - j. Contractor to notify the College CIH 24-hours prior to implementation of the “VOC Work plan”.
  - k. Contractor will implement the “VOC Work plan” and proceed with required work.
  - l. The College, at its discretion, will monitor the work in progress and ensure the Work plan is adhered to throughout the process.
  - m. Contractor will notify the College CIH when process is complete.

#### 17. Personal Mobile Equipment Devices

- i Guidelines:

This Guideline provides for the requirements associated with the use of Personnel Mobile Electronic Devices on the job site.
- ii Definitions
  - a. Designated Work Area – All areas within the project limits except the project offices (Contractor, Owner, and Subcontractor), designated break/lunch areas,

and outside the project fence.

- b. Two-Way Radios - a radio that can both transmit and receive thus allowing the operator to have a conversation with other similar radios operating on the same radio frequency (channel).
  - c. Personnel Mobile Electronic Device – Includes cellular phones, tablets, portable multi-media player, camera (still or video), or any other electronic device intended for personnel use. Hereafter known as “Device.” Two-Way Radios operating on a single radio frequency are not considered Personnel Mobile Electronic Devices.
- iii Personnel Mobile Electronic Devices are strictly prohibited from all Designated Work Areas except when permitted by Contractor/Owner and as follows:
- a. Personnel requesting to utilize Devices in any Designated Work Area on the San Jacinto College Project must first gain written approval from the Lead Superintendent or Lead Project Manager. The requesting person’s employer shall be required to submit in writing, the request with justification of the need, and a permit sticker will be assigned to the person by the Contractor. The sticker must be attached to the employee’s hard hat in a visible area. Contractor will maintain a log of all stickers issued including date and employee name.
  - b. If an employee that possesses a permit sticker needs to utilize his/her Devices, it must be utilized in a safe and stationary location and related to work activities.
  - c. Device usage is not permitted under any circumstances while operating or at the controls of construction machinery, or while operating any mobile equipment.
  - d. Personnel with permit sticker are not permitted to utilize their Device if that person is involved in any work activity where the Device could take attention away from the task at hand.
  - e. Headphones, earbuds, Bluetooth accessories, etc. are strictly prohibited while working on San Jacinto College Projects.
  - f. Contractor/College shall have complete authority to restrict usage at their sole discretion.
  - g. If a person is found using a Device in a Designated Work Area outside of the acceptable limits of this policy, he or she shall be subject to disciplinary action, up to and including removal from the Project.
  - h. Contractor shall document and maintain records of San Jacinto College “PERSONNEL MOBILE ELECTRONIC DEVICES FOR SJC CONSTRUCTION PROJECTS” See Exhibit “A”
- iv Two-Way Radios:
- a. Use of Two-Way Radios permitted only by Contractor/Owner Project Designated personnel, and only in compliance with this policy.
  - b. Personal Mobile Equipment Devices are strictly prohibited from all designated work areas except when permitted by Contractor following College Guidelines.
  - c. Personnel requesting to utilize devices in any designated work area on Contractor project must first gain written approval from Contractor’s Lead Superintendent or Lead Project Manager.

- d. If an individual possessing a permit sticker needs to utilize his/her device, it must be utilized in a safe and stationary location, and related to work activities.
- e. Headphones, earbuds, Bluetooth accessories, etc., are strictly prohibited while working on any College project.

18. Safe Work Plan for Occupied Facilities

- i The Safe Work Plan for occupied facilities is designed to notify the College representative of any potential scope of work that could affect any building operations during normal working hours.
- ii Contractor is required to complete a risk assessment when conducting work in an occupied facility that could cause any health hazards to those occupying the facility.
- iii The plan is to be developed ensuing that notification to the College's representative is within their requested time frame.

19. Safe Work Zone – Material and Personnel Hoists

- i Only Contractors employees shall be authorized to operate the material and personnel hoists.
- ii Contractor will establish a safe work zone process on the exterior side of the structure where the material and personnel hoists are in operation.

20. Scaffold and Equipment

- i Contractor agrees to conduct inspection of scaffold and/or equipment.
- ii Contractor acknowledges that scaffold and/or equipment is in good condition prior to their use.
- iii Contractor agrees that scaffolding and/or equipment is in accordance with OSHA regulations.
- iv Contractor will ensure that prior to usage of scaffold or equipment the workers are trained per OSHA standard.

4.

21. Lift Permit and Plan

- i Contractor shall provide the College with Site Specific Crane and Rigging Lift Safety Policy. Contractor shall complete daily lift plans prior to hoisting any material and equipment.
- ii All engineered data concerning the materials and material rigging required for lift shall be provided by Contractor at no extra cost to the College.
- iii Riggers are not allowed to stay on a truck while unloading material. The Rigger must rig the material/equipment and ask the Crane Operator to do a test lift; before giving the operator the go-ahead signal/verbal the Rigger must get off the trailer.

22. Stop Work Authority

- i Every employee including sub-contractor employees are fully authorized and obligated to stop any job, any behavior, or any activity that may be unsafe. Be assured that no employee or contractor will incur retribution of any sort for stopping a job due to safety reasons.

23. Visitor Release and Indemnification

- i All visitor(s) must check-in at the Contractor Office Construction jobsite trailer and sign a Visitor Release and Indemnification.
- ii Visitors will be required to use personal protective equipment; a hard hat, safety glasses and any other personal protective equipment as may be required by the project.

5.

24. Visitation Guidelines

- i In general, safety on the construction site is the responsibility of the Contractor. The College does not have the right to lower any safety standards set in place by the Contractor.
- ii Each person has a responsibility to protect their person and to advise responsible personnel at any site of perceived unsafe conditions.
- iii Anyone who is not assigned to work at the site on a regular basis shall be considered a visitor.
- iv Prior permission is required for all construction site visits due to safety, security, liability and legal reasons. Individuals on any construction site without permission will be escorted off.
- v The safety of College sponsored visitors to each site is a shared responsibility of the College's Project Manager and the Contractor. A visitor orientation is required each time a visitor tours a site, regardless of who the visitor is, and whether or not they have received an earlier orientation, as conditions may have changed.
- vi All visits to the site by non-program personnel will be by appointment made with the designated Project Manager for the relevant project, and approval by the Director of Capital Projects. This is intended to ensure required personal protective equipment and job site orientations are available at the time of the desired visit.
- vii All visitors shall sign a release prior to touring a site.
- viii All visitors will report to the job site office to sign in, visitors must be accompanied by the Project Manager. The Project Manager will coordinate all visits with the Contractor prior to walking the job site.
- ix All visitors must wear OSHA/ANSI approved hard hats, safety glasses, ear protection, shirts with sleeves over the shoulder, trousers, safety vests, safety gloves, and hard-soled steel or composite toed shoes when on site. No inappropriate clothing or footwear shall be permitted.
- x Any group of visitors larger than six individuals will be considered a "tour". Tour requests will be granted on a case-by-case basis at the discretion of the Director of Capital Projects.
  - a. Requests for tours shall be screened and limited in both frequency and numbers of people.
  - b. Tours will most often be conducted during non-working hours, along a designated route that has been cleared of hazards and properly protected to avoid potential personal injury.
  - c. A designated member of the Program staff shall guide all approved tours when applicable.
  - d. Requests must be made at least one week in advance of the tour. Two weeks' notice will be required for groups larger than ten individuals.

## Exhibit "A"

# PERSONNEL MOBILE ELECTRONIC DEVICES FOR SJC CONSTRUCTION PROJECTS

### 1. GUIDELINE

- 1.1 This Guideline provides for the requirements associated with the use of Personnel Mobile Electronic Devices on the job site.

### 2. DEFINITIONS

- 2.1 Designated Work Area – All areas within the project limits except the project offices (Contractor, Owner and Subcontractor), designated break/lunch areas, and outside the project fence.
- 2.2 Two Way Radios - a radio that can both transmit and receive thus allowing the operator to have a conversation with other similar radios operating on the same radio frequency (channel).
- 2.3 Personnel Mobile Electronic Device – Includes cellular phones, tablets, portable multi-media player, camera (still or video), or any other electronic device intended for personnel use. Hereafter known as "Device." Two Way Radios operating on a single radio frequency are not considered Personnel Mobile Electronic Devices.

### 3. PERSONNEL MOBILE ELECTRONIC DEVICE

- 3.1 Personnel Mobile Electronic Devices are strictly prohibited from all Designated Work Areas except when permitted by Contractor/Owner and as follows:
  - 3.1.1 Personnel requesting to utilize Devices in any Designated Work Area on the San Jacinto College Project must first gain written approval from the lead superintendent or lead project manager. The requesting person's employer shall be required to submit in writing the request with justification of the need, a permit sticker will be assigned to the person by Contractor. The sticker must be attached to the employee's hard hat in a visible area. Contractor will maintain a log of all stickers issued including date and employee name.
  - 3.1.2 If an employee that possesses a permit sticker needs to utilize his/her Devices, it must be utilized in a safe and stationary location and related to work activities.
  - 3.1.3 Devices usage is not permitted under any circumstances while operating or at the controls of construction machinery or while operating any mobile equipment.
  - 3.1.4 Personnel with permit sticker are not permitted to utilize their Device if that person is involved in any work activity where the Devices could take attention away from the task at hand.
  - 3.1.5 Headphones, Earbuds, Bluetooth Accessories, Etc. are strictly prohibited while working on the

San Jacinto College Project.

3.1.6 Contractor/Owner shall have complete authority to restrict usage at their sole discretion.

3.1.7 If a person is found using Devices in Designated Work Areas outside of the acceptable limits of this policy, he or she shall be subject to disciplinary action up to and including removal from the Project.

#### 4. TWO WAY RADIOS

4.1 Two Way Radios are permitted to be used by Contractor/Owner Project Designated persons and only in compliance with this policy.

## 01 35 43 Environmental Procedures

- A. The College desires to create the most environmentally responsible construction environment possible within the limits of the construction schedule, contract sum, and available equipment, materials and products.
- B. Dust Control and Fugitive Emissions
  - 1. To the extent practicable construction project activity shall not cause or permit the emission of any particular matter at sufficient duration or quantity as to create a nuisance or observable deposition upon property outside of the project limits.
  - 2. Reasonable efforts to control particulate emissions may include but are not limited to:
    - a. Use of water or chemicals for control of dust during demolition of structures, construction, or during grading of roads or clearing of land.
    - b. Covering open bodied trucks transporting loose materials at all times when in motion.
    - c. Immediate clean-up of dirt or debris spilled onto paved surfaces to reduce re-suspension of particulate matter caused by vehicle movement.
- C. Odors
  - 1. Work that is likely to cause objectionable odors shall be performed only after coordination with the SJCD Project Manager. Filtering of air intakes may be needed to prevent odors and vapors from entering buildings.
  - 2. In cases where unavoidable odors will be produced, Contractor shall provide seven (7) business days' advance notice to the SJCD Project Manager in order that adequate notice can be given to the campus and affected stakeholders. Work stoppage may occur if advance notification has not been coordinated or odors and vapors from the work are found to generate complaints from building occupants.
- D. Protection of Air Handling Systems
  - 1. Contractor shall be responsible for protection of the cleanliness of air handling systems at all times. On new work, this includes complete closure of all duct work on a daily basis.
  - 2. On existing air handling systems cleanliness protection may include as needed:
    - a. During site work or building demolition, pre-filters shall be provided and maintained on all building outside air intakes at all times throughout the construction duration.
    - b. During any interior work that may create dust in the interior space and adjacent corridor/hallways, air filters shall be provided and maintained on all affected air return and exhaust grilles. Where air flow in or out of the space is not required, all air duct openings shall be temporarily sealed off with a suitable covering.
    - c. Upon completion of all Work affecting existing air handling systems, the Contractor shall remove all temporary filters, covers and associated parts and restore the system to its original operating condition unless otherwise stated elsewhere in the Contract Documents.
- E. Ventilation during Painting or Other Finish Work in Occupied Structures
  - 1. During painting and for a period of 72 hours following completion of painting, the air leaving the room/space shall be exhausted only to the outside, with no re-entrainment to any



occupied spaces and for a period of 72 hours following completion of painting.

F. Construction and Maintenance Isolation Requirements

1. All construction, maintenance, and remodeling activities, regardless of size or scope, must be fenced, barricaded, or otherwise isolated to restrict entrance and to ensure the safety of those in the general area.
2. The contractor will provide all barricading, isolation, and fencing material. The contractor will also provide all appropriate warning and detour signs when sidewalks, exits, or roads are closed.

G. Hazardous Materials

1. Hazardous materials, at a minimum, refer to asbestos, lead, mercury, polychlorinated biphenyl (PCB), and containerized chemicals.
2. On every project involving existing facilities, a hazardous materials survey shall be performed prior to any demolition. This survey will be performed by SJC Facilities Services or by independent consultants as directed by the SJC Project Manager.
  - a. The survey will provide an overview of typical surfaces and locations containing the hazardous material in question but may not specifically delineate every location where the hazardous material may be found.
  - b. Under no circumstance shall demolition work occur prior to approval from the SJC Project Manager.
  - c. After beginning work, should the Contractor observe or suspect the existence of hazardous materials in the structure or components of the work, the Contractor shall immediately stop work and notify the SJC Project Manager.

**01 35 46 Indoor Air Quality Procedures**

- A. Indoor Air Quality Management Plan: Describe in detail measures to be taken to promote adequate indoor air quality. The SMACNA IAQ Guideline for Occupied Buildings Under Construction may be used as an adequate template.
1. Submit IAQ Plan at pre-construction meeting.
  2. Identify construction activities likely to produce odors, moisture, vapors or dust and potential impact on project areas, especially occupied areas.
  3. Evaluate potential problems by severity and describe methods of control.
  4. Describe construction ventilation to be provided, including type and duration of ventilation, use of permanent HVAC systems, types of filters and schedule for replacement of filters.
  5. Describe cleaning and dust control procedures.
  6. Describe commissioning procedure.
- B. Implementation
1. Controls, sequences, permanent equipment/systems shall meet the Design Intent / Basis of Design in accordance with the Project's schedule without imposing hardship to the Commissioning requirements and schedule.
  2. Protect stored on-site or installed absorptive materials from moisture damage.

3. HVAC equipment and supply air ductwork shall not be used for ventilation during construction without approval of the Owner or Commissioning Authority with respect to the following criteria:
  - a. Meet all requirements of *Section 01 76 00 - Protecting Installed Construction*.
  - b. Seal return air inlets or otherwise positively isolate return air system to prevent recirculation of air; provide alternate return air pathways.
  - c. If the Permanent Design does not permit temporary isolation of Return Ducting, then filtration media with a Minimum Efficiency Reporting Value (MERV) of 11 shall be used at each return air grill.
  - d. Within Design parameters, operate HVAC system on 100 percent outside air.
  - e. Ensure that all air filters are correctly installed prior to starting use. Replace all filtration media at a minimum of weekly or sooner as necessary to maintain cleanliness. Replace all filtration immediately prior to occupancy.
  - f. Prior to permanent use of return air ductwork without intake filters, clean up and remove dust debris generated by construction activities using a HEPA vacuum cleaning system. Do not perform dusty or dirty work after removing filters.
4. Prevent the absorption of moisture by:
  - a. Sequencing the delivery of moisture sensitive materials so that they are not present in the building until wet work is completed and dry.
  - b. Storing such materials in fully sealed moisture-impermeable packaging.
  - c. Providing sufficient TEMPORARY ventilation for drying. Permanent equipment may be allowed to be used once all Contractor-submitted care provisions have been approved by Owner.
  - d. Beginning construction ventilation only when building envelope is sealed.

#### **01 35 53 Security Procedures**

- A. Security of the Project site shall be strictly maintained. Contractor shall be responsible for keeping areas involved in this Work locked at all times when Work is not in progress.
- B. Provide fencing, barricades, cameras, or guards as required to protect the Work, existing facilities, and College's operations from unauthorized entry, vandalism, or theft.
- C. Keys required for access to existing College Facilities will be issued by the Facilities Services Department to the Contractor only.
  1. It shall be Contractor's responsibility to open areas for Subcontractors.
  2. At completion of the Project, all keys shall be returned to Owner's Representative. Failure to return keys will obligate Contractor for all costs incurred due to necessary rekeying.

#### **01 40 00 Quality Requirements**

- A. Quality assurance services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Architect.
  1. Specific quality control requirements for individual construction activities are specified in the

sections that specify those activities.

2. Inspections, test and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements
- B. The Contractor shall provide all inspections, tests, and similar quality control services, specified in individual Specification sections and required by governing authorities, except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified entity. Costs for these services shall be included in the Contract Sum. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.
- C. The Owner will engage and pay for the services of an independent agency to perform inspections and tests specified as the Owner's responsibility.
1. Owner's philosophy is that it will pay for the testing of mock-ups to verify the integrity of Architect's design. Quality Control of work is a Contractor responsibility.
  2. Should initial tests find non-compliance with Contract Documents, all retesting shall be performed by the Owner's testing company and all costs thereof shall be deducted from the construction Contract Sum by Change Order.
- D. Contractor Responsibilities.
1. The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested.
  2. The Contractor is responsible to notify the agency at least 48 hours in advance of operations to permit assignment of personnel, and not less than 12 hours in advance of cancelled work to prevent trip charges. Any trip charges generated as a result of failure to notify the testing agency in advance of cancelled work shall be borne by the Contractor.
  3. Auxiliary services required include but are not limited to:
    - a. Providing the Testing Agency with Construction and Progress Schedules, scheduling times for inspections, tests, taking samples, and similar activities.
    - b. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
    - c. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
    - d. Providing facilities for storage and curing of test samples.
    - e. Provide the testing agency with a design mix, approved by the Architect for material mixes that require control by the testing agency. Provide design mix to testing agency at the Contractor's field office.
    - f. Security and protection of samples and test equipment at the Project site.
- E. Owner Responsibilities.
1. The Owner will employ and pay for the services of an Independent Testing Laboratory and Special Inspector to perform services which are the Owner's responsibility. The tests and special inspections as scheduled shall be contracted and paid for by the Owner.
  2. The Owner will be actively involved in the project. The Architect and its consultants shall work

cooperatively with the Owner and its inspectors to facilitate the implementation of the Owner's Inspection Services. The Architect and its consultants shall make themselves available to the Owner so that a timely resolution of possible deficiencies can be effected with a minimum of disruption to the Project. The Owner's Designated Representative has the authority to ask the Architect to reject Work which does not conform to the Contract Documents. If the Architect chooses not to honor such request, they shall provide the Owner with a timely written explanation of their actions.

F. Testing Agency Responsibilities.

1. The Independent Testing Agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Specification sections shall cooperate with the Architect and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.
2. The agency shall notify the Owner, Architect/Engineer, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services. The Agency shall send copies of all reports directly to each party listed above.
3. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents.
4. The agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
5. The agency shall submit a certified written report of each inspection, test or similar service, to the Architect/Engineer, Program Manager, Owner's Representative, and the Construction Manager.

**01 45 23 Testing and Inspection Services**

Description

- A. The Contractor shall allow in his proposal the coordination and supervision of tests to be performed by an independent laboratory selected by the Owner.
- B. All testing laboratory services shall be provided and paid for by the Owner outside of this Contract.
- C. A testing lab shall be selected by the Owner, and the Contractor shall be notified as soon as possible.
- D. The Contractor shall cooperate with the testing laboratory in all matters pertaining to the work. The Owner retains the option to add to or delete any or all testing specified herein.

Duties of the Testing Laboratories

- A. The testing laboratory shall provide testing services under a separate agreement with the Owner or Architect, who shall be responsible for the costs of initial testing – pass or fail.
  - 01 The Contractor shall be responsible for costs of all re-tests required to achieve passing results.
  - 02 The Contractor shall be responsible for charges of the testing lab for expenses incurred for cancelled and / or mis-scheduled testing requests.
  - 03 The testing lab shall invoice Contractor direct for all re-tests of failed initial tests; and send copies of the invoices to the Architect and Owner for record.

- 04 The testing lab and Contractor shall be responsible to negotiate and execute a separate agreement if required by the testing lab for charges described above.
- B. The laboratory is not authorized to revoke, alter, relax, enlarge, or release any requirement of the Specifications, or to approve or accept any portion of the work.
  - 01 When it appears that the material furnished or work performed by the Contractor fails to fulfill specification requirements, the testing laboratory shall promptly notify the Contractor, Architect and Owner of work being tested of such deficiencies.
- C. The laboratory shall promptly distribute copies of the laboratory test and inspection reports. Standard distribution shall include copies of all reports to the Owner, Architect, and Contractor.
  - 01 The structural engineer, civil engineer, MEP engineer, concrete supplier, and any outside consultants shall receive copies of the testing results regarding their particular phase of the project.
  - 02 Electronic distribution of test reports / results is mandatory.
- D. The testing lab is required to furnish a report of the status of testing performed as it relates to anticipated expenses described in the Agreement with the testing lab. Reports shall be furnished at most bi-monthly to the Owner and Architect.
  - 01 Report information shall include verification that Owner paid testing progress corresponds with anticipated expenses.
  - 02 The testing lab shall be required to notify the Architect and Owner immediately if / when the testing lab anticipates exceeding the lump sum fee agreed to by the Owner.
  - 03 Such notification must occur prior to expensing 75% of the testing lab fee.

#### Testing Laboratory Contractual Relationships

- A. The Owner shall contract with the Testing Laboratory outside the Owner-Contractor Agreement.
- B. The Owner shall pay for the initial laboratory services / tests – pass or fail.
- C. In the case of a failed test that does not meet the specified requirements, the Contractor shall be responsible for payment directly to the Testing Laboratory for all services / re-testing required to achieve a passing result.
  - 01 The Owner shall not be invoiced for services or re-testing associated with failed initial tests.
- D. The Owner shall not be responsible for Contractor's mismanagement or mis-scheduling of the Testing Laboratory that results in cost to the Testing Laboratory that do not result in Testing Laboratory performing its intended function (i.e. Contractor cancellation of Testing Laboratory services previously called for).
- E. The Testing Laboratory record and document all retesting of failed initial tests and charges due to the mismanagement or mis-scheduling of the Contractor.
- F. The Testing Laboratory is responsible for making separate arrangements with the Contractor for invoicing reimbursement of mismanaged services and re-testing associated with failed initial tests. Such expenses shall not be invoiced to the Owner.

## Testing Laboratory Guidelines and Procedures

- A. Technicians scheduled to perform specific testing services must be qualified to review and perform other services that overlap (i.e., earthwork, foundation inspections, rebar inspection, and concrete), when scheduled concurrently at the project site.
- B. Technician time for services performed will be reimbursed at a regular time rate. Compensation at the overtime rate will be considered for any hours over eight hours spent at the job site on a single day, field testing services performed on a Saturday or Sunday, and any field services performed on a recognized holiday.
- C. Concrete design mixes will receive a cursory review with any discrepancies reported to the Architect.
- D. Nuclear density testing will be based on a daily rental rate for the actual testing equipment; compensation on a per test basis will not be considered.
- E. Report distribution shall include the Owner, Architect, Contractor, Civil Engineer, Structural Engineer, and others requesting or requiring review of the specific testing results.
- F. Job site trips solely for cylinder pick-up shall be minimized. Whenever possible, cylinder / specimen pick-up shall be conducted when a technician is scheduled to be on-site for other testing work.
- G. The Contractor shall bear the responsibility of scheduling all testing services. The Contractor and the testing laboratory shall assume full responsibility to coordinate the testing services. Cancellations and/or failed tests will be reimbursable to the Owner by the responsible party for the cancellation or failure of a test or service.

## References

### A. Earthwork:

- 01 ASTM D4318-10 – Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils
- 02 ASTM D698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.
- 03 ASTM D6938-10 – Standard Test Method for In-Place Density and Water Content of Soil-Aggregate by Nuclear Method (shallow Depth)
- 04 AASHTO T89 – Determining the Liquid Limit of Soils
- 05 AASHTO T90 – Determining the Plastic Limit and Plasticity Index of Soils
- 06 AASHTO T99 – Moisture-Density Relations of Soils

### B. Concrete:

- 01 ASTM C31/C 31M – Standard Practice for Making and Curing Concrete Test Specimens in the Field.
- 02 ASTM C138 – Standard Test Method for Density (Unity Weight), Yield, and Air Content (Gravimetric) of Concrete.
- 03 ASTM C143 – Standard Test method for Slump of Hydraulic Cement Concrete.
- 04 ASTM C173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
- 05 ASTM C231 – Standard Test method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- 06 ASTM C1064 – Standard Test Method for Temperature of Freshly Mixed Hydraulic-Mixed Cement Concrete.
- 07 ACI 301 – Specifications for Structural Concrete for Buildings.

## Tests Conducted

- A. Earthwork:
- 01 Existing subgrade under building slabs and paving: In-place density tests for each 2,500 SF, or fraction thereof.
  - 02 Select earth fill at building pad: In-place density tests for each 2,500 SF, or fraction thereof, of each compacted lift.
  - 03 Proctor curve for one type of fill material. If the original choice of material does not meet the specifications, the Contractor shall pay for additional testing.
  - 04 Liquid limit of fill material.
  - 05 Plastic limit and plasticity index of fill material.
  - 06 Perform moisture content tests for each 5,000 SF of building pad immediately prior to placement of under-slab vapor membrane.
  - 07 Earth fill at new paving: In-place density tests for each 4,000 SF, or fraction thereof, of each compacted lift.
  - 08 Proctor curve for one type of fill material. If the original choice of material does not meet the specifications, the Contractor shall pay for additional testing.
  - 09 Liquid limit of fill material.
  - 10 Plastic limit and plasticity index of fill material.
  - 11 Trenching and Backfilling: In-place density tests for each 100 LF, or fraction thereof, of each compacted lift.
  - 12 Soil Stabilization: Various tests relative to the requirements of Texas Highway Department Standard Specification for Construction of Highways, Streets and Bridges.
- B. Cast-In-Place Concrete:
- 01 Review proposed concrete design mixes.
  - 02 Provide full time services for the review of all drilled pier excavation and placement of concrete.
    - a. Include a daily report noting grid lines and locations of each pier drilled.
    - b. After the drilled pier shaft has been drilled, the lab shall test an undisturbed sample and verify that it meets or exceeds the design specification.
  - 03 Provide on-site services for each concrete pour at all structural building concrete grade beams, slab on grade, columns, and other miscellaneous structural concrete.
    - a. Included within this scope of work is the review of all the rebar placement, size, spacing of stirrups, and miscellaneous placement requirements.
  - 04 Cast four (4) concrete test cylinders for every 50 cubic yards or fraction thereof, placed on any day for structural concrete.
  - 05 Cast four (4) concrete test cylinders for each 100 cubic yards, or fraction thereof, placed on any day for all other types of concrete.
  - 06 Strength level of an individual class of concrete shall be considered satisfactory when both of the following criteria are met:
    - a. The arithmetic average of any three consecutive strength tests equal or exceed f'c.
    - b. No individual strength test (average of two cylinders) falls below f'c by more than 500 psi.
  - 07 Conduct slump testing of concrete at intervals equal to test cylinders are made.
- C. Test Specimens:
- 01 Concrete Cylinder Specimens: Break one (1) at 7 days and two (2) at 28 days. If the 28 day break average exceeds minimum specified requirements, discard the fourth cylinder. If the 28 day break average is below specified minimum, hold and break the fourth cylinder at 56 days; or process as directed by the structural Engineer.
  - 02 Grout Specimens: Break one (1) at 7 days and two (2) at 28 days. If the 28 day break average exceeds minimum specified requirements, discard the fourth cylinder. If the 28 day break average is below specified minimum, hold and break the fourth cylinder at 56 days; or process as directed by the structural Engineer.

## **Governmental Inspections**

- A. The Contractor shall allow in his Proposal the application, coordination, scheduling and cost of all on-site inspections to be performed by governmental authorities having jurisdiction which are required for approval of the Work and occupancy of the building; including, but limited to:
  - 01 City departments
  - 02 County departments
  - 03 Flood Control Districts
  - 04 Municipal Utility Districts
  - 05 Health Departments
  - 06 Fire Marshal Offices
- B. The Contractor shall also cooperate with Owner for all observations required by the Owner.
- C. The Contractor shall make all corrective measures in accordance with instructions received from the governing authority inspector having jurisdiction, as required to receive 100% approval for the work being inspected.
- D. The Contractor shall record and keep record of all governmental agency tests and inspections; including deficiencies noted by the agency, and corrective action(s) taken to receive final approval of the agency.
- E. The Contractor shall bear all costs for initial inspections, re-inspections and any other expenses related to on-site inspections made by governing authorities.
- F. No allowance shall be made for additional Contract Time, nor an increase in the Contract Sum for any unanticipated expenses or delays resulting from failed governmental inspection or resulting re-inspections required to obtain agency approval(s).

## **Below Slab Sanitary Sewer Testing**

- A. In addition to normal industry / governmental testing required for the sanitary sewer system, Contractor shall allow in his Proposal the application, coordination, scheduling and cost to provide a static water test(s) as described below.
- B. The contractor shall perform a static pressure test on all sanitary sewer piping systems below the building slab.
- C. The test(s) shall be maintained continuously from the time the pipe installation is initially tested prior to final cover-up, and continue throughout all foundation preparation and placement of concrete slabs; and terminating a minimum of seven (7) days after the placement of concrete slabs.
- D. Maintain sealed caps on all stub-ups to prevent dissipation of water within the piping system.
- E. Any failure of the static testing indicating leakage during the above period shall be immediately reported to the Architect, MEP Engineer and Owner.
- F. The Contractor shall be responsible for all corrective measures necessary to repair and / or replace defecting piping as directed by the Architect.



### **General Owner Consultant Observations/Inspections**

- A. Throughout the progress of the Work, the Owner's A/E consultants shall make regular site visits and prepare observation reports.
- B. Refer to specification section 01 3129 – Notification of Architect Requirements for specific observations required by the Architect, and the scheduling of such observations.
- C. Contractor and A/E requested subcontractors shall be present for all A/E observations. Coordinate with A/E field representatives as required.
- D. Contractor shall coordinate all trades as required to address issue or deficiencies identified on the observation reports.
- E. Upon completion of corrective measures, Contractor shall note corrective measures, including date(s) on the observation report(s) and distribute the Architect.

### **TX Department of Licensing and Regulation (TDLR)**

- A. The Owner /Architect shall be responsible for interfacing with Texas Department of Licensing and Registration (TDLR) regarding state approval for compliance with Texas Accessibility Standards.
- B. The Owner /Architect shall make the initial submission of the Contract Documents for review.
- C. TAS review comments affecting the Work shall be incorporated into the Work as directed by the Architect either by Addendum, Change Proposal Request, Minor Change or Clarification.
- D. During the progress of the Work, the Contractor shall bring to the Architect's attention any portion of the Work that may be questionably compliant with TDLR / TAS.
- E. The Architect shall coordinate and manage the TAS inspection of the completed project.
  - 01 TAS required corrective measures due to design issues shall be paid for by the Owner.
  - 02 TAS required corrective issues due to Contractor issues (materials, installation, etc.) shall be paid for by the Contractor.
- F. All corrective work shall be completed within thirty (30) days after notification unless otherwise agreed upon by the Owner.

### **01 45 23.13 Observation Procedures**

- A. Scope of Work: the Contractor shall coordinate and cooperate with Architect and Consultants as required for on-site.
- B. Related Work:
  - b. 01 Section 01 31 29 – Notification of Architect Requirements
  - 02 Section 01 45 23 – Testing and Inspection Services
- C. Related Requirements:

- 01 Coordination, scheduling and implementation of inspections and testing required by laws, ordinances, rules, regulations, orders or approvals, or public authorities required for interim and final approval of the Work shall be the sole responsibility of the Contractor.
- 02 Contractor shall maintain a log of all required governmental interim and final inspections throughout the progress of the Work.

D. General Info

- 02 Throughout the progress of the Work, the Owner's A/E consultants shall make regular site visits and prepare observation reports.
- 03 Contractor and requested subcontractors shall be present for all A/E observations. Coordinate with A/E field representatives as required.
- 04 Contractor shall coordinate all trades as required to address issue or deficiencies identified on the observation reports.

E. Observation Reports:

- 05 Upon completion of on-site observations by the Architect and Architect's Consultants, documentation of the Observation shall be furnished to the Contractor.
- 06 Observation report items that reflect instructions for corrective measures shall be addressed / corrected by the Contractor in a timely manner.
- 07 Upon completion of corrective measures, Contractor shall detail corrective measures, including date(s) of work and date(s) of Contractor's verification of completeness on the observation report(s) and return a copy the Architect and Consultant as appropriate.
- 08 Wherever possible, Contractor's written documentation shall include all corrective work identified to be addressed on the observation report. Minimize piece meal responses as much as possible.
- 09 A complete history of Contractor's observation responses shall be required to be submitted as a condition of project close-out.

F. Project Consultant Observations:

- a. The Contractor shall allow in his Proposal the coordination and scheduling of Observations to be performed by the Owner's project consultants; including the Architect, MEP Engineer, Structural Engineer, Food Service Consultant, Theater Consultant, and Special Systems Consultants as they may apply to this Work.
- b. All project consultant observation services shall be performed by designees of the relative consultant; upon which the Contractor may rely as to the capability and thoroughness of the observation being performed. Upon request by the Contractor, the names of A/E field representatives performing specific observations shall be furnished by the Architect.
- c. The Owner shall pay for the observation services of the project consultants in accordance with the Owner – Architect Agreement and the requirements of the Contract Documents. Excessive observations and re-observations resulting from the Contractor's actions as described in this section, shall be paid for by the Contractor directly to the affected Consultant.
- d. The Contractor shall cooperate with the Owner's project consultants in all matters pertaining to required observations of the work as described in the Contract Documents. The Owner retains the option to add to or delete any or all observations specified herein; and thereby accept the relative work without observation.

- G. Authorities and Duties of the A/E/ Field Representatives
- 01 The project consultant representatives are not authorized to revoke, alter, relax, increase, or release the Contractor from any requirement of the Contract Documents without written notice furnished to the Contractor by the Architect.
- 02 When it appears that the material, assembly or work performed by the Contractor fails to fulfill Contract requirements, the project consultant representative shall promptly notify the General Contractor, Architect and Owner.
- 03 The project consultant representative(s) shall promptly distribute copies of the observation reports. Standard distribution shall include copies of all reports to the Owner, Architect, and General Contractor.
- H. Project Consultant Observation Guidelines and Procedures
- 01 Project Consultants shall make all observations required in the Contract Documents and requested by the Contractor and Owner.
- 02 For each material, assembly or phase observation required in the Contract Documents, and upon request by the Contractor, the project consultant(s) shall perform the following observations as required in the Owner – Architect Agreement; and shall be at the expense of the Owner in accordance with the Owner – Architect Agreement.:
- a. Initial observation to determine compliance with the Contract Documents.
  - b. Observation to determine deficiencies where the initial observation results do not show 100% compliance with the Contract Documents. At the consultant's discretion, this observation may be performed concurrent with the initial observation.
  - c. Re-observation to determine 100% compliance with the Contract Documents.
- 03 In the event the observation series described above does not result in 100% approval of the material, assembly or phase being inspected, all subsequent re-observations required to achieve 100% approval shall be at the sole expense of the Contractor to be paid directly to the project consultant based on the consultant's standard hourly rates for time expended, including travel to and from the site.
- 04 Recognizing the size and complexity of work included in a project may be sufficiently large enough to require the project to be divided into scope areas, each such area shall be considered separate and stand-alone with respect to paragraph 3.4-B above.
- a. Requests by the Contractor for project consultant observations of partial scope completion areas shall be considered observations of the entire scope area with respect to paragraph 3.4-B above; and subsequent observations of the remaining portions of the same scope area shall be paid for directly to the Consultant by the Contractor.
  - b. Consultants shall invoice the Contractor on a monthly basis, and payment shall be due upon the Contractor's receipt of the invoice.
- 05 The Contractor shall bear the responsibility of requesting and scheduling all project consultant observations required by the Contract Documents. The Contractor shall give the project consultant a minimum of forty-eight (48) hours' notice prior to the requested observation.
- a. No extension of Contract Time shall be granted for untimely observations due to the Contractor's failure of proper observation request notification.
- 06 Observations voluntarily made by project consultants at their discretion, not specifically requested by the Contractor, shall not count as one of the observations described in paragraph 3.4-B above, nor shall the Contractor be liable for any related expenses.

## **01 50 00 Temporary Facilities and Controls**

### A. General.

1. Comply with industry standards and applicable laws and regulations of authorities having jurisdiction.
2. Keep temporary services and facilities clean and neat in appearance. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.
3. All temporary facilities and controls for the project shall be enumerated in the Contractor's General Conditions document.
4. Protect all improvements and vegetation not included in the contract from damage resulting from construction activities. In the event damage occurs to improvements or vegetation outside the limits of the contract, the Contractor shall repair/replace or be assessed a charge at the discretion of the Owner's Designated Representative.

### B. Temporary Utilities.

1. Prepare a schedule indicating dates for implementation and termination of each temporary utility.
2. Connection to the service shall be the responsibility of the Contractor, with Owner's approval.
3. Contractor shall not shut down utilities. Coordinate requested outages with fourteen days in advance of intended service interruptions with the Owner's Project Manager to allow for coordination with Stakeholders.
4. At the earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of the permanent service.

### C. Temporary Facilities.

1. Provide and maintain adequate support facilities for the use of all persons employed on the Work during construction. (The use of existing College facilities will not be allowed without Owner's written approval.)
2. Provide barriers and fencing to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage. For renovation activities, provide temporary floor to ceiling partitions (not plastic sheeting) as required to separate and protect work areas from College occupied areas.

### D. Contractor is permitted to post one project identification sign acceptable to Owner.

## **01 55 19 Temporary Parking Areas**

- A. Temporary Parking Areas will be approved by the Owner's Representative before being used and will be as indicated in the Project Specific Site Logistics and Traffic Management Plan.

## **01 57 10 NPDES Requirements**

- A. Requirements for documentation to be prepared and signed by Contractor before conducting construction operations, in accordance with terms and conditions of National Pollutant Discharge Elimination System (NPDES) Permit as stated in the Federal Register Vol. 57 No 175, issued by the Environmental Protection Agency on September 9, 1992.

- B. Contractor's responsibility for implement, maintain and inspect storm water pollution prevention control measures including but not limited to, erosion and sediment controls, storm water management plans, waste collection and disposal, off-site vehicle tracking, and similar other practices shown on the Drawings or specified elsewhere in this or other Specifications.
- C. Meet with the Owner's Representative and Architect/Engineer to review implementation of the Storm Water Pollution Prevention Plan (SWPPP) prior to proceeding with earthwork operations
- D. See related work referenced on civil drawings.
- E. Notice of Intent: Contractor shall fill out, sign, and date Contractor's Notice of Intent (NOI) attached as Figure 1 at the end of this Section. Return signed copy of the Contractor's NOI to Owner. Owner will complete Owner's Notice of Intent attached as Figure 2 and will submit both notices to the EPA. Submission of the NOI's is required by both Owner and Contractor before start of construction operations.
- F. Retention of Records: Keep a copy of the Storm Water Pollution Prevention Plan at the construction site or at Contractor's office from date that it became effective to the date of project completion. At Project close-out, Contractor shall submit to Owner all NPDES forms and a copy of the SWPPP. Storm water pollution prevention records and date will be retained by Owner for a period of 3 years from Date of Final Completion.
- G. Required Notices: Post the following notices from the date that this SWPPP goes into effect until the date of final site stabilization:
  - 01. Copies of the Notices of Intent submitted by the Owner and Contractor and a brief project description, as given in Paragraph 1.1 of the SWPPP, shall be posted at the construction site or at Contractor's office in a prominent place for public viewing.
  - 02. Notice to drivers of equipment and vehicles, instructing them to stop, check and clean tires of debris and mud before driving onto traffic lanes. Post such notices at every construction exit area.
  - 03. In an easily visible location on site, post a notice of waste disposal procedures.
  - 04. Notice of hazardous material handling and emergency procedures shall be posted with the NOI on site. Keep copies of Material Safety Data Sheets at a location on site that is known to all personnel.
- H. See NPDES Form 3510-6 - EPA Notice of Intent for Storm Water Discharges Associated with Industrial Activity Under a NPDES General Permit and the Instructions for EPA Form 3510-6.

**01 57 40 Reinforced Filter Fabric Barrier**

- A. Section includes installation of reinforced filter fabric barriers for erosion and sediment control used during construction until final development of Site. Use reinforced filter fabric barriers to retain sedimentation in channelized flow areas.
- B. See related work referenced on civil drawings.
- C. References:
  - 01. ASTM D3786 - Standard Test Method for Hydraulic Bursting Strength for Knitted goods and Nonwoven Fabrics
  - 02. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
- D. Submittals:

01. Submit manufacturer's catalog sheet and other product data on geotextile fabric
- E. Filter Fabric Material: Provide woven or nonwoven geotextile filter fabric of polypropylene, polyethylene, ethylene, or polyamide material; Mirafi 140NS or equivalent accepted by Architect.
01. Provide filter fabric with minimum grab strength of 100 psi in any principal direction, Mullen burst strength exceeding 200 psi and equivalent opening size between 50 and 14a.
  02. Provide filter fabric with ultraviolet inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature of 0°F to 120°F.
- F. Fencing: Provide galvanized welded steel wire fence with minimum thickness of 14 gages and a maximum mesh spacing of 6 inches. Provide galvanized 2 inch x 4 inch welded wire fabric, 12 ½ gage.
- G. Preparation and Installation:
01. Provide erosion and sediment control systems at locations shown on the Storm Water Pollution Prevention Plan (SWPPP) and specified in this Section.
  02. No clearing and grubbing or rough cutting shall be permitted until erosion and sediment control systems are in place, other than as specifically directed by the Architect/Engineer to allow soil testing and surveying.
  03. Maintain existing erosion and sediment control systems located within the project site until acceptance of the project or until directed by the Architect/Engineer to remove and discard the existing system.
  04. Regularly inspect and repair or replace damaged components of reinforced filter fabric barrier as specified in this Section. Unless otherwise directed, maintain the erosion and sediment control systems until project area stabilization is accepted by the Engineer/Owner. Remove erosion and sediment control systems promptly when directed by Engineer/Owner. Discard removed materials off site.
  05. Remove sediment deposits and dispose of them at designated spoil site for project. If a project spoil site is not designated on the Storm Water Pollution Prevention Plan (SWPPP), dispose of sediment off Site at a location not in or adjacent to a stream or flood plain. Off-Site disposal is the responsibility of Contractor. Sediment to be placed at the project site should be spread evenly throughout site, compacted and stabilized. Sediment shall not be allowed to flush into a stream or drainage way. If sediment has been contaminated, it shall be disposed of in accordance with existing federal, state, and local rules and regulations.
  06. Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Damage caused by construction traffic to erosion and sediment control systems shall be repaired immediately.
  07. Conduct all construction operations under this Contract in conformance with the erosion control practices described in Section 015720 - Erosion and Sedimentation Source Controls.
- H. Filter Fabric Fence Construction and Monitoring:
01. Provide filter fabric barriers in accordance with the Storm Water Pollution Prevention Plan (SWPPP) drawing detail for Reinforced Filter Fabric Barrier. Filter fabric barrier systems shall be installed in such a manner that surface runoff will percolate through the system in sheet flow fashion and allow sediment to be retained and accumulated.
  02. Attach woven wire support to 1-inch by 2-inch wooden stakes spaced a maximum of 6 feet apart and embedded a minimum of 8 inches. Install wooden stakes at a slight angle toward the source of the anticipated runoff.
  03. Trench in toe of filter fabric barrier with a spade or mechanical trencher so that downward face of trench is flat and perpendicular to direction of flow as shown on the Storm Water Pollution Prevention Plan (SWPPP) Drawings. Lay filter fabric along the edges of the trench. Backfill and compact trench.

04. Securely fasten the filter fabric material to the woven wire with tie wires.
05. Reinforced filter fabric barrier shall have a height of 18 inches.
06. Provide filter fabric in continuous rolls and cut to the length of fence to minimize joints. When joints are necessary, splice fabric together only at support posts with a minimum 6-inch overlap and seal securely.
07. Inspect reinforced filter fabric barrier systems after each rainfall, daily during periods of prolonged rainfall, and at a minimum once each week. Repair or replace damaged sections immediately. Remove sediment deposits when silt reaches a depth one-third the height of the barrier or 6 inches, whichever is less.

#### **01 64 00 Owner-Furnished Products**

- A. Owner will furnish material and equipment to be incorporated into the Work by the Contractor as noted on plans.

#### **01 70 00 Execution and Closeout Requirements**

- A. The work shall be executed according the concepts of "Continuous Audit, Continuous Punch, and Continuous Close." Accordingly, it is expected that all administrative issues and execution deficiencies be promptly resolved with the intent being that final payment may be within 60 days of project completion.

#### **01 74 19 Construction Waste Management and Disposal**

- A. This Project shall generate the least amount of waste possible. Processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.
- B. Develop and execute a Site Housekeeping and Waste Management Plan for this Project for approval by Owner's Project Manager.

#### **01 76 00 Protecting Installed Construction**

- A. Any Component / System that is damaged, including but not limited to accidents or misuse resulting in scratches, dents, abrasions etc., shall be repaired back to "like new condition", otherwise the same equipment shall be replaced with new equipment prior to "Final Acceptance" to the satisfaction of the Owner's Project Manager. This applies to all installed construction, including general finishes, mechanical and electrical devices, equipment and systems, regardless of acceptance for use during Construction.
- B. The Contractor shall only use permanent equipment as specified in the Contract Documents. Specific requests to use permanent equipment other than what is specified in the Contract Documents must first be approved by the Owner's Project Manager, A/E and Commissioning Authority prior to such use. This includes the use of devices, equipment and systems, such as elevators or HVAC equipment, during any phase of construction prior to "Final Acceptance."
- C. All equipment warranties shall be adjusted and / or extended to not affect the normal minimum expected warranty duration as expressed or implied within this project in accordance with the Base Bid requirements and without additional cost to the project or the College unless

otherwise approved by the Owner's Project Manager.

## **01 77 00 Project Closeout Procedures**

### 1.1. RELATED DOCUMENTS

- A. Provisions established within the General and Supplementary General Conditions for all Sections of Division 01 - General Requirements, other applicable Sections of all Divisions of Specifications, and the Drawings are collectively applicable to this Section. In the event of conflict between specific requirements of the various documents, the more restrictive and more extensive requirement shall govern.

### 1.2 SECTION OVERVIEW

- A. General Description of Closeout Requirements
- B. Requirements for Substantial Completion
- C. Provisions for Release of Retainage
- D. Requirements for Final Acceptance
- E. Required Project Record Documents
- F. Project Cleaning

### 1.3. GENERAL DESCRIPTION OF CLOSEOUT REQUIREMENTS

- A. DEFINITION: Project Closeout is hereby defined to include requirements near the end of the Contract Time, in preparation for substantial completion acceptance, occupancy by Owner, release of retainage, final acceptance, final payment, and similar actions evidencing completion of the work. Specific additional requirements for individual units of work are specified in Sections of Divisions 02 - 3.
- B. TIME of closeout is directly related to completion and acceptance by the Owner, and therefore may be either a single time period for the entire project, or a series of time periods for individual portions or phases of the project that have been certified as substantially complete at different dates.
- C. This Section is based on completion and acceptance of the entire project during a single time period.
  - 1. If the project is to be accepted in phases, whether by originally specified project scope or by subsequent agreement between the parties, then Project Closeout requirements shall pertain



to each separately accepted portion or phase of the project; unless by written notice the Owner allows for these requirements to be done singularly upon anticipated acceptance of the final phase.

- D. RECORD DOCUMENTS for Project Closeout must be submitted in hard copy and electronically and are required at substantial completion. These documents include but are not necessarily limited to the following drafts:
1. As-Built Record Drawings.
  2. As-Built Record Specifications.
  3. Operating & Maintenance Manuals.
  4. Record Approved Submittals and Samples.
  5. Certification that No Asbestos Products are incorporated into the Project
  6. Completed Punch Lists signed off by Designer, Contractor, and Owner
- E. REQUIRED DOCUMENTS for final payment to be released include final versions of all of the above and the following in hard copy and electronic format:
1. Final Release of Claims & Liens
  2. Affidavit of payment of Debt and Claims
  3. Consent(s) of Surety
  4. Completed Commissioning and Closeout Manual
  5. Certificate of Occupancy

#### 1.4. REQUIREMENTS FOR SUBSTANTIAL COMPLETION

- A. Prior to requesting Designer and Owner to schedule a Substantial Completion, or Pre-Final, inspection (for either the entire work or portions thereof as agreed to by the parties to the contract); complete the following and list known exceptions in request.
1. Progress payment requests coinciding with the period of time anticipated for substantial completion, should reflect a minimum of 95% completion for all applicable work.
  2. Submit to Designer and Owner a complete copy of the Contractor's most current punch list covering the portion(s) of the Project claimed as substantially complete.
    - a. Such punch lists shall indicate the dates of re-checks and include the review person's name and signed off along with the schedule for completion of work items remaining.
    - b. All items remaining outstanding on the Contractor's punch list shall include a projected date of completion and/or correction with an explanation of why such is not presently completed.
  3. Submit to Designer for review the full set of as-built blue line marked-up record drawings and marked-up record specifications as described later in this Section.
  4. Submit to Designer for review the preliminary copies of Owner's Operating and Maintenance (O&M) Manuals as described later in this Section.
  5. Provide access to Contractor's copy of the Commissioning and Closeout Manual for review by Owner and Designer. The Manual shall be up to date before the Substantial Completion inspection can be requested.
  6. Submit certification statement that no asbestos containing materials have been used or incorporated into the project.
  7. Obtain and submit releases enabling Owner's full and unrestricted use of the work and access to services and utilities, including (where applicable) operating certificates, Certificates of Occupancy and similar releases.
  8. Deliver tools, spare parts, extra stocks of materials, and similar physical items to Owner. These will be delivered with an attached transmittal with a completed listing of what is

being transmitted, signed by the Contractor and the Owner's Representative.

- B. If Owner intends to occupy Project upon Substantial Completion Acceptance, Contractor shall make provisions for final changeover of locks with the Owner's personnel. Upon written directive from Owner, this task may be waived until final acceptance for the convenience of the Contractor in completing punch list activity.
- C. Complete instructions of Owner's personnel for all systems and equipment serving the areas claimed as substantially complete, for which Owner Training was not completed in association with system demonstrations and inspections. Refer also to Section 01 91 13 - Project Commissioning.
- D. Complete initial clean up requirements as described later in this Section for the entire portion of the Project claimed as substantially complete. Touch up and otherwise repair and restore marred exposed finishes.
- E. Substantial Completion Inspection Procedure
  - 1. The Contractor shall ensure the work is ready for inspection and/or re-inspection. If the work is found not to be as stated in the Contractor's punch list or the items have not been substantially corrected/completed; the inspection will be terminated and all costs incurred the Owner and the Design Team will be the responsibility of the Contractor.

#### 1.5. PROVISIONS FOR RELEASE OF RETAINAGE

- A. Refer to Division 01 29 00 – Payment Procedures
- B. Release of any retainage, or reduction in amount of retainage withheld, is strictly at the discretion of the Owner, regardless of Contractor compliance with requirements. All of the requirements noted for Substantial Completion Acceptance must be completed prior to application for final release of contract retainage. In addition, meet the following requirements:
  - 1. Submit affidavits of final release of claim and lien from each subcontractor and supplier who provided materials and/or labor to the Project.
  - 2. Submit affidavit that all bills for the Project have been paid, or will be paid within thirty (30) days of Contractor receipt of payment.
  - 3. Submit Consent of Surety to Release of Retainage.

#### 1.6. REQUIREMENTS FOR FINAL ACCEPTANCE

- A. Prior to requesting Designer and Owner to schedule Final Inspection for the Project, complete the following:
  - 1. Prepare draft payment request showing 100% completion for each line item on the Schedule of Values. Submit with this draft all final releases and supporting documentation not previously submitted and accepted. Include Certificates of Insurance where applicable. Note that Final Payment, including final release of retainage, will not be issued until all work (including punch list items) has been completed, all requirements met, a project closeout audit performed (if deemed necessary) and a Final Change Order has been processed if required to resolve final cost or closeout audit issues, including deletion of any remaining contract allowances.
  - 2. Submit copy of Designer's pre-final, or substantial completion, punch list, which includes evidence that each item has been completed or otherwise resolved.
  - 3. Submit final meter readings for utilities, and similar data as of time of substantial completion or when Owner took possession of and responsibility for corresponding

- elements of the work.
4. Submit final record as-built drawings and specifications, one (1) electronic and one (1) hardcopy of operating & maintenance manuals as described later in this Section. This includes specific warranties, maintenance agreements, product certifications and similar documents. Record closeout documentation must be acceptable to Designer and Owner prior to issuance of final payment.
  5. Transmit completed Commissioning and Closeout Manual to the Owner. This manual shall be complete, acknowledging receipt of all attic stock, spare parts, training/demonstration, test reports and any other requirements of the contract documents.
  6. Complete final cleaning requirements, including touch-up of marred surfaces. All interior surfaces will be dust free and in a sanitary condition
  7. Submit final payment request, including the following documentation:
    - a. Consent of Surety
    - b. Release of Liens and Claims
    - c. Affidavit of payment of Debts and Claims
    - d. Completed and signed Notice Of Termination
  8. Revise and submit evidence of final and continuing insurance coverage complying with applicable insurance requirements.

B. Final Acceptance Inspection Procedure

1. Upon compliance with all above noted requirements, and following completion of the work required in the substantial completion punch list, provide written notice to the Designer and Owner that the project is ready for Final Inspection.
2. All Owner and Designer costs for travel and man-hours for additional inspections at either Substantial Completion or Final Acceptance which are required either by failure of the Contractor to complete the noted punch list items, or by erroneous notices that the work is ready for such inspections, will be the responsibility of the Contractor. Such costs will be deleted from the contract amount in Change Order.

1.7. REQUIRED PROJECT RECORD DOCUMENTS

A. AS-Built Record Drawings

1. Do not use record documents for construction purposes; protect from deterioration and loss in a secure location; provide access to record documents for Owner and/or Designer's reference or review during normal working hours.
2. In general terms; the Contractor is to furnish one (1) electronic copy of prints made from the Designer's contract drawings, or subsequent updates thereof, annotated as noted below with actual as-built conditions, one (1) set of blue line prints made from the electronic copy, and the original marked-up blue line prints.
  - a. As-builts are required to show all changes in the work relative to the original contract documents; and show additional information of value to Owner's records, but not indicated in original contract documents.

3. Record as-builts' are to include marked-up copies of contract drawings and specifications, including newly-prepared drawings if any such are applicable or necessary to achieve the intended result, and shop drawings to include all changed conditions issued through addenda and/or change orders.
  - a.. Include marked up product data submittals, field records for variable and concealed conditions such as excavations and foundations, and further; miscellaneous record information on work, which is otherwise recorded only schematically or not at all.
4. Certain individual sections of Divisions 2 through 33 indicate specific requirements, which may clarify requirements of this section. Where a conflict may be perceived to exist, the more restrictive requirement will prevail. There is no intent, however, to require more sets of as-builts' than is indicated herein.

#### 1.8 A. Maintenance of AS-Built Drawings during construction

1. During progress of the work, maintain a blue line set of contract drawings along with specifications and shop drawings in the construction office. Update these drawings weekly, at a minimum, with markup of actual installations, which vary from the work as originally shown.
  - a. Mark whatever drawing is most capable of showing actual physical condition, fully and accurately, and reference all other appearances of this work to the sheet, which was updated. Include cross-reference to the official change number on the updated sheet and all additional sheets where the work is shown.
  - b. Mark with erasable colored pencil, using separate colors where feasible to distinguish between changes for different categories of work at same general location.
  - c. Mark up important additional information, which was either shown schematically or omitted from original drawings. Give particular attention to information on work concealed, which would be difficult to identify or measure and record at a later date.
  - d. Note alternative numbers, change order numbers and similar identification for any change.
  - e. Require each person preparing markup to initial and date markup and indicate name of firm.
  - f. The Contractor shall maintain and have available for review in conjunction with the regular project meetings, a current set of the as-built blue line drawings and specifications marked with "as constructed" information. Availability for review, and acceptability, of both the format and the content is a prerequisite condition for certification of monthly pay requests by the Owner and Designer.

#### 1.8 B. Supplemental Drawings

1. Where marked-up shop drawings are intended for inclusion in the record set, mark cross-reference on contract drawings at corresponding location. Use of shop drawings as supplements to the record as-builts is encouraged for all items which require the larger scale employed on the shop drawings in order to show the work in sufficient detail to be of future use to the Owner.
  - a. Use of such shop drawings is particularly applicable to ductwork and electrical shop drawing layouts. Use of shop drawing supplements is acceptable so long as the following conditions are met:

- 1). Regardless of overall size of the original shop drawings, such will be reproduced electronically of the same size with equivalent borders and titles as the contract drawings and other record as-built drawings. Include project name and number as well as the applicable submittal number.
- 2). The applicable supplemental sheet shall be placed in the set directly behind the contract drawing, which it supplements, with appropriate reference notes on both the applicable contract drawing and all other affected drawings.
- 3). The supplemental document shall be identified as a "Supplementary Record As-Built Drawing" and shall be numbered with an extension to the contract drawing it supplements in a manner acceptable to the Owner.

B. Preparation of final AS-Built Drawings

1. This Section requires that a copy of the marked-up blue line as-builts be submitted to the Designer for review prior to requesting substantial completion inspections.
  - a. Following the Designer's and the Owner's review of the marked-up blue lines, and upon authorization by the Designer based on their belief that the marked-up information is accurate and complete, the Contractor shall proceed with preparation of a full set of professionally drafted record drawings.
2. All record as-built drawings and supplemental shop drawing sheets must be reproduced electronically. This includes the entire set of contract drawings, whether or not individual sheets are affected by as-built data.
3. All drawings shall show the official SJCC project name and number. Further, each drawing, including supplemental drawings, shall also have a stamp to the effect of "Record As-Built" along with the Contractor's certification that such is an accurate reflection of actual as-built conditions. Each certification shall be signed and dated and shall be acceptable to the Owner.
  - a. All drawings shall be the same size as original contract documents.
  - b. All drawings issued as addenda, clarifications and/or change orders shall be incorporated into the record as-built drawing set. Such shall be fully shown on the applicable contract drawing. If supplemental sheets are used, follow the requirements outlined above for supplemental shop drawing sheets.

1.8 C. AS-Built Record Specifications

1. During progress of the work, maintain and update one record copy of specifications at the jobsite, including addenda, change orders and similar modifications issued in printed form during construction, to indicate all significant variations in actual work in comparison with text of specifications as originally issued.
  - a. Give particular attention to substitutions, selection of options, and similar information on work where the exact products used are not clearly identified or readily discernable in the original specifications. Note related record drawing information and product data, where applicable.
  - b. It is not necessary to re-type an entire section if modified, but it is mandatory that all changes to specified materials, installation, warranty, etc. be clearly and fully marked within the applicable specifications section in a manner acceptable to the Designer and the Owner. Such should be reviewed and a documentation procedure established early in the construction period.

2. In association with request for substantial completion inspection, submit the marked-up copy of the Project Specifications to the Designer for review.
3. Once the marked-up Project Specifications are found acceptable by the Designer, and upon his authorization, based on his belief that the marked-up information is accurate and complete; proceed with preparation of a Record Set Project Specifications.
  - a. Neatly transcribe and post all as-built mark-up information to a "clean" copy of the Project Specifications, insuring that similar types of information is annotated in like fashion throughout the Specifications.
4. Once completed, submit both the mark-up site copy of the Project Specifications and the newly prepared Record Project Specifications to the Designer for review and, if acceptable, for subsequent transmittal to the Owner.

C. Operating and Maintenance Manuals

1. In general terms, the Contractor is to organize maintenance-and-operating manual information into suitable sets of manageable size, and bind into individual binders properly tabbed and indexed.
  - a. Such shall include emergency instructions, spare parts listings, warranties, wiring diagrams, inspection procedures, shop drawings, product data, and similar applicable information.
  - b. Such shall be bound in heavy-duty, 3-ring vinyl-covered binders including pocket folders for folded sheet information. Mark binder identification on both front and spine of each binder.
  - c. One (1) complete copy of each bound O&M Manual are required, 2 sets of CD's, and 3 flash drives
2. The requirements of this Section are separate, distinct and in addition to product submittal requirements that may be established by other Sections of the Specifications. Owner's manuals, manufacturer's printed instructions, parts lists, and other submittals required by other Sections of the Specifications may be included in the O&M Manuals provided that they are approved and are formatted in a manner consistent with the requirements of this Section.
  - a. Test data and Commissioning data included in the O&M Manuals need not be duplicated in the Commissioning and Closeout Manual. Test data not pertaining to a particular device or piece of equipment (such as domestic water pipe pressure test reports) shall be inserted in the C&C Manual.
3. Equipment is defined as any mechanism, mechanical, electrical or electronic device, or any combination thereof, which is made up of 2 or more working parts to perform a particular function.
4. When an item of equipment is a packaged unit furnished by one manufacturer and the package as furnished contains proprietary items of equipment obtained from other sources; copies of equipment data as required herein shall be furnished for each item of such equipment as if it had been separately furnished.
5. For general guidance only, the following are examples of equipment, material, and systems for which operating and maintenance data is required:
  - a. Pipe & Fittings Air Handling Units
  - b. Gate Valve Temperature Controls
  - c. Elevators Pumps and Controllers
  - d. Electrical Switchgear Irrigation System
  - e. Light Fixtures Fire Sprinkler
  - f. Transformers Security Systems
  - g. Electric Panel Wall Light Switches

- h. Circuit Breakers Motors & Devices
  - i. Metal Fabrications Telephone Systems
  - j. Pressure Gauges Fume Hoods
  - k. A/C Diffusers Fire Alarm System
  - l. Sterilizers Compressors
  - m. Laboratory Casework Overhead Coiling Doors
  - n. Finish Hardware Access Flooring
  - o. Automatic Door Operators Finish Materials
6. All the applicable data for any one item of equipment or material or system shall be bound together as a package, within a Manual containing like equipment, materials, or systems, as indicated by the appropriate specification division. Each package of data shall be numbered according to the Specification Section governing the particular system.
  7. All data furnished in accordance with this Section shall be submitted on bind able 8-1/2" x 11" sheets or on sheets that are bind able and foldable multiples of 8-1/2" x 11". The bind able edge shall be the left 11" edge.
  8. Waivers to the size requirement may be requested in specific instances upon application in writing to the Designer and Owner with justification for substitution in size.
  9. Material and equipment data required by this Section is intended to include all data necessary for the proper installation, removal, normal operation, emergency operation, startup, shutdown, maintenance, cleaning, adjustment, calibration, lubrication, assembly, disassembly, repair, inspection, trouble shooting and service of the equipment or materials.
  10. The UGC requires that a preliminary copy of all operating and maintenance manuals, in addition to as-built documents, be furnished prior to the Substantial Completion inspection. The Contractor is to accumulate and package the documentation, and submit it to the Designer for review.
  11. The Contractor's submission of a preliminary copy of all O&M Manuals to the Designer for review is a precondition for scheduling of a Substantial Completion Inspection. The Contractor's final submission of these Manuals in an acceptable format (based on review of preliminary copies by the Designer) is a precondition for scheduling of a Final Acceptance Inspection, release of remaining contract retainage, or application for Final Payment.
  12. Equipment Data to be Included in O&M Manuals
    - a. Description of Equipment shall be prepared upon 8-1/2" x 11" forms. Include one such form for each item of equipment. Refer also to the equipment list requirements of Sections 01 91 13 – General Commissioning Requirements, 23 00 00 - General Mechanical and 26 00 00 - General Electrical. The equipment information to be included in the O&M Manuals is as follows:
      - 1). Complete description of item: Such should list basic descriptive terminology first, followed by modifying words to include model, size and weight, flow rate, amperage, voltage, material, etc., as applicable, plan designation, if any, and package serial number
      - 2). Part Number: Manufacturer's and supplier's part number.
      - 3). Quantity: Total quantity of this equipment item installed under this Contract.
      - 4). Specification Paragraph Reference: State the specification section and paragraph under which the item of equipment was procured, and page number.
      - 5). Source: Manufacturer's name and address and supplier's name and address.
      - 6). Serial Number: Complete manufacturer's serial number(s) or other identity symbol(s) as applicable.
      - 7). Location: State the name of the system and/or sub-system in which each

like item of equipment is installed and state the physical location of each like item of equipment by identifying the column grid intersections, as shown on the plans, near which the item is located and also state the room or space title as applicable.

- b. Parts Lists which clearly identifies every part in the item of equipment with the proper manufacturer's name, part nomenclature and number, local source, and list price.
- c. Recommended Spare Parts. Furnish a list of recommended spare parts for each equipment item that will be needed to support that item of equipment for a 12-month period. The quantities of spare parts recommended shall be based upon the quantity of like equipment items installed under the Contract. The recommended spare parts list for each equipment item shall be prepared upon 8-1/2" x 11" forms which contain the following information for each part in columns:
  - 1). Part Description: Complete descriptive nomenclature plus manufacturer's complete model and part number, and list price cost for each part.
  - 2). Quantity Per Assembly: Quantity of listed part that occurs in the item of equipment.
  - 3). Quantity of Equipment Items: Quantity of like equipment items installed under this Contract.
  - 4). Shelf Life: Storage life of part, in months, if the part has limited life.
  - 5). Recommended Quantity: Quantity of part recommended to support the installed quantity of equipment in which the part appears for a period of 12 months.
  - 6). Source for part: Name, address, and phone and FAX number of the nearest supplier for the part.
- d. Contractor's Purchase Order: Copy of Contractor's purchase order for equipment. The copy furnished need only show quantity ordered, part number, equipment description and name and address of vendor who supplied the item
- e. Normal Operating Instructions: Normal operating instructions shall provide sufficient detailed information to permit a journeyman mechanic to adjust, startup, operate and shut down the equipment. Special startup precautions must be noted as well as other action items required before the equipment is put into service.
- f. Emergency Operating Procedures: A detailed description of the sequence of action to be taken in the event of a malfunction of the unit, either to permit a short period of continued operation or emergency shutdown to prevent further damage to the unit and to the system in which it is installed.
- g. Preventive Maintenance: Detailed information to cover routine and special inspection requirements, including field adjustments, inspections for wear, adjustment changes, packing wear, lubrication points, frequency and specific lubrication type required, cleaning of the unit and type solvent to use, and such other measures as are applicable to preventive maintenance program.
- h. Calibration: Detailed data on what to calibrate, how to calibrate, when to calibrate and procedures to enable checking the equipment for reliability or indications as well as data for test equipment, special tools and the location of test points.
- i. Scale and Corrosion Control: Detailed information covering the prevention of and removal of scale and corrosion.
- j. Trouble Shooting Procedures: Detailed information and procedures for detecting and isolating malfunctions and detailed information concerning probable causes and applicable remedies.
- k. Removal and Installation Instructions: Detailed information concerning the logical sequence of steps required to remove and install the item including instructions for



- the use of special tools and equipment.
- l. Disassembly and Assembly Instructions: Detailed illustrations and text to show the logical procedure and provide the instructions necessary to disassemble and assemble the unit properly. The text shall include all checks and special precautions as well as the use of special tools and equipment required to perform the assembly or disassembly.
  - m. Repair Instructions: Detailed repair procedures to bring the equipment up to the required operating standard including instruction for examining equipment and parts for needed repairs and adjustments, and tests or inspections required to determine whether old parts may be reused or must be replaced.
  - n. System Drawings: Detailed drawings, where applicable, that clearly show wiring diagrams, control diagrams, system schematics, pneumatic and fluid flow diagrams, etc., which pertain to the unit function. Drawings are required to show modifications to another manufacturer's standard unit which is incorporated into the assembly or package unit
    - 1). System diagrams shall be provided on multiples of 8-1/2" x 11" format, folded to fit within the Manual. The outer (exposed) face of the folded drawing shall include identification of the system and the specification section that governs its installation and operation.
    - 2). The requirements of this paragraph are separate, distinct, and in addition to similar requirements that may be established by other Sections. Where such system diagrams are required for submittal by other specification sections, the same diagrams will be acceptable for inclusion herein, so long as the diagrams used were approved during the submittal phase and they are reproduced for clarity and to fit the size format of the O&M Manual.
    - 3). The Contractor shall provide diagrammatic drawings for each installed system, which shall show the placement of the system in relation to the building, and the physical location of each item or equipment installed within the system. Each installed item of equipment shown on the drawing will be identified by the equipment item model and/or serial/part number.
    - 4). System drawings may, for purpose of clarity, be prepared upon a major subsystem basis.
    - 5). The drawings may be prepared upon several drawings having referenced match lines.
  - o. Special Tools and Test Equipment: Furnish a detailed list of the special tools and test equipment needed to perform repair and maintenance for each equipment item. The list shall contain the special tool and test equipment part number, size, quantity, price, manufacturer's name and address, and local supplier's name and address.
  - p. Warranties & Guarantees: Bind within the tabbed section for each system, equipment item, or material, an executed copy of the specified warranty/guarantee covering that particular system, equipment item, or material.
    - 1). This is to include both the manufacturer's warranty as specified and the installing contractor's guarantee for workmanship and system operation.
    - 2). This copy of the particular warranty/guarantee is in addition to original signature copies of all project warranties/guarantees bound together separately. This binder shall be transmitted to the Owner when complete.
    - 3). Provide in a separate tabbed section of the O&M Manual a grouping of all project warranties and guarantees as required by various specification sections and other conditions of the Contract. This is to include all specific warranties on manufactured items and installed systems as noted above, in

addition to General Contractor's project warranty and applicable guarantees from all subcontractors and suppliers covering defects in workmanship or manufacture.

- 4). As clarification, it is intended that the Owner be provided with a separate binder containing all original project warranties and including one additional binder with copies of all warranties and guarantees. Also provide a copy of the appropriate warranty in the same section as the equipment (or system) data furnished in individual tabbed sections of the O&M Manuals for convenient reference.
- q. Training of Owner Personnel: Documentation of training of Owner's Personnel regarding operation of particular systems shall be included within the tabbed section for that particular system. Such documentation shall include identification of parties receiving training and date(s) of such training.

#### G. Miscellaneous Record Information

1. The following shall be bound in like manner to above noted equipment data and system drawings. It is suggested that a separate tabbed section be included in the Commissioning and Closeout Manual for these Miscellaneous Items. Categories of requirements resulting in miscellaneous work records are recognized to include, but not limited, the following:
  - a. Required field records on excavations, foundations, underground construction, wells and similar work.
  - b. Accurate survey showing locations and elevations of underground lines, including invert elevations of drainage piping.
  - c. Surveys establishing lines and levels of building.
  - d. Plant treatment records (wood, soil, etc)
  - e. Certifications received in lieu of labels on products and similar record documentation.
  - f. Batch mixing and bulk delivery records.
  - g. Testing and qualification of tradesmen.
  - h. Documented qualification of installation firms.
  - i. Load/performance testing.
  - j. Final inspection and deficiency corrections.

#### H. Record Product Submittals

1. During progress of the work, maintain approved copies of each product data submittal and shop drawing, and mark up significant variations in the actual work in comparison with submitted information. Include both variations in product as delivered to site, and variations from manufacturer's instructions and recommendations for installation.
  - a. A separate binder with one copy of all MSDS sheets for all products incorporated into the project shall be maintained during the course of the project. This binder shall be included in the record submittal documents.
2. Give particular attention to concealed products and portions of the work that are not clearly identified in the original submittal or cannot otherwise be readily discerned later by direct observation. Cross reference to change orders and markup of record drawings and specifications.
3. Upon completion of as-built revisions, submit two complete sets of all approved submittals to Designer for review and subsequent transmittal to Owner. Organize and group files in sturdy file boxes with tabbed dividers for each separate specification division. Include a complete table of contents.

4. These record submittal requirements are in addition to inclusion of similar material as supplementary as-built drawings or technical data for the O&M Manuals.

I. Record Sample Submittal

1. Immediately prior to date(s) of substantial completion, arrange for Designer and Owner's representative to meet with Contractor at site to determine which (if any) of the submitted samples or mock-ups maintained by Contractor during progress of the work are to be transmitted to Owner for record purposes.
2. Comply with Designer's instructions for packaging, identification marking, and delivery to Owner's designated location at the Project Site or the Physical Plant.
3. Dispose of other samples in manner specified for disposal of surplus and waste materials, unless otherwise indicated or directed by Designer.

J. Commissioning and Closeout Manual (C&C Manual)

1. The Contractor shall incorporate all commissioning and closeout documentation and/or verification not included in the O&M manuals, into a Manual for transmittal to the Owner at the conclusion of the project. This Manual is intended to be a consolidation of documentation/verification for the project Commissioning and Closeout process.
2. Requirements for production of this manual are found in Section 01 91 00 Project Commissioning.

2.1 PROJECT CLEANING AT SUBSTANTIAL COMPLETION

- A. The Contractor is required to maintain the project and site in a clean and orderly condition throughout the course of construction. In addition to continuous project cleaning, the following requirements are related to project closeout.
- B. Special cleaning for specific units of work may also be specified in other sections of Project Specifications.
- C. Provide an initial cleaning of the work consisting of cleaning each surface or unit of work to normal "clean" condition expected for a first-class building cleaning and maintenance program.
- D. Comply with manufacturer's instructions for cleaning of all system components, equipment, and materials incorporated into the Project.
- E. The following "initial" final cleaning is to be accomplished immediately prior to the time the Contractor requests Substantial Completion Inspection:
  1. Remove labels that are not required as permanent labels.
  2. Clean exposed hard-surfaced finishes, including glass, metals, stone, concrete, painted surfaces, plastics, tile, wood, special coatings, and similar surfaces, to a dirt-free condition, free of dust, stains, films and similar noticeable distracting substances. Restore reflective surfaces to original condition.
  3. Remove debris and surface dust from limited-access spaces including plenums, shafts, and similar spaces.
  4. Clean concrete floors in non-occupied spaces, wet-mop and broom clean.
  5. Clean fixtures and lamps of all dust and debris.

6. Remove crates, cartons and other flammable waste materials or trash from work areas. Building(s) shall be turned over to the Owner free of concealed garbage, trash and rodent infestation. If any of the preceding are revealed, or odors from them occur, they shall be removed by the Contractor at his expense. Restore property to its original condition where no improvements are shown.
7. Elevator shafts, electrical closets, pipe and duct shafts, chases, furred spaces, and similar spaces which are generally unfurnished, shall be cleaned and left free from rubbish, loose plaster, mortar drippings, extraneous construction materials, dirt and dust.
8. Rubbish shall be lowered by way of chutes, taken down on hoists, or lowered in receptacles. Under no circumstances shall any rubbish or waste be dropped or thrown from one level to another within or outside the building(s).
9. Care shall be taken by workmen not to mark, soil or otherwise deface finished surfaces. In the event that finished surfaces become defaced, all costs for cleaning and restoring such surfaces to their originally intended condition shall be the responsibility of the Contractor.

## 2.2 PROJECT CLEANING AT FINAL ACCEPTANCE

- A. The following "final" cleaning is to be accomplished immediately prior to the time the Contractor requests Final Acceptance Inspection:
  1. Clean transparent materials, including mirrors and window/door glass, to a polished condition, removing substances that are noticeable as vision-obscuring materials.
  2. Turn the work over in immaculate condition inside and outside including the premises.
  3. Clean all work on the premises including walks, drives, curbs, paving, fences, grounds and walls. Slick surfaces shall be left with a clear shine. Cleanup shall include removal of smudges, marks, stains, fingerprints, soil, dirt, paint, dust, lint, labels, discolorations and other foreign materials.
  4. Clean all finished surfaces on interior and exterior of project (again) including floors, walls, ceilings, windows, glass, doors, fixtures, hardware and equipment. Final wax and polish all natural finish metal on interior or exterior surfaces. Clean and apply finish (including wax) to all floors as recommended by the manufacturer.
  5. In addition to the cleaning specified above and the more specific cleaning required in various Sections of the Specifications, the building(s) shall be prepared for occupancy by a thorough cleaning throughout, including washing (or cleaning by approved methods) surfaces on which dirt or dust has collected, and by washing glass on both sides. Wash exterior glass using a window-cleaning contractor specializing in such work.
  6. Remove temporary buildings and structures, fences, scaffolding, surplus materials and rubbish of every kind from the site of the work. Repair these areas to be compatible with the surrounding construction finished condition.
  7. Remove all non-natural construction materials and debris, including metal and plastics from landscapes, lawns, and flower beds.

**SECTION 01 21 00.1**  
**ALLOWANCE EXPENDITURE AUTHORIZATION (AEA) FORM**

SJCC Project No: \_\_\_\_\_

Date: \_\_\_\_\_

Allowance For: \_\_\_\_\_

Authorization No. \_\_\_\_\_

Issued To: \_\_\_\_\_

You are authorized to perform the following item(s) of work and to adjust the allowance sum accordingly, as indicated below. This is not a change order and does not increase or decrease the contract amount.

**Work Description:**

Original Allowance Sum:	\$
Allowance Expenditures Prior to This Authorization:	\$
Allowance Balance Prior to This Authorization: Allowance	\$
Sum Will Be Decreased by This Authorization:	\$
New Allowance Balance:	\$

\_\_\_\_\_  
Designer

\_\_\_\_\_  
Date

\_\_\_\_\_  
Contractor

\_\_\_\_\_  
Date

\_\_\_\_\_  
Owner

\_\_\_\_\_  
Date

End of Section

**SECTION 01 25 00.1  
REQUEST FOR SUBSTITUTION FORM**

---

**REQUEST FOR SUBSTITUTION (Attach Additional Pages as Necessary)**

**From:** \_\_\_\_\_

**To:** \_\_\_\_\_  
\_\_\_\_\_

---

**References:** Specification Section: \_\_\_\_\_  
Specified Product Name: \_\_\_\_\_  
Drawing Sheet(s): \_\_\_\_\_

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**Description of Proposed Substitution:** Substitute Product Name: \_\_\_\_\_  
Manufacturer: \_\_\_\_\_ Installer: \_\_\_\_\_  
\_\_\_\_\_ Reason for not providing specified item: \_\_\_\_\_

Differences between proposed substitution and specified product: \_\_\_\_\_  
\_\_\_\_\_

Point-by-point comparative data attached (Required for analysis and review by Architect)

---

**Substitution Product History:**  New Product  2 to 5 Years Old  5 to 10 Years Old  More than 10 Years Old  
Similar Installations of Proposed Product: \_\_\_\_\_  
Project: \_\_\_\_\_  
Project Address: \_\_\_\_\_  
\_\_\_\_\_

---

**Effect of Proposed Substitution:**  
Acceptance of proposed substitute will require the following change in Contract Sum and Contract Time:  
 No Change in Contract Sum  
 Increase Contract Sum By \$ \_\_\_\_\_  
 Decrease Contract Sum By \$ \_\_\_\_\_  
Effect of proposed request for substitution on (Attach additional sheets if necessary):  
Change in Construction Progress Schedule:  No Effect  \_\_\_\_\_  
Changes required in details and construction of related work:  No Change  Yes, Explain: \_\_\_\_\_  
\_\_\_\_\_  
Change in warranty requirements:  No Change  \_\_\_\_\_

---

**Representations by Contractor:**

- a. Substitute item is equivalent or superior to that specified in quality and durability, design, appearance, function, finish, performance, is of size and weight that will permit installation in spaces provided, and that will allow adequate service access;
- b. Substitute item is compatible with other portions of the Work;

- c. Substitute item has been coordinated with other portions of the Work;
  - d. Substitute item has received necessary approvals from authorities having jurisdiction;
  - e. Substitute item is consistent with the Contract Documents and will produce the intended results;
  - f. Substitute item provides specified warranty; and
  - g. If requested substitution involves more than one contractor, or subcontractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors, or subcontractors involved.
- 

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(Signature)

---

(Typed or Printed Name and Title)

---

(Date)

**Section 01 26 53.1**  
**Change Proposal Request Form**

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Project: \_\_\_\_\_ Change Order Request Number: \_\_\_\_\_  
\_\_\_\_\_ From (Contractor): \_\_\_\_\_  
To: \_\_\_\_\_ Date: \_\_\_\_\_  
\_\_\_\_\_ A/E Project Number: \_\_\_\_\_  
Re: \_\_\_\_\_ Contract For: \_\_\_\_\_

---

This Change Order Request (C.O.R.) contains an itemized quotation for changes in the Contract Sum or Contract Time in response to proposed modifications to the Contract Documents based on Proposal Request No. \_\_\_\_\_

---

Description of Proposed Change:

Attached supporting information from:  Subcontractor  Supplier  \_\_\_\_\_  \_\_\_\_\_

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Reason for Change:

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Does Proposed Change involve a change in Contract Sum?  No  Yes [Increase] [Decrease] \$ \_\_\_\_\_  
Does Proposed Change involve a change in Contract Time?  No  Yes [Increase] [Decrease] Days. \_\_\_\_\_

---

Attached pages:  Proposal Worksheet Summary: \_\_\_\_\_  
 Proposal Worksheet Detail(s): \_\_\_\_\_

---

Signed by: \_\_\_\_\_ Date: \_\_\_\_\_

---

Copies:  Owner  Consultants  \_\_\_\_\_  \_\_\_\_\_  \_\_\_\_\_  \_\_\_\_\_  File

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## PERSONNEL MOBILE ELECTRONIC DEVICE PERMIT REQUEST

PROJECT: \_\_\_\_\_

DATE: \_\_\_\_\_

COMPANY: \_\_\_\_\_

EMPLOYEE NAME: \_\_\_\_\_

EMPLOYEE POSITION: \_\_\_\_\_

JUSTIFICATION FOR  
REQUEST: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_.

### AUTHORIZED SIGNATURES

EMPLOYEE: \_\_\_\_\_

COMPANY AGENT: \_\_\_\_\_

CONTRACTOR APPROVAL: \_\_\_\_\_



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**SECTION 02 32 00**

**GEOTECHNICAL INVESTIGATION**

CONDITIONS OF THE CONTRACT, AND DIVISION 1 APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. The Geotechnical Investigation Report is not a part of the Contract Documents, but is included for Contractor's reference and use in determining specific scopes of work required for the complete project.
- B. The Geotechnical Investigation Report specific to this project follows this section and is identified as:
- |    |                  |   |
|----|------------------|---|
| 01 | Entitled:        | Geotechnical Investigation<br>Proposed San Jacinto College<br>Maritime Facility, Phase II<br>Harris County, Texas |
| 01 | Prepared by:     | HTS, Inc.   |
| 02 | HTS Project No.: | 13-S-342  |
| 03 | Dated:           | August 28, 2013   |
| 04 | Total Pages:     | 51  |

**1.2 APPLICABILITY**

- A. The Geotechnical Investigation Report is provided for proposer's general information only. Architect and Owner shall not be held responsible for accuracy of data contained in the geotechnical report.
- 01 Questions or request for additional information regarding the Geotechnical Investigation Report shall be made in writing directly to the Geotechnical Lab and copied to the Architect.
- A. Prior to submission of proposals, Proposers shall visit and acquaint themselves with existing conditions and make any additional investigations they deem necessary to properly propose work and satisfy themselves as to existing subsurface conditions.
- 01 Such investigations shall be performed only under time schedules and arrangements approved in advance by the Owner.
- 02 Upon making on-site observations, the Proposer shall inform the Architect of any discrepancies with the Geotechnical Investigation Report and / or any concerns the Proposer has relative to existing site conditions.
- B. No additional cost will be made available to the successful proposer for work arising from his failure to examine site or subsoil conditions prior to proposing.
- C. The Geotechnical Investigation Report is not a part of the Contract Documents, but is included for Contractor's reference and use in determining specific scopes of work required for the completed project.
- D. A copy of the Geotechnical Investigation Report (51 pages) is attached to this Section.

**SEE ATTACHED REPORT**

**END OF SECTION**

**REPORT  
GEOTECHNICAL INVESTIGATION  
PROPOSED SAN JACINTO COLLEGE  
MARITIME FACILITY, PHASE II  
HARRIS COUNTY, TEXAS**

**PREPARED FOR:**

**San Jacinto College District  
4624 Fairmont Parkway, Suite 207  
Pasadena, Texas 77504-3398**

**PREPARED BY:**

**HTS, Inc. Consultants  
416 Pickering Street  
Houston, Texas 77091-3312**

**HTS Project No.: 13-S-342**

**August 28, 2013**



*Excellence in Engineering, Consulting, Testing and Inspection*

**August 28, 2013**

**San Jacinto College District  
4624 Fairmont Parkway, Suite 207  
Pasadena, Texas 77504-3398**

**Attn: Mr. Larry Logsdon**

**Re: Report  
Geotechnical Investigation  
Proposed San Jacinto College Maritime Facility, Phase II  
Harris County, Texas**

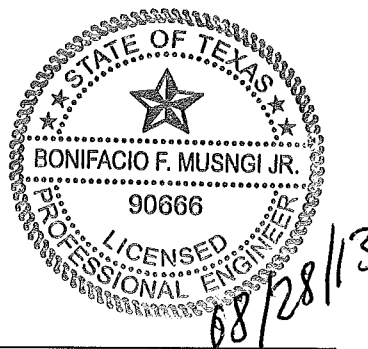
**HTS Project No.: 13-S-342**

**HTS, Inc. Consultants (HTS) is pleased to transmit our geotechnical investigation report for the above referenced project. This report includes the results of field and laboratory testing and geotechnical recommendations pertaining to the proposed buildings, training pool, pavements, and associated underground utilities.**

**We appreciate the opportunity to perform this geotechnical investigation and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this report or if we may be of further service, please contact our office.**

**Respectfully submitted,  
HTS, Inc. Consultants**

**Bonifacio F. Musngi, Jr., P.E.  
Senior Project Engineer**



**HTS, Inc. Consultants  
F-3478**

*h:word/2013/300-349/13-342*

**Cc: Mr. Robert Trabanino, AIA (Bay-IBI Group Architects)**

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**APPENDIX A**

**Boring Logs (Boring Nos. 1 through 9)**

**REPORT  
GEOTECHNICAL INVESTIGATION  
PROPOSED SAN JACINTO COLLEGE MARITIME FACILITY, PHASE II  
HARRIS COUNTY, TEXAS**

**1.0 INTRODUCTION AND SUMMARY**

**1.1 Introduction**

This report presents the results of the geotechnical investigation pertaining to the design and construction of the proposed buildings, training pool, pavements, and associated underground utilities for the proposed San Jacinto College Maritime Facility, Phase II. The proposed development will be located on the west side of Old Highway 146 where it ends near South Shady Lane at the Bayport Turning Basin in Harris County, Texas. The site location for the proposed project is shown in Figures 1 and 2.

The purpose of this geotechnical investigation was to provide design criteria and recommendations pertaining to the proposed buildings, pavements, and associated underground utilities.

This geotechnical investigation was performed by HTS, Inc. Consultants (HTS) in accordance with HTS Proposal No. SJCD-3537 dated July 24, 2013.

The scope of work for this geotechnical investigation consisted of:

- drilling and sampling a total of 9 geotechnical borings where 5 of the borings (Boring Nos. 1 through 5) were drilled to a depth of 35 feet beneath the surface within the proposed building and expansion, 2 of the borings (Boring Nos. 6 and 7) were drilled to a depth of 20 feet beneath the surface within the truck dock area and training pool, and 2 of the borings (Boring Nos. 8 and 9) were drilled to a depth of 10 feet beneath the surface within the access roads and parking spaces as shown in Figure 2,
- performing field tests and recovering both disturbed and relatively undisturbed soil samples,
- measuring the depth to groundwater in the geotechnical borings during drilling and after the completion of drilling,
- backfilling the boreholes with soil cuttings after the completion of the drilling activities,
- visually classifying samples obtained and conducting laboratory tests to determine the physical and mechanical properties of the soils,
- analyzing the field and laboratory test data,



- performing engineering analyses as necessary to develop pile capacity curves (skin friction and end bearing) for drilled shafts that may be used for the design of foundations that will support the loads of the proposed buildings,
- performing potential vertical rise evaluation of the subsoils within the project area,
- providing design criteria and construction recommendations for the proposed training pool,
- performing pavement design analyses pertaining to pavements for the proposed access drives and parking areas,
- providing site preparation and subgrade stabilization recommendations for the proposed access drives and parking areas,
- performing engineering analyses as necessary to develop recommendations pertaining to potential uplift of underground structures due to upward acting hydrostatic pressures caused by groundwater conditions, lateral earth pressures on underground structures, dewatering requirements for excavations, utility trench shoring and bracing requirements, OSHA soil type classifications pertinent to trench shoring and bracing design, excavation/backfill requirements, and utility bedding requirements, and
- submitting 1 bound copy and a pdf file of a report that presents the results of the geotechnical investigation.

## **1.2 Description of Proposed Facilities**

Development of the site will include the construction of a training facility building, a future building expansion, a training pool, access drives and surface parking spaces, and associated underground utilities. It is our understanding that the proposed building will be elevated to about 16 to 17 feet above an open first level. The first floor level is in a flood area and will not have wall enclosures nor structural loading but may have concrete slab as the finished floor for maintenance and work areas. The proposed building will be a concrete frame building with pan joist second and roof level framing. The anticipated column loads are 200 kips for dead load and 110 kips live load.

The proposed parking areas (with about 173 spaces) will be located northeast and east of the proposed building. The proposed pavements for the proposed access drives and parking spaces are anticipated to consist of reinforced concrete pavement.

## **1.3 Summary of Findings**

The pertinent findings of this geotechnical investigation are provided below.

### **1.3.1 Subsurface Conditions**

The subsurface condition at the location of the proposed development is described:

- by the laboratory test results presented in Table 1, and
- on the boring logs for Boring Nos. 1 through 9 as provided in Appendix A.

Data from the 9 geotechnical borings drilled suggest that the upper 35 feet of subsurface soils within the area of the proposed facilities are composed of 4 separate soil layers. HTS has designated these 4 soil layers as Layers I through IV. Descriptions of the soils that constitute these layers are provided below:

LAYER	DEPTH BELOW GROUND SURFACE (FT)	MATERIAL DESCRIPTION
I	0 - 6.5	Fill material consisting of gray, reddish brown, brown, light brown, and tan LEAN CLAY, LEAN CLAY WITH SAND, and FAT CLAY, firm to hard with ferrous nodules, calcareous nodules, sand pockets, sand fissures, gravel, and roots.
II	4 - 22	Cohesive soils consisting of gray, light gray, brown, light brown, and tan LEAN CLAY and FAT CLAY, firm to very stiff with ferrous nodules, calcareous nodules, sand fissures, sand pockets, and slickensides.
III	12 - 27	Cohesionless soils consisting of reddish brown, brown, light brown, and tan SILTY SAND, CLAYEY SAND, SANDY SILT, and SILT WITH SAND, very loose to medium dense with ferrous nodules and calcareous nodules (not encountered in Boring Nos. 6, 8, and 9).
IV	22 - 35	Cohesive soils consisting of reddish brown, brown, light brown, and tan LEAN CLAY and FAT CLAY, firm to hard with ferrous nodules, calcareous nodules, sand fissures, sand pockets, and slickensides (not encountered in Boring Nos. 6 through 9).

Laboratory testing was performed on selected samples of the subsurface materials obtained to classify the soils in accordance with ASTM D 2487 and to define the engineering properties of the soils. Portions of the test results indicating the high and low values of specific testing are provided in the table below:

LAYER	DEPTH (FT)	LIQUID LIMIT (%)		PLASTICITY INDEX (%)		MOISTURE CONTENT (%)		PASSING NO. 200 SIEVE (%)		UNCONFINED COMPRESSIVE STRENGTH (TSF)	
		HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW
I	0 - 6.5	65	35	38	19	24.8	11.0	92.0	84.7	2.5	
II	4 - 22	68	36	42	15	33.4	19.3	93.6	87.2	3.0	0.6
III	12 - 27	--		--		23.8	20.9	74.7	48.7	--	
IV	22 - 35	66	44	41	19	30.0	26.6	99.7	99.4	2.7	0.8

-- No sample was tested.

### 1.3.2 Groundwater Conditions

Groundwater measurements were obtained during drilling and approximately 15 minutes after the water was initially encountered, as applicable. The results of the groundwater measurements are presented in the table below:

BORING NO.	TOTAL DEPTH OF BORING (FT.)	DEPTH TO WATER DURING DRILLING (FT.)	DEPTH TO WATER APPROX. 15 MINUTES AFTER WATER WAS INITIALLY ENCOUNTERED (FT.)	DEPTH TO OBSTRUCTION APPROX. 15 MINUTES AFTER WATER WAS INITIALLY ENCOUNTERED (FT.)
1	35	13.0	12.5	14.8
2	35	15.0	13.0	14.2
3	35	18.0	13.5	19.1
4	35	13.0	13.0	13.6
5	35	18.0	15.0	16.2
6	20	18.0	15.0	19.0
7	20	15.0	8.0	12.9
8	10	Dry	NA	NA
9	10	Dry	NA	NA

Note: Depths are referenced from the existing ground surface elevation at the time the borings were drilled.

NA = Not applicable

The borings were backfilled with soil cuttings after the groundwater measurements were obtained.

### 1.3.3 Shrink/Swell Potential

The overburden soils within the upper 8 feet at the site of the proposed development generally consisted of lean clay and fat clay soils with high to very high potential for vertical movement (shrink/swell). The maximum potential vertical rise (PVR) of the upper 8 feet of the site soils, based on worst case soil moisture conditions, is about 2.1 inches under a 144 psf [1 pound per square inch (psi)] restraining load.

## 1.4 Summary of Recommendations

Recommendations are provided below pertaining to the design and construction of the foundations for the proposed buildings, pool, access drives, parking areas, and associated underground utilities.

### 1.4.1 Recommended Site and Subgrade Preparation Requirements

Site and subgrade preparation recommendations for the proposed buildings, access drives, and parking areas are summarized below.

#### 1.4.1.1 Recommended Site and Subgrade Preparation Requirements - Proposed Building

It is not anticipated that a significant amount of work will be involved in subgrade preparation within the building area because the project site is in a flood zone and the first floor level will not have wall enclosures nor structural loading but may have concrete slab as the finished floor for maintenance and work areas. However, the following recommendations should be considered if a concrete slab will be placed as cover for the first floor level.

- Strip any vegetation and organic topsoil to a depth of at least 6 inches, as applicable.
- Proofroll the exposed soils with a 15-ton roller or equivalent suitable equipment. Observe the soils during proofrolling so as to detect any wet, soft, or pumping soils and treat such soils with suitable drying or stabilizing agents or remove the unsuitable soils and replace with properly compacted suitable earth fill or select fill.
- Compact the exposed soils to an in-place dry density equal to at least 95% of the maximum standard dry density (ASTM D 698) at a moisture content within  $\pm 2\%$  of the optimum moisture content.
- Place properly compacted suitable earth fill or select fill as necessary to achieve the desired subgrade elevation.

- Grade the finished grade elevation in a manner that will allow the flow of water away from the building area.

Select fill should consist of a clayey sand or inactive lean clay with a maximum liquid limit of 35 and a plasticity index range of 8 to 20. Suitable earth fill may consist of the on-site lean clay soils that are free from organics and deleterious substances. The fill should be placed in 8-inch thick loose lifts and compacted to an in-place dry density equal to at least 95% of the maximum standard dry density (ASTM D 698) at a moisture content within  $\pm 2\%$  of the optimum moisture content

Depending on weather conditions, difficulty may be encountered in adequately densifying/compacting the surficial soils. If the surficial soils are unsuitably wet, excess pore pressures (“pumping”) may develop and excess displacement of the subgrade soils may occur during site preparation. If the site subgrade soils become unsuitably wet, the construction contractor should:

- dry the soils to within  $\pm 2\%$  of the optimum moisture content by discing these materials,
- dry the soils by blending a stabilizing agent (lime or fly-ash) with the unsuitably wet soil, or
- remove the unsuitably wet soils and replace the wet soil with properly compacted suitable earth fill or select fill having an acceptable moisture content.

#### **1.4.1.2 Recommended Site and Subgrade Preparation Requirements - Proposed Access Drives and Parking Areas**

Recommendations for site and subgrade soil preparation for proposed pavements have been developed so as to lower the shrink/swell potential and to increase the strength of the surficial soils as well as to improve the performance of the pavements. It is recommended that the subgrade soils within the pavement areas be prepared as described below.

- Establish site drainage and install storm drainage structures in order to preclude the inundation of the site area with storm water or the lateral seepage of storm water into the pavement subgrade soils.

- Strip any vegetation, topsoil, roots, and any unstable soils in the construction area and excavate the on-site soils for a depth of at least 6 inches and as necessary to achieve the desired subgrade elevation.
- Proofroll the exposed subgrade soil with a 15-ton roller, or equivalent suitable equipment, observing the subgrade soil during proofrolling so as to detect any wet, soft, or unstable/pumping soils. Wet, soft, or unstable/pumping soils should be treated with suitable drying or stabilizing agents or the unsuitable soils should be removed and replaced with properly compacted suitable earth fill or select fill.
- Compact the exposed subgrade soil to an in-place dry density equal to at least 95% of the maximum dry density at a moisture content within  $\pm 2\%$  of the optimum moisture content as determined by ASTM D 698.
- If it is necessary to place fill to bring the pavement subgrade soil to the desired grade elevation, suitable earth fill or select fill should be utilized. Suitable earth fill may consist of the on-site excavated soils that are free of organics and deleterious substances. Select fill should consist of a clayey sand or inactive lean clay with a maximum liquid limit of 35 and a plasticity index range of 8 to 20. Fill materials should be placed in 8-inch thick loose lifts (6-inch compacted lifts) and compacted to an in-place dry density equal to at least 95% of the maximum dry density at a moisture content within  $\pm 2\%$  of the optimum moisture content as determined by ASTM D 698.
- Stabilize the upper 6 inches of the pavement subgrade soils using 5% lime by dry soil weight (i.e., 26 pounds of hydrated lime per square yard of surface area for a depth of 6 inches). The blended soil-lime mixture should be compacted to an in-place dry density equal to at least 95% of the maximum dry density in accordance with (ASTM D 698). Stabilization procedures should be performed in accordance with Item 220 entitled "Lime Stabilized Subgrade" from the most recent revision of the Harris County Public Infrastructure Department, Architecture and Engineering Division (HCPID-AED) Specifications entitled "Specifications for the Construction of Roads and Bridges within Harris County, Texas".

Lime stabilization should extend a minimum of 2 feet beyond the edges of the pavements in order to preclude edge failure of the pavements.

*The required quantity of lime for use in lime stabilization, as recommended above, is an estimated value only. The actual quantity of lime should be based upon tests performed on the pavement subgrade soils at the time of construction.*

Depending on weather conditions, difficulty may be encountered in adequately densifying/compacting the surficial soils. If the surficial soils are unsuitably wet, excess pore pressures (“pumping”) may develop and excess displacement of the subgrade soils may occur during site preparation. If the site subgrade soils become unsuitably wet, the construction contractor should:

- dry the soils to within  $\pm 2\%$  of the optimum moisture content by discing these materials,
- dry the soils by blending a stabilizing agent, such as lime or fly ash, with the unsuitably wet soil, or
- remove the unsuitably wet soils and replace with properly compacted suitable earth fill or select fill having an acceptable moisture content.

#### **1.4.2 Recommended Foundation System – Drilled Shafts**

The column loads of the proposed buildings may be supported by a drilled shaft foundation system. For a drilled shaft foundation system, the loads are being carried by the skin friction and the point bearing capacities. This type of foundation system is designed to transmit part of its load to the various strata through skin friction and the remainder by bearing at its tip. In this type of load transfer, the majority of the load is resisted by skin friction. The length of the shaft is a function of the design load with the allowable friction resistance of the soils acting on its cumulative perimeter with depth and the allowable bearing strength at the tip. We have developed design curves of allowable pile capacities for 5 different drilled shaft sizes (24-inch, 36-inch, 48-inch, 60-inch, and 72-inch diameters), shown in Figure 3, that may be used for design. In developing the allowable capacities, a factor of safety value of 2.0 was applied to the ultimate skin friction capacity component and the ultimate end bearing capacity component. The weight of the pile (from the ground surface to the foundation tip) was also incorporated in the design curves. The required pile sizes and depths could be directly determined from these curves. Other sizes in between the provided curves may be determined by interpolation.

For foundations such as drilled shafts, the lateral loads are resisted by the soil as well as the rigidity of the shaft or pile. Analyses can be performed by methods ranging from chart solutions to finite difference methods. If needed, once the pile sizes and loading conditions have been determined, HTS can assist in performing the lateral load analysis.

It is recommended that the center to center spacing of the drilled shafts be equal to at least 3 pile or shaft diameters. Should the center to center spacing be less than 3 times the average pile or shaft diameter, the allowable net single pile axial capacities shown in Figure 3 should be reduced to account for group effect. It is not anticipated that pile group effect will be a concern. However, if required, HTS will be glad to perform pile group analysis when final layout and plans are provided.

**1.4.3 Recommended Drilled Shaft Construction and Installation**

Drilled shaft construction and installation may be performed in accordance with the procedures and guidelines in Item 411 entitled “Drilled Shaft Foundation” of the latest revision of the Harris County Public Infrastructure Department – Architectural and Engineering Division (HCPID-AED) “Specifications for the Construction of Road and Bridges within Harris County, Texas” or Item 416 entitled “Drilled Shaft Foundation” of the 2004 “Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges” of the Texas Department of Transportation (TxDOT).

**1.4.4 Design Recommendations for Pavements**

Rigid pavements for the proposed project should consist of the following minimum recommended pavement sections.

RIGID PAVEMENT		
Material	TRAFFIC CLASSIFICATION	
	Light and Medium Duty	Heavy Duty
Reinforced Concrete Pavement	6.0	7.0
Lime Stabilized and Compacted Subgrade	6.0	6.0

Pavement subgrade soil preparation should comply with the recommendations provided in Section 1.4.1.2 of this report. Pavement design assumptions and material properties are discussed in Section 5.4 of this report.



All related civil design factors such as drainage, cross-sectional configurations, surface elevations, and environmental factors that will significantly affect the service life of the pavement should be included in the preparation of the construction drawings and specifications.

**1.4.5 Reinforcement of Rigid Pavements**

Provided below are parameters and equations that may be used for the design of steel reinforcements for rigid pavements.

*Longitudinal and Transverse Reinforcement* – Reinforcement for longitudinal and transverse reinforcement steel may be calculated from the following formula:

$$P_s = \frac{F * L * W}{2 f_s}$$

where:

- $P_s$  = percent cross-sectional area of steel per foot width slab, in<sup>2</sup>
- $F$  = coefficient of resistance between slab and base  
(=1.8 for lime stabilized subgrade)
- $L$  = expansion joint spacing, ft.
- $W$  = weight of pavement per foot width slab, psf.
- $f_s$  = working stress of steel (use 75% of yield strength)

*Reinforcement Spacing* – Reinforcement spacing may be calculated from the following formula:

$$Y = \frac{A_s * 100}{P_s * D}$$

where:

- $A_s$  = cross-sectional area of rebar, in<sup>2</sup>
- $P_s$  = percent cross-sectional area of steel required, in<sup>2</sup>/ft.
- $D$  = slab thickness, in.

For Grade 40 steel, the center-to-center distance of #4 reinforcing bars (yield strength = 40,000 psi) for a 6-inch concrete pavement was computed to be as follows:

**Longitudinal Reinforcement**

Pavement Thickness, in.	Expansion Joint Spacing (L), feet	Percent Steel Required, $P_s$ , in <sup>2</sup> /ft.	Maximum Rebar Spacing, in.
6	10	0.023	18
6	20	0.045	18
6	30	0.068	18
6	40	0.090	18

**Transverse Reinforcement**

Pavement Thickness, in.	Expansion Joint Spacing (L), feet	Percent Steel Required, $P_s$ , in <sup>2</sup> /ft.	Maximum Rebar Spacing, in.
6	12	0.027	24
6	24	0.054	24
6	36	0.081	24
6	48	0.108	24

For Grade 40 steel, the center-to-center distance of #4 reinforcing bars (yield strength = 40,000 psi) for a 7-inch concrete pavement was computed to be as follows:

**Longitudinal Reinforcement**

Pavement Thickness, in.	Expansion Joint Spacing (L), feet	Percent Steel Required, $P_s$ , in <sup>2</sup> /ft.	Maximum Rebar Spacing, in.
7	10	0.026	18
7	20	0.053	18
7	30	0.079	18
7	40	0.105	18

**Transverse Reinforcement**

<b>Pavement Thickness, in.</b>	<b>Expansion Joint Spacing (L), feet</b>	<b>Percent Steel Required, P<sub>s</sub>, in<sup>2</sup>/ft.</b>	<b>Maximum Rebar Spacing, in.</b>
7	12	0.032	24
7	24	0.063	24
7	36	0.095	24
7	48	0.126	22

***Lap Length*** – We recommend a minimum lap length of about 24 inches for a #4 reinforcing steel.

***Tie Bars*** – For 6-inch and 7-inch concrete pavements, we recommend the use of at least a #4 bar with a minimum length of 30 inches and spaced at about 30 to 36 inches on center.

***Load Transfer Devices*** - A commonly used load-transfer device is the plain round steel dowel conforming to AASHTO M31, Grade 60 or higher. Other mechanical devices that have proven satisfactory in field installation may be used. For 6-inch and 7-inch concrete pavements, we recommend the use of at least a #8 round dowel with a minimum length of 18 inches and a spacing of 12 inches on center.

**1.4.6 Water Line Design, Bedding, and Backfill Requirements**

Water lines may be designed by using conventional conduit formulas and assuming a negative projection condition for the computation of loadings.

The total load on water lines will consist of the weight of the compacted backfill above the pipe, the weight of the pavement, and live loadings where applicable. The wet unit weight of compacted backfill is estimated to be 130 pounds per cubic foot (pcf) for clayey sand/lean clay backfill material.

Earthwork should conform to applicable provisions of Section 02317 entitled “Excavation and Backfill for Utilities” from the 2011 City of Houston Department of Public Works and Engineering (COH-DPWE) “Standard Construction Specifications for Wastewater Collection Systems, Water Lines, Storm Drainage and Street Paving”.

Water line trenches should be excavated with trench widths that comply with the requirements of Subsection 3.05, Subparagraph C, page 02317-11 of Section 02317 of the above-referenced October 2002 COH-DPWE Specifications. Trench foundation for water lines should be prepared in

accordance with Subsection 3.08 of Section 02317 of the above-referenced 2011 COH-DPWE Specifications.

Bedding for the proposed water lines should be designed and installed as specified by Section 02317, Section 02511, Section 02512, and Drawing No. 02317-04 of the above-referenced 2011 COH-DPWE Specifications.

Backfill for water line excavations should consist of bank run sand or suitable earth fill as specified in Section 02320 of the above-referenced 2011 COH-DPWE Specifications. Backfill should be placed in accordance with Section 02317 of the 2011 COH-DPWE Specifications.

**1.4.7 Sanitary Sewer Design, Bedding, and Backfill Requirements**

Sanitary sewers may be designed by using conventional conduit formulas and assuming a negative projection condition for the computation of loadings.

The total load on sanitary sewers will consist of the weight of the compacted backfill above the pipe, the weight of the pavement, and live loadings where applicable. The wet unit weight of compacted backfill is estimated to be 130 pcf for clayey sand/lean clay backfill material.

Earthwork should conform to applicable provisions of Section 02317 entitled "Excavation and Backfill for Utilities", Section 02531 entitled "Gravity Sanitary Sewers", and Section 02532 entitled "Sanitary Sewer Force Mains" from the 2011 City of Houston Department of Public Works and Engineering (COH-DPWE) "Standard Construction Specifications for Wastewater Collection Systems, Water Lines, Storm Drainage and Street Paving".

Sanitary sewer trenches should be excavated with trench widths that comply with the requirements of Subsection 3.05, Subparagraph C, page 02317-11 of Section 02317 of the above-referenced 2011 COH-DPWE Specifications.

Trench foundation for sanitary sewer lines should be prepared in accordance with Subsection 3.07 of Section 02317 of the above-referenced 2011 COH-DPWE Specifications.

Bedding for the proposed sanitary sewer lines should be designed and installed as specified by Section 02317, Section 02321, Section 02531, Section 02532, and Drawing Nos. 02317-01, 02317-02, 02317-03, and 02317-08 of the above-referenced 2011 COH-DPWE Specifications.

Backfill for sanitary sewer line excavations should consist of materials as specified in Sections 02320 and 02321 of the above-referenced 2011 COH-DPWE Specifications. Backfill should be placed in accordance with Section 02317 of the 2011 COH-DPWE Specifications.

**1.4.8 Storm Sewer Design, Bedding, and Backfill Requirements**

Storm sewers may be designed using conventional conduit formulas and assuming a negative projection condition for computation of loadings.

The total load on storm sewers will consist of the weight of the compacted backfill above the pipe, the weight of the pavement, and live loadings where applicable. The wet unit weight of compacted backfill is estimated to be 130 pounds per cubic foot (pcf) for clayey sand/lean clay backfill material.

Earthwork should conform to applicable provisions of Section 02317 entitled "Excavation and Backfill for Utilities", Section 02631 entitled "Storm Sewers", and Section 02611 entitled "Reinforced Concrete Pipe" from the 2011 City of Houston Department of Public Works and Engineering (COH-DPWE) "Standard Construction Specifications for Wastewater Collection Systems, Water Lines, Storm Drainage and Street Paving".

Storm sewer trenches should be excavated with trench widths that comply with the requirements of Subsection 3.05, Subparagraph C, page 02317-11 of Section 02317 of the above-referenced 2011 COH-DPWE Specifications.

Trench foundation for storm sewer lines should be prepared in accordance with Subsection 3.07 of Section 02317 of the above-referenced 2011 COH-DPWE Specifications.

Bedding for the proposed storm sewer lines should be designed and installed as specified by Section 02317, Section 02321, Section 02611, and Drawing Nos. 02317-02 and 02317-03 of the above-referenced 2011 COH-DPWE Specifications.

Backfill for storm sewer line excavations should consist of materials as specified in Sections 02320 and 02321 of the above-referenced 2011 COH-DPWE Specifications. Backfill should be placed in accordance with Section 02317 of the 2011 COH-DPWE Specifications.

**1.4.9 Excavation Dewatering Requirements**

Groundwater was encountered at depths ranging from 13 to 18 feet beneath the surface in 7 (Boring Nos. 1 through 7) of the 9 borings during drilling (the other 2 borings, Boring Nos. 8 and 9 which are both 10-foot deep borings, were dry during drilling). Approximately 15 minutes after the water was initially encountered, the water level was measured at depths ranging from 8 to 15 feet

beneath the surface. Accordingly, it is not expected that groundwater will be encountered for excavations that are no deeper than about 12 feet beneath the surface. However, any seepage water within 12 feet of the surface, where the exposed soils consist of the site clays, is expected to be controlled with the use of sumps and pumps. However, deeper excavations may expose the site sandy soils and result in significant amounts of seepage water entering the excavations. When this condition occurs, more extensive groundwater efforts such as well points, vacuum well points, or any other suitable dewatering system may be required for groundwater dewatering of excavations. Control of groundwater and surface water during the installation of the underground utilities should be performed in accordance with Section 01578 of the 2011 COH-DPWE Specifications.

#### **1.4.10 Temporary Shoring and Bracing Requirements for Excavations**

The contractor should ensure designing and constructing stable protection systems for excavations such as support systems, sloping and benching systems, shield systems, and other systems that provide protection.

Temporary special shoring, for use in the installation of structures or utilities that will require excavations deeper than 5 feet, should consist of vertical or sloped cuts, benches, shields, support systems, or other systems that will provide necessary protection in accordance with OSHA Standards and Interpretations, 29 CFR 1926, Subpart P, "Excavations".

If OSHA Standards and Interpretations, 29 CFR 1926, Subpart P, "Excavations" is used for the design of temporary excavation protection systems, the Layers II and IV lean clay and fat clay should be categorized as Type B soils while the Layer I fill soils as well as the Layer III sands should be categorized as Type C soils. The definitions of Type B and Type C soils are provided in Appendix A of the OSHA Standards and Interpretations, 29 CFR 1926, Subpart P, "Excavations" ([www.osha.gov](http://www.osha.gov)). In order to eliminate the potential for caving of trench excavations, trench safety shall be implemented for trench excavations that are deeper than 5 feet.

#### **1.4.11 Recommended Earth Pressure Design Parameters for Design of Below Ground Structures**

Below ground structures may be designed by using equivalent fluid pressures, earth pressure coefficients, and soil shear strength properties. Long term, effective stress, shear strength parameters should be used for the design of permanent underground structures. Below ground structures at the proposed site may be designed by using the following design parameters:

ON SITE SOILS	WEIGHT OF EQUIVALENT FLUID FOR ACTIVE CASE (PCF)	WEIGHT OF EQUIVALENT FLUID FOR PASSIVE CASE (PCF)	ACTIVE EARTH PRESSURE COEFFICIENT (K <sub>a</sub> )	PASSIVE EARTH PRESSURE COEFFICIENT (K <sub>p</sub> )	EFFECTIVE STRESS ANGLE OF INTERNAL FRICTION (°)*	EFFECTIVE STRESS COHESION (PSF)*	WET UNIT WEIGHT (PCF)
Lean Clays	96	231	0.49	2.50	20	250	130
Fat Clays	95	204	0.53	2.26	18	200	125
Sands/Silts	83	250	0.33	3.00	30	0	125

The weights of equivalent fluid shown above, include hydrostatic forces but do not include surcharge forces imposed by construction equipment or vehicular loadings. Surcharge forces must be considered in order to compute maximum stresses for use in the design of below ground structures.

The weights of equivalent fluid for the passive case and the passive earth pressure coefficients shown above do not include a safety factor. It is recommended that for design purposes, a factor of safety of 2 be applied to the effective stress angle of internal friction to calculate the weights of equivalent fluid for the passive case and the passive earth pressure coefficients. With the use of a safety factor of 2, the weights of equivalent fluid for the passive case will be 169, 158, and 171 pcf for the site sands, fat clays, and lean clays, respectively. The passive earth pressure coefficients will be 1.70, 1.53, and 1.61 for the site sands, fat clays, and lean clays, respectively.

#### 1.4.12 Design Criteria and Recommendations for the Proposed Training Pool

Based on the subsoil profile and groundwater conditions defined by Boring No. 6, excavations for the construction of the proposed training pool will cut through the Layer I lean clay fill soils and the Layer II fat clay soils. Depending on the design depths of the proposed pool, the bottom of the proposed pool will be seated on either the Layer I lean clay fill soils and/or the Layer II fat clay soils. Foundation soils for the proposed swimming pool should be prepared in accordance with the following recommendations.

- Excavate the overburden soils to the desired foundation grade elevation.
- Proofroll the exposed subgrade soils with a 15-ton roller or other suitable equipment as approved by the engineer, observing the soils during proofrolling so as to detect any wet, soft, or unstable soils and treating such soils with suitable drying or stabilizing agents or removing the unstable soils and replacing with properly compacted select fill.

- Compact the exposed subgrade soils to an in-place dry density equal to at least 95% of the Standard Proctor maximum dry density (ASTM D 698) at a moisture content within  $\pm 2\%$  of the optimum moisture content.

Select fill should consist of inactive lean clays with a maximum liquid limit of 35 and a plasticity index range of 8 to 20. The select fill should be placed in 8 inch thick loose lifts (6-inch compacted lifts) and compacted to an in place dry density equal to at least 95% of the maximum standard dry density (ASTM D 698) at a moisture content within  $\pm 2\%$  of the optimum moisture content.

Properly prepared foundation soils should provide an allowable bearing capacity of 1,600 psf which considers a factor of safety of at least 3.0 against a bearing capacity failure. Settlement of the swimming pool foundation soils should be negligible based on the comparison of the total weight of the overburden soils removed as compared to the total weight of the swimming pool full of water (overburden soils removed greater than weight of swimming pool full of water).

It should be noted that the proposed training pool will generally be seated on the site fat clays. These soils have high to very high potential for vertical rise when exposed to extreme saturation which may affect the integrity of the training pool. Therefore, the potential for the exposure of the foundation soils to extreme saturation should be prevented by:

- ensuring that the proposed training pool is leak-free, and
- providing for a monitoring and seepage water collection system that is aimed at determining presence of seepage water beneath the bottom of the pool and removing seepage water as needed.

(Typically, the bottom of the pool is provided with an aggregate layer where seepage water could be allowed to flow into a collector sump near the edge of the pool where a vertical pipe could be installed for seepage water monitoring and removal (using a pump with an automatic trigger capability).

Excavations for the construction of the proposed training pool that are deeper than 5 feet should have proper temporary side support or safe inclinations that follows Section 1.4.10 of this report.

## 2.0 FIELD INVESTIGATION

For this geotechnical study, 9 geotechnical borings were drilled and sampled in August 9 and 12, 2013 at the locations shown in Figure 2. The boring locations were selected by the client and located/staked in the field by representatives of HTS measuring from existing points of reference. Drilling, sampling, and testing were performed in accordance with applicable ASTM standards by using a drill rig mounted on an all terrain vehicle and a conventional



auger drilling method. Van & Sons Drilling Company performed the drilling under contract to HTS and under the supervision of an HTS geotechnical engineering technician.

Soil sampling during the drilling of the geotechnical borings consisted of continuous sampling to 12 feet and intermittent sampling thereafter with both disturbed and relatively undisturbed samples being obtained.

Relatively undisturbed samples were obtained by hydraulically forcing sections of 3-inch outside diameter (O.D.) tubing (Shelby tube) into the subsoils. The tube samples were extruded in the field, sealed with foil, and placed into airtight plastic bags. Estimates of the unconfined compressive strengths and undrained shear strengths of the cohesive soils were obtained with pocket penetrometer readings being taken on the tube samples.

A disturbed sample of soil was taken using standard penetration test procedures. The standard penetration test (SPT) blow count is defined as the number of SPT hammer blows that are required to advance a split spoon sampler 1 foot into the soil. One SPT hammer blow consists of a 140-pound hammer free falling for a distance of 30 inches. The results of the standard penetration test provide a basis for estimating the relative strength and compressibility of the soil profile components. The samples recovered were removed from the split spoon sampler and placed into airtight plastic bags.

The soils samples were visually classified in accordance with ASTM D 2488 standards and methods. All samples were transported to HTS' laboratory for purposes of performing laboratory tests on selected samples.

### 3.0 LABORATORY TESTING

A laboratory testing program was conducted to obtain engineering properties for use in performing engineering analyses and to adjust field soil classifications. The following laboratory tests were performed:

LABORATORY TEST	TEST STANDARD
Moisture Content of Soils	ASTM D 2216
Moisture Content and In Situ Dry Density of Soils	ASTM D 2937
Percent Soil Particles Passing a No. 200 Sieve	ASTM D 1140
Liquid Limit, Plastic Limit, and Plasticity Index of Soils	ASTM D 4318
Unconfined Compressive Strength of Cohesive Soils	ASTM D 2166

The number of tests and test results are presented in the attached Table 1. All tests were performed in accordance with applicable ASTM standards and methods and soil classifications were completed in accordance with the requirements of ASTM D 2487.

## 4.0 SUBSURFACE CONDITIONS

### 4.1 Subsoils

The subsurface soil conditions as determined from the drilling of the geotechnical borings are provided in:

- Section 1.3.1 of this report, and
- the boring logs in Appendix A.

The boring logs were prepared by using both field visual classifications and the results of laboratory testing. The stratification lines, shown on the boring logs, represent the approximate boundaries between soil types and the transitions between soil types may be gradual.

### 4.2 Groundwater

Groundwater conditions are described in Section 1.3.2 of this report and on the boring logs provided in Appendix A of this report. The depth to groundwater was obtained by:

- observing the drilling operations and the free moisture contained in the samples recovered during drilling, and
- obtaining water level measurements in the borings during drilling and approximately 15 minutes after the water was initially encountered, as applicable.

It is possible that seasonal variations will cause fluctuations in the water level data measured at the time of our field investigation. We recommend that the contractor determine the actual groundwater level at the site at the time of construction in order to assess the impact, if any, of the groundwater to the construction activities. It should be noted that recommendations contained in this report are based on groundwater depths at the time of this geotechnical investigation and that an accurate determination of the true groundwater level may require several days or even months of observations.

## 5.0 ENGINEERING ANALYSES

Engineering analyses were performed in order to determine design parameters that can be used for the design of the proposed buildings, pool, pavement areas, and associated underground utilities. Analyses performed included:

- analyses of subsurface soil grain size and plasticity characteristics and site ground water levels as necessary to identify potential dewatering requirements,
- analyses of the potential heave (potential vertical rise) of the subsoils within the estimated active zone in the project area,

- pile capacities of drilled shafts that may be used to support the loads of the proposed buildings,
- analyses to determine lateral earth pressure design parameters that can be used in the design of below ground structures and temporary shoring and bracing for excavations,
- analyses to determine pavement subgrade soil stabilization requirements,
- pavement design analyses for rigid pavement for the proposed access drives and parking spaces, and
- analyses of subsurface soil grain size, plasticity, and shear strength properties as necessary to categorize the site subsurface soil and groundwater conditions with regard to OSHA requirements for trench shoring/bracing.

### **5.1 Potential Dewatering Requirements**

Potential dewatering requirements were developed based upon measured groundwater level depths, the types of subsurface soils encountered, and the grain size characteristics of the subsurface soils. Sumps and sump pumps may be used to effectively dewater clay soils and sandy soils that occur below the ground water table and contain more than 20% soil particles passing a No. 200 sieve. The use of well points, vacuum well points, or a comparable dewatering system should provide for the effective dewatering of sandy soils which occur below the groundwater table and are found to contain less than 15 to 20% soil particles passing a No. 200 sieve.

### **5.2 Potential Vertical Rise Analyses**

Potential vertical rise analyses were completed for the subsoil within the project area. The depth of seasonal moisture variation at the proposed site was estimated to be 8 feet. The estimated depth of seasonal moisture variation was based on moisture content versus depth data obtained from the soils sampled/tested.

The potential vertical rise analyses for the slab-on-grade floor and drilled piers were performed by using the Texas Department of Transportation (TxDOT) Test Method Tex-124-E, the Van der Merwe Method, and the results of laboratory index tests.

### **5.3 Drilled Shaft Allowable Axial Capacities and Settlement Analyses**

Drilled shaft allowable capacities and settlement analyses were performed in accordance with analyses methods presented by established references (Pages 557 through 559 of "Principles of Foundation Engineering", Seventh Edition by Braja Das).

**5.4 Pavement Design Analyses**

Pavement design analyses were performed in accordance with the American Association of State Highway and Transportation Officials (AASHTO) "AASHTO Guide for Design of Pavement Structures" dated 1993. The AASHTO "Low-Volume Road Design" Method was used for the pavement design.

Concrete pavement design recommendations provided in Section 1.4.4 of this report are based upon the following assumptions and parameters:

TERMS	INPUT	REFERENCES
18-kip equivalent single axle loads (ESALs) for a 20-year period	50,000	For passenger vehicle access drive and parking spaces
Level of Reliability, (R)	95%	AASHTO 1993 Guide Sec. 2.1.3, Pg. II-9
U.S. Climatic Region Category	Region I	AASHTO 1993 Guide Sec. 4.1, Pg. II-70
Relative Quality of Roadbed Soil	Fair	AASHTO 1993 Guide Sec. 4.1.1, Pg. II-71, Table 4.2
Overall Standard Deviation ( $S_o$ )	0.35	AASHTO 1993 Guide Sec. 4.2.1, Pg. II-77
Drainage Coefficient ( $C_d$ )	1.0	AASHTO 1993 Guide Sec. 2.4.1, Pg. II-25, Table 2.5
Initial Serviceability Index ( $p_o$ )	4.5	AASHTO 1993 Guide Sec. 2.2.1, Pg. II-10
Terminal Serviceability Index ( $p_t$ )	2.0	AASHTO 1993 Guide Sec. 2.2.1, Pg. II-10
Effective Modulus of Subgrade Reaction ( $k$ )*	30 pci	AASHTO 1993 Guide Sec. 4.2.2, Pg. II-81
Load Transfer Coefficient (J)	3.2	AASHTO 1993 Guide Sec. 2.4.2, Pg. II-26
28-day Concrete Flexural Strength ( $S'_c$ )	500 psi	AASHTO 1993 Guide Sec. 2.3.4, Pg. II-16

\* Based on a resilient modulus of 30,000 psi for the 6-inch thick lime stabilized subgrade, subgrade resilient modulus of 4,500 psi for fair relative quality of roadbed soil for Region I, and a loss of support (LS) of 2.

The traffic counts used for the design of the pavements for the parking areas assumed a total of 4 vehicle trips per day for each of the 173 passenger vehicles parking spaces being considered on the northeast and east portion of the development area. Assuming a daily traffic mixture consisting of 90% passenger cars, 8% light duty vehicles, 1% medium duty vehicles, and 1% buses, 6 days per week parking area usage, and using the guidelines of Appendix D of the American Association of State Highway and Transportation Officials

(AASHTO) for Low Volume Pavements, an 18-kip equivalent single axle load (ESAL) application value of 50,000 was calculated over a design service life period of 20 years for rigid pavement design for the parking areas. The required pavement section was determined using a computer code titled "WINPAS" which is based on the design procedures outlined by the American Association of State Highway and Transportation Officials (AASHTO) in "AASHTO Guide for Design of Pavement Structures" dated 1993.

#### **5.5 Pavement Subgrade Soil Stabilization Analyses**

Subgrade soil stabilization requirements for the proposed pavement were developed based upon the results of laboratory testing (Atterberg Limits, percent soil particles passing a No. 200 sieve, and unit weight determinations). These requirements should be verified based on laboratory compaction tests performed as part of the construction quality control program.

#### **5.6 OSHA Guidelines for Trench Shoring/Bracing**

The site soils were categorized as Types B and C soils in accordance with OSHA requirements as referenced above in Section 1.4.10 of this report. The site soils were categorized based upon the site groundwater conditions, the results of laboratory tests (moisture content determinations, Atterberg Limits, percent soil particles passing a No. 200 sieve, and unconfined compression tests) and pocket penetrometer values measured during drilling.

#### **5.7 Earth Pressure Design Parameter Analyses**

Earth pressure coefficients may be used to define the lateral loads exerted by the overburden soils on underground structures. Earth pressure coefficients, as provided in this report, were computed by using Rankine's methods. The recommended lateral earth pressure coefficients and equivalent fluid weight values, provided in this report, are based on soil properties as summarized in Section 1.4.11 of this report. Earth pressure design parameters, provided in this report for use in designing permanent below ground structures, are based on effective stress, shear strength parameters.

## **6.0 CONSTRUCTION CONSIDERATIONS**

The following recommendations should be followed with regard to construction of the proposed facilities:

### **6.1 Foundation Construction**

- Excavations for foundations should be clean and free of all loose materials prior to the placement of concrete. Concrete should be placed at the foundation areas immediately upon forming, reinforcing steel placement, cleaning, and inspection.
- Fill material and fill compaction should comply with the recommendations provided in Section 1.4.1 of this report.

- Construction operations should be monitored by a qualified representative of the soil engineer.
- Materials testing should be performed so as to assure that acceptable materials and construction methods are provided by the contractor.

## 6.2 Backfill Around Structures

Backfill around structures should consist of select fill compacted to an in-place dry density equal to at least 90% of the maximum dry density at a moisture content within  $\pm 5\%$  of the optimum moisture content as determined by ASTM D 698. Care should be taken so as not to overcompact backfill or allow heavy equipment adjacent to the existing structures. The backfill placement operations should be monitored and the backfill tested to assure compliance with the project specification.

## 6.3 Surface Drainage

The following drainage precautions should be observed during construction and maintained at all times after construction has been completed:

- The ground surface surrounding the exterior of the structures should be provided with erosion protection and sloped to drain away from the structures in all directions. We recommend a minimum slope of 6 inches in the first 10 feet.
- Roof downspouts and drains should discharge beyond the limits of the edges of the foundations and be channeled to drain immediately away from the foundations.
- Excessive wetting or drying of foundations should be avoided. Trees and other vegetation capable of withdrawing significant amounts of moisture from the subsoils should be located a distance from the nearest foundation equal to at least the expected ultimate height of the vegetation, or appropriate moisture barriers should be provided.

## 6.4 Drainage for Pavements

Drainage is an important structural characteristic which affects the predicted performance of a pavement system. A Cd value of 1.0 was used as an input parameter for the present study. A Cd value of 1.0 corresponds to 'Good Drainage'. AASHTO defines 'Good Drainage' as "the ability to remove water from the pavement within 1 day". Therefore, "proper drainage maintenance" is necessary to ensure continued 'Good Drainage' and minimize the inundation and weakening of the subgrade soils under the proposed roadway reconstruction.

## 7.0 CLOSING REMARKS

HTS, Inc. Consultants has performed a geotechnical investigation and provided recommendations pertaining to the design and construction of the proposed buildings, training pool, pavements, and associated underground utilities for the proposed San Jacinto College Maritime Facility, Phase II in Harris County, Texas. This report has been prepared for the exclusive use of San Jacinto College District in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

In the event that changes are made in the nature, design, or location of the proposed facilities, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the findings/recommendations of this report are modified or verified in writing. The analyses and recommendations presented in this report are based upon data obtained from 9 geotechnical borings drilled on August 9 and 12, 2013. The nature and extent of variations within the subsurface materials may not become evident until after construction is initiated. If significant variations in the subsurface materials are encountered during construction, it may be necessary to re-evaluate the recommendations provided in this report.

# TABLE



**TABLE 1**

**LABORATORY TEST SUMMARY**

**PROJECT:** Proposed San Jacinto College Maritime Facility, Phase II  
**LOCATION:** Harris County, Texas  
**CLIENT:** San Jacinto College District

HTS PROJECT NO.: 13-S-342  
PAGE 1 OF 2

Boring No.	Sample Depth (feet)	Type of Material	Moisture Content (%)	Dry Density (pcf)	Atterberg Limits (%)			-200 Sieve (%)	Unconfined Compressive Strength (tsf)	Strain (%)	Lateral Pressure (psi)	Remarks
					LL	PL	PI					
1	2-4	Lean Clay (FILL)	23.0		49	21	28	92.0				(1) Sample failed along sand fissures. (2) Sample failed along slickensides. (3) Sample bulged at failure.
	8-10	Fat Clay (CH)	24.7		54	22	32	93.6				
	10-12	Fat Clay (CH)	29.0	94.7	54	25	29		3.0 (1,2)	7.3	0	
	23-25	Fat Clay (CH)	29.7	93.3	63	27	36	99.4	0.8 (1,2)	1.9	0	
2	4-6	Lean Clay (FILL)	15.4	114.3	38	16	22	92.0	2.5 (1,3)	8.5	0	(1) Sample failed along sand fissures. (2) Sample failed along slickensides. (3) Sample bulged at failure.
	13-15	Fat Clay (CH)	24.2	97.9	56	24	32		1.3 (1)	3.2	0	
	23-25	Sandy Silt (ML)	21.5					50.1				
	28-30	Lean Clay (CL)	30.0	94.7	44	25	19	99.7	1.8 (1,2)	5.2	0	
3	6-8	Fat Clay (CH)	33.4	91.0	68	26	42	89.1	2.1 (1,2)	6.7	0	(1) Sample failed along sand fissures. (2) Sample failed along slickensides. (3) Sample bulged at failure.
	13-15	Fat Clay (CH)	22.2	106.4	51	20	31		1.5 (1,3)	8.2	0	
	18-20	Fat Clay (CH)	25.3	100.2	58	24	34		1.3 (1,3)	3.8	0	
	33-35	Fat Clay (CH)	26.6	96.0	66	25	41		2.7 (1)	3.9	0	
4	2-4	Fat Clay (FILL)	15.6		53	15	38	87.6				(1) Sample failed along sand fissures. (2) Sample failed along slickensides. (3) Sample bulged at failure.
	10-12	Fat Clay (CH)	25.6	100.3					1.6 (1,2)	10.7	0	
	18-20	Fat Clay (CH)	27.4		51	24	27	99.2				
	23.5-25	Silt With Sand (ML)	23.8					74.7				
28-30	Lean Clay (CL)	28.0	101.5	46	26	20		1.4 (1,3)	14.5	0		



# TABLE 1

## LABORATORY TEST SUMMARY

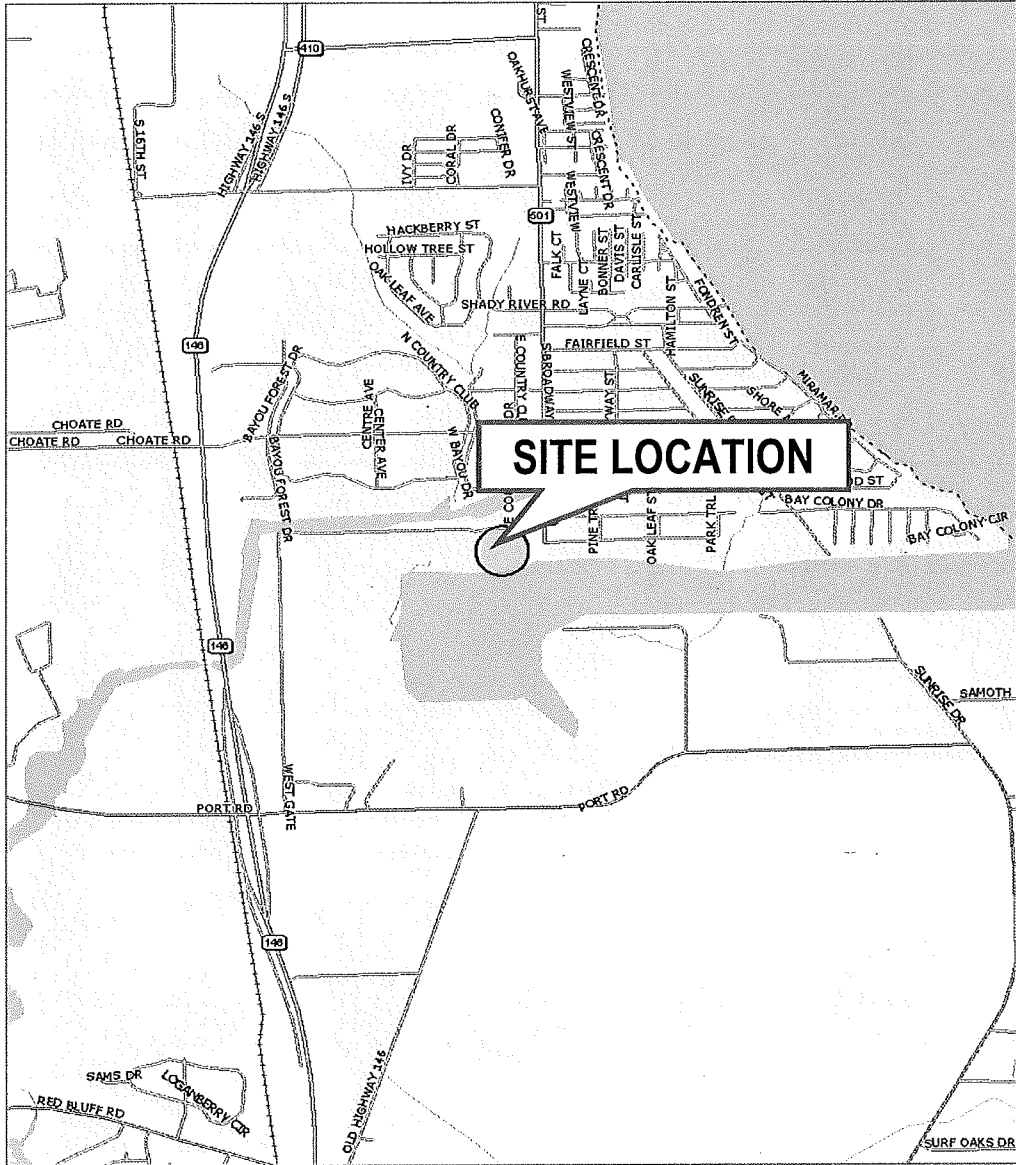
**PROJECT:** Proposed San Jacinto College Maritime Facility, Phase II  
**LOCATION:** Harris County, Texas  
**CLIENT:** San Jacinto College District

HTS PROJECT NO.: 13-S-342  
 PAGE 2 OF 2

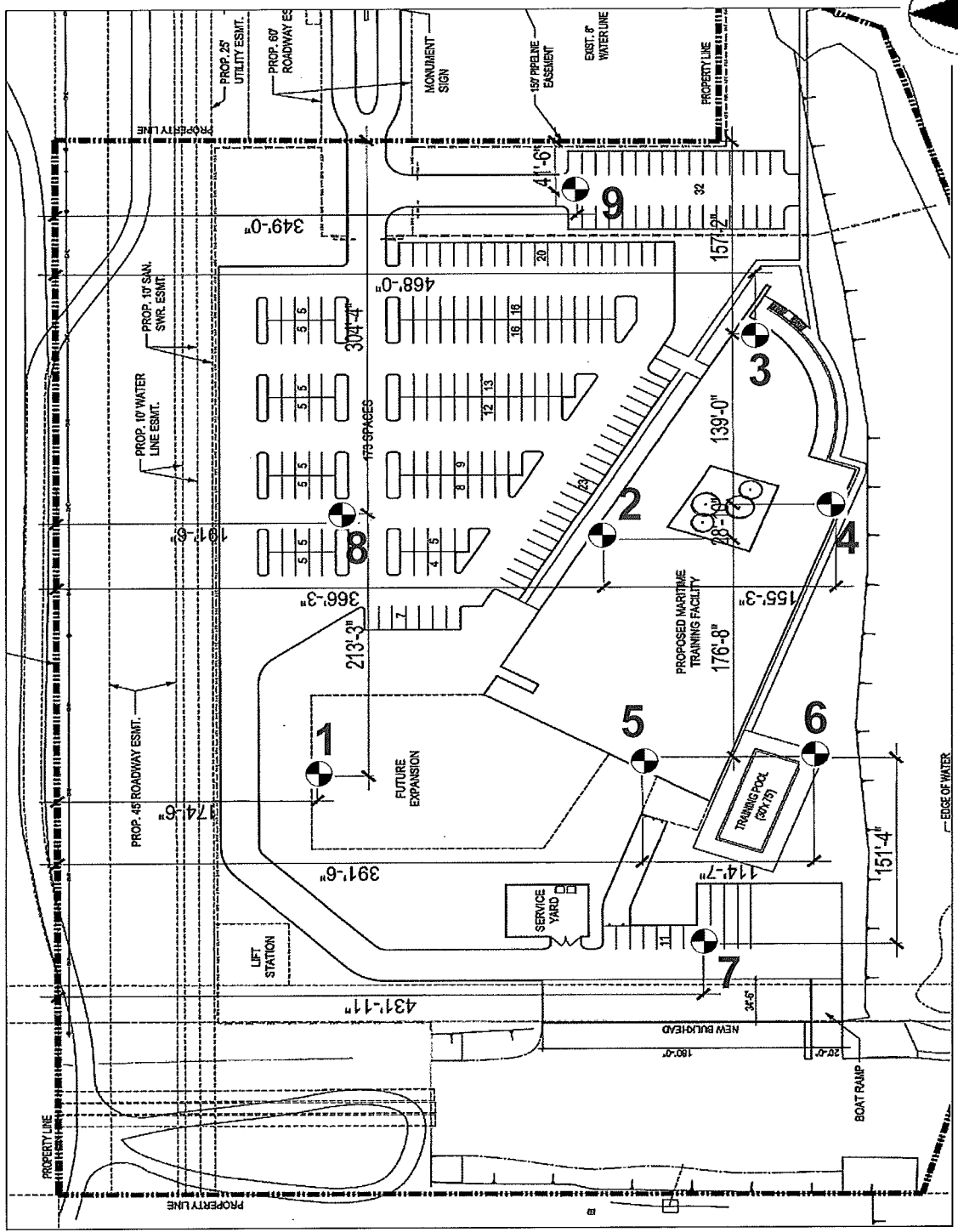
Boring No.	Sample Depth (feet)	Type of Material	Moisture Content (%)	Dry Density (pcf)	Atterberg Limits (%)			-200 Sieve (%)	Unconfined Compressive Strength (tsf)	Strain (%)	Lateral Pressure (psi)	Remarks
					LL	PL	PI					
5	4-6	Fat Clay (FILL)	24.8	106.9	63	28	35	89.7	0.6 (1,2)	6.0	0	
	8-10	Fat Clay (CH)	30.7		61	28	33	87.2				
	13-15	Lean Clay (CL)	23.2		36	21	15	92.6				
	18-20	Clayey Sand (SC)	20.9		65	24	41	48.7				
	28-30	Fat Clay (CH)	29.3									
6	0-2	Lean Clay With Sand (FILL)	11.2	102.6	49	19	30	84.7	2.3 (1,2)	7.5	0	
	8-10	Fat Clay (CH)	28.7		60	26	34	97.2				
	13-15	Fat Clay (CH)	23.7		54	25	29					
	18-20	Fat Clay (CH)	28.4		58	23	35					
7	2-4	Lean Clay (FILL)	11.0	101.4	35	16	19	87.5	1.4 (1,3)	14.2	0	
	10-12	Fat Clay (CH)	26.7		90.9							
8	0-2	Lean Clay (FILL)	14.4		38	17	21	90.4				
	4-6	Fat Clay (CH)	19.3		63	22	41	89.2				
9	2-4	Lean Clay (FILL)	14.2		36	17	19	90.7				
	8-10	Fat Clay (CH)	28.9		67	27	40	91.1				



## FIGURES



	<b>Project:</b>	Proposed San Jacinto College Maritime Facility Phase II Harris County, Texas	<b>Project No:</b> 13-S-342
416 Pickering St, Houston, Texas	<b>Date:</b> 8/25/13		<b>SITE LOCATION</b>



416 Pickering St.,  
Houston, Texas

Project:  
Date: 8/25/13

Proposed San Jacinto College Maritime Facility  
Phase II  
Harris County, Texas

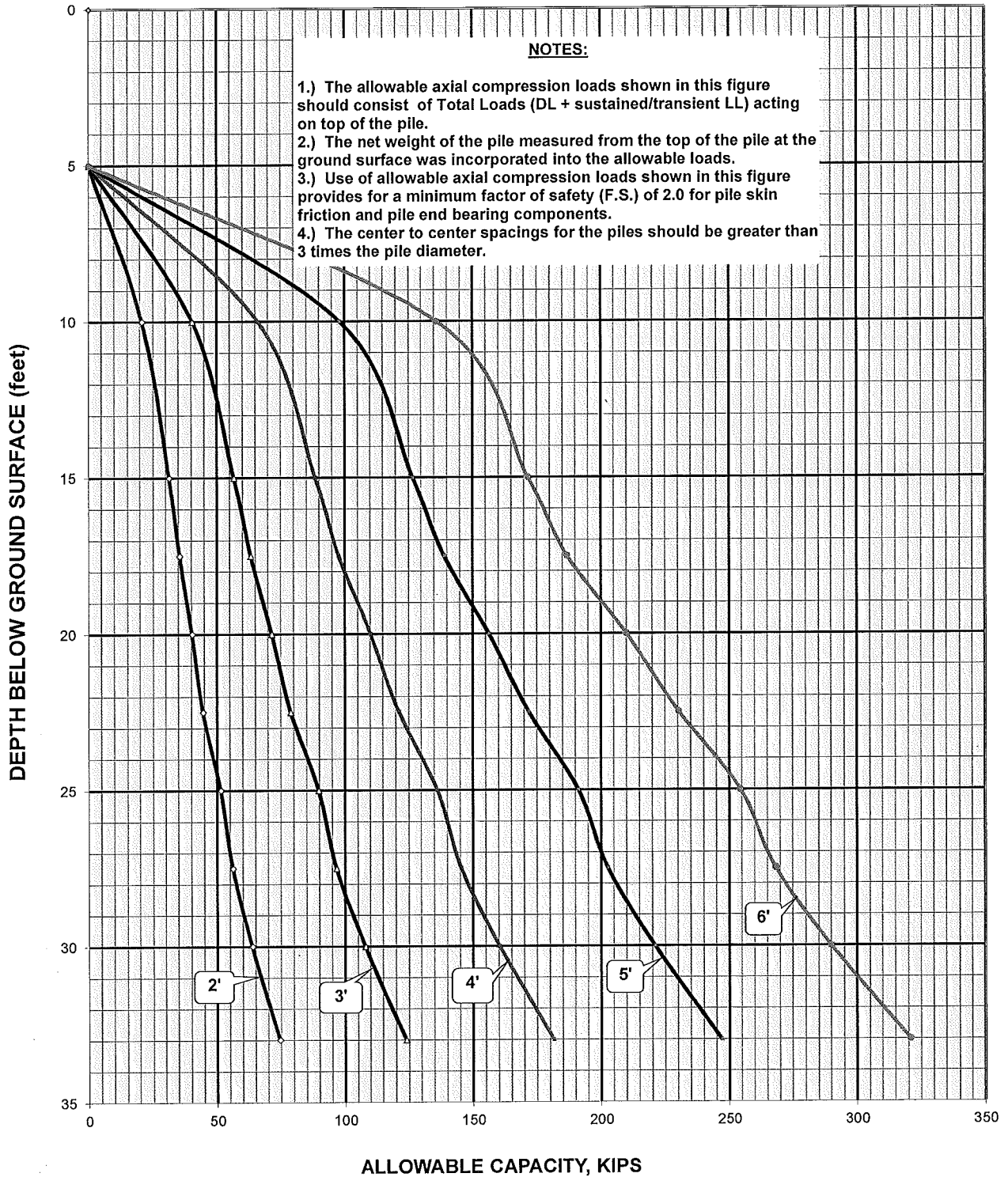
**LOCATIONS OF BORINGS**

Project No:  
13-S-342

**Figure 2**

# DESIGN CURVES

## PILE CAPACITY CURVES - IN COMPRESSION



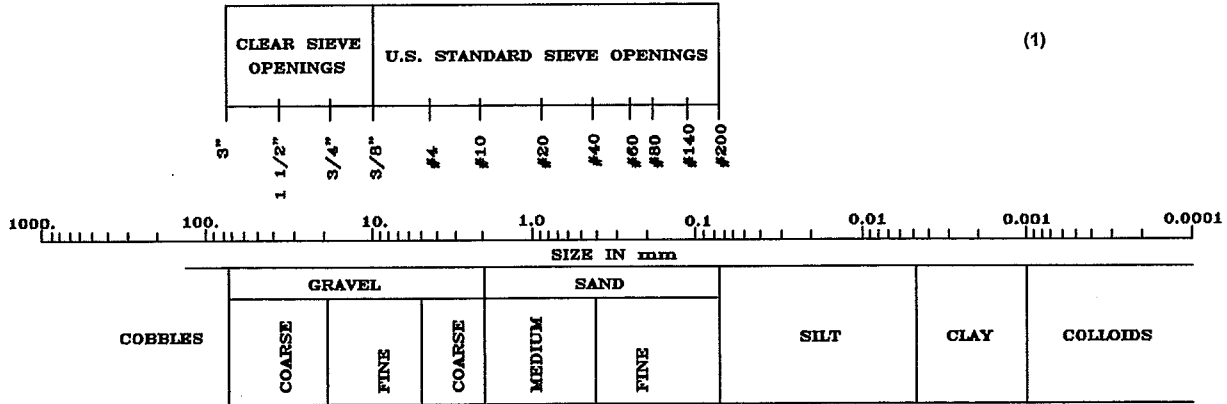
Project : Proposed San Jacinto College Maritime Facility, Phase II  
 Location: Harris County, Texas

Job No.: 13-S-342  
 Client: SJCD  
 Date: 8/23/2013

**FIGURE 3**

**APPENDIX A**  
**BORING LOGS**  
**(Boring Nos. 1 through 9)**

# DESCRIPTION OF BORING LOG TERMS



## U S C S CLASSIFICATION FOR SOILS BORING LOG LEGEND

- Core
- Penetration Sample
- No Recovery
- J - Jar
- Groundwater Level Encountered During Drilling
- Static Water Level

### SPLIT-SPOON SAMPLER DRIVING RECORD

Blows Per Foot ..... Description  
 8-10-12 ..... Number of blows for each six inch increment of split spoon penetration  
 50/5' ..... Number of blows of split spoon penetration for the indicated depth of penetration in inches.

Consistency	Undrained Shear Strength, Tons per Sq. Ft.	Unconfined Compressive Strength, Tons Per Sq. Ft. (Pocket Penetrometer)
Very Soft	0.12	Less than 0.25
Soft	0.12 to 0.25	0.25 to 0.50
Firm	0.25 to 0.50	0.50 to 1.0
Stiff	0.50 to 1.0	1.0 to 2.0
Very Stiff	1.0 to 2.0	2.0 to 4.0
Hard	Greater than 2.0	Greater than 4.0

Blows Per Foot	Descriptive Term	Relative Density %
0 - 4	Very Loose	Less than 20
5 - 10	Loose	20 to 40
11 - 30	Medium Dense	40 to 60
31 - 50	Dense	60 to 80
Over 50	Very Dense	Greater than 80

### SOIL STRUCTURE

- Slickensided ..... Having planes of weakness that appear slick and glossy. The degree of slickensidedness depends upon the spacing of slickensides and the ease of breaking along these planes.
- Fissured ..... Containing shrinkage or relief cracks, often filled with fine sand or silt; usually more or less vertical.
- Pocket ..... Inclusion of material of different texture that is smaller than the diameter of the sample.
- Parting ..... Inclusion less than 1/8 inch thick extending through the sample.
- Seam ..... Inclusion 1/8 inch to 3 inches thick extending through the sample.
- Layer ..... Inclusion greater than 3 inches thick extending through the sample.
- Laminated ..... Soil sample composed of alternating partings or seams of different soil types.
- Interlayered ..... Soil sample composed of alternating layers of different soil types.
- Intermixed ..... Soil sample composed of pockets of different soil types and layered or laminated structure is not evident.
- Calcareous ..... Having appreciable quantities of carbonate.

**Notes:**  
 The boring logs and related information depict subsurface conditions only at the specific locations and dates indicated. Soil conditions and water levels at other locations may differ from conditions occurring at these boring locations. Also the passage of time may result in a change in the conditions at these boring locations.

**References:**  
 (1) ASTM D 422  
 (2) Soil Mechanics in Engineering Practice, Terzaghi and Peck, 1967.





# LOG OF BORING

**PROJECT:** Proposed San Jacinto College Maritime Facility  
Phase II

**BORING NO.:** 1  
**BORING LOCATION:** See Figure 2  
**BORING TYPE:** Auger 0 - 20'  
Rotary 20' - 35'  
**HTS PROJECT NO.:** 13-S-342  
**DATE:** August 9, 2013

**PROJECT LOCATION:** Harris County, Texas

**CLIENT:** San Jacinto College District

Depth (ft.)	Sample		Penetrometer Reading (tsf)	SPT Blows Per Foot	Description of Stratum		
	Type	No.					
1		1	4.5	10-12-15	Light brown LEAN CLAY (FILL), stiff to hard w/ calcareous nodules		
2							
3		2	1.25				
4							
5		3	2.75				
6							
7		4	1.0		6'	Light gray FAT CLAY (CH), firm to very stiff	
8							- light brown and tan at 8'
9		5	1.25				
10							- tan w/ sand fissures and slickensides at 10'
11		6	1.25				
12							
13						▼ 12.5' 13'      ▽ 13'	
14		7	1.0			Light brown CLAYEY SAND (SC), loose	
15						15'	
16						Brown SILTY SAND (SM), medium dense	
17							
18							
19	X	8					
20							
21							
22						22'	
23						Brown FAT CLAY (CH), firm to very stiff - w/ sand fissures and slickensides at 23'	
24		9	3.5				
25							

See page 2 of 2 for continuation of Log of Boring No. 1



# LOG OF BORING

**PROJECT:** Proposed San Jacinto College Maritime Facility  
Phase II

**BORING NO.:** 1  
**BORING LOCATION:** See Figure 2  
**BORING TYPE:** Auger 0 - 20'  
 Rotary 20' - 35'  
**HTS PROJECT NO.:** 13-S-342  
**DATE:** August 9, 2013

**PROJECT LOCATION:** Harris County, Texas

**CLIENT:** San Jacinto College District

Depth (ft.)	Sample		Penetrometer Reading (tsf)	SPT Blows Per Foot	Description of Stratum
	Type	No.			
26		10	2.75		Brown FAT CLAY (CH), firm to very stiff w/ sand fissures and slickensides
27					
28					
29					
30					
31					
32					
33					
34					
35					
Boring terminated at 35'					
Groundwater was encountered at a depth of 13' during drilling. Approximately 15 minutes after water was encountered, the water level was measured at a depth of 12.5' and the boring was open to a depth of 14.8'.					



# LOG OF BORING

PROJECT: Proposed San Jacinto College Maritime Facility  
Phase II

BORING NO.: 2  
BORING LOCATION: See Figure 2  
BORING TYPE: Auger 0 - 20'  
Rotary 20' - 35'  
HTS PROJECT NO.: 13-S-342  
DATE: August 9, 2013

PROJECT LOCATION: Harris County, Texas

CLIENT: San Jacinto College District

Depth (ft.)	Sample		Penetrometer Reading (tsf)	SPT Blows Per Foot	Description of Stratum
	Type	No.			
1		1	4.5		Reddish brown LEAN CLAY (FILL), stiff to hard w/ calcareous nodules  - w/ sand fissures at 4'  6.5'
2					
3		2	4.5		
4					
5		3	1.5		
6					
7		4	1.5		Gray and brown FAT CLAY (CH), stiff to very stiff
8					
9		5	1.75		
10					- tan and light brown w/ sand pockets at 10'
11		6	2.0		
12					
13					▼ 13' - w/ sand fissures at 13'
14		7	2.25		
15					▽ 15'
16					
17					
18					18'
19		8	0.75		Tan and light brown CLAYEY SAND (SC), loose
20					
21					21'
22					Reddish brown SANDY SILT (ML), medium dense
23					
24	X	9			
25				8-11-15	

See page 2 of 2 for continuation of Log of Boring No. 2



# LOG OF BORING

**PROJECT:** Proposed San Jacinto College Maritime Facility  
Phase II

**BORING NO.:** 2  
**BORING LOCATION:** See Figure 2  
**BORING TYPE:** Auger 0 - 20'  
Rotary 20' - 35'  
**HTS PROJECT NO.:** 13-S-342  
**DATE:** August 9, 2013

**PROJECT LOCATION:** Harris County, Texas

**CLIENT:** San Jacinto College District

Depth (ft.)	Sample		Penetrometer Reading (tsf)	SPT Blows Per Foot	Description of Stratum			
	Type	No.						
26		10	4.0		Reddish brown SANDY SILT (ML), medium dense			
27					27'			
28					Reddish brown LEAN CLAY (CL), stiff to very stiff w/ sand fissures and slickensides			
29								
30					30'			
31					Brown FAT CLAY (CH), very stiff			
32								
33								
34					11	4.0		
35								35'
Boring terminated at 35' Groundwater was encountered at a depth of 15' during drilling. Approximately 15 minutes after water was encountered, the water level was measured at a depth of 13' and the boring was open to a depth of 14.2'.								

# LOG OF BORING

**PROJECT:** Proposed San Jacinto College Maritime Facility  
Phase II

**BORING NO.:** 3  
**BORING LOCATION:** See Figure 2  
**BORING TYPE:** Auger 0 - 20'  
Rotary 20' - 35'  
**HTS PROJECT NO.:** 13-S-342  
**DATE:** August 9, 2013

**PROJECT LOCATION:** Harris County, Texas

**CLIENT:** San Jacinto College District

Depth (ft.)	Sample		Penetrometer Reading (tsf)	SPT Blows Per Foot	Description of Stratum
	Type	No.			
1		1	4.0		Light brown LEAN CLAY (FILL), stiff to very stiff  - gray and light brown at 4'  6'
2					
3		2	4.0		
4					
5		3	4.0		
6			1.25		
7		4	1.5		Gray FAT CLAY (CH), stiff to very stiff w/ ferrous nodule, sand fissures, and slickensides
8					- tan w/ calcareous nodules at 8'
9		5	1.25		
10					- light brown at 10'
11		6	1.75		
12					
13					▼ 13.5'
14		7	2.5		
15					
16					
17					
18					▽ 18'
19		8	4.0		
20					
21					
22					22'
23					Brown SILTY SAND (SM), medium dense
24	X	9		9-13-17	
25					

See page 2 of 2 for continuation of Log of Boring No. 3



# LOG OF BORING

**PROJECT:** Proposed San Jacinto College Maritime Facility  
Phase II

**BORING NO.:** 3  
**BORING LOCATION:** See Figure 2  
**BORING TYPE:** Auger 0 - 20'  
Rotary 20' - 35'  
**HTS PROJECT NO.:** 13-S-342  
**DATE:** August 9, 2013

**PROJECT LOCATION:** Harris County, Texas

**CLIENT:** San Jacinto College District

Depth (ft.)	Sample		Penetrometer Reading (tsf)	SPT Blows Per Foot	Description of Stratum			
	Type	No.						
26		10	4.5		Brown SILTY SAND (SM), medium dense			
27					27'			
28					Brown FAT CLAY (CH), very stiff to hard w/ sand pockets - w/ sand fissures at 28'			
29								
30								
31								
32								
33					- tan and light brown at 33'			
34					11	4.0		
35								35'
Boring terminated at 35' Groundwater was encountered at a depth of 18' during drilling. Approximately 15 minutes after water was encountered, the water level was measured at a depth of 13.5' and the boring was open to a depth of 19.1'.								



# LOG OF BORING

**PROJECT:** Proposed San Jacinto College Maritime Facility  
Phase II

**BORING NO.:** 4  
**BORING LOCATION:** See Figure 2  
**BORING TYPE:** Auger 0 - 20'  
Rotary 20' - 35'  
**HTS PROJECT NO.:** 13-S-342  
**DATE:** August 9, 2013

**PROJECT LOCATION:** Harris County, Texas

**CLIENT:** San Jacinto College District

Depth (ft.)	Sample		Penetrometer Reading (tsf)	SPT Blows Per Foot	Description of Stratum
	Type	No.			
1		1	4.5		Reddish brown LEAN CLAY (FILL), hard w/ calcareous nodules
2					
3		2	4.5		2' Gray and brown FAT CLAY (FILL), stiff to hard
4					
5		3	2.0		6' Gray FAT CLAY (CH), stiff
6					
7		4	1.75		
8					
9		5	1.5		- light brown w/ calcareous nodules, ferrous nodules, sand fissures, and slickensides at 10'
10					
11		6	1.75		12' Tan and light brown CLAYEY SAND (SC), very loose to medium dense ▽ 13' ▼ 13'
12					
13		7	0.5		
14					
15		8	1.5		
16					
17		8	0.75		
18					
19		8	0.25		22' Reddish brown SILT WITH SAND (ML), medium dense
20					
21		9		10-13-17	
22					
23		9			
24	X				
25					

See page 2 of 2 for continuation of Log of Boring No. 4



# LOG OF BORING

**PROJECT:** Proposed San Jacinto College Maritime Facility  
Phase II

**BORING NO.:** 4  
**BORING LOCATION:** See Figure 2  
**BORING TYPE:** Auger 0 - 20'  
Rotary 20' - 35'  
**HTS PROJECT NO.:** 13-S-342  
**DATE:** August 9, 2013

**PROJECT LOCATION:** Harris County, Texas

**CLIENT:** San Jacinto College District

Depth (ft.)	Sample		Penetrometer Reading (tsf)	SPT Blows Per Foot	Description of Stratum			
	Type	No.						
26		10	4.0		Reddish brown SILT WITH SAND (ML), medium dense			
27					26'	Brown LEAN CLAY (CL), stiff to very stiff w/ sand pockets and sand fissures		
28								
29								
30								
31							30'	
32							Reddish brown FAT CLAY (CH), very stiff w/ calcareous nodules and sand pockets	
33								
34					11	4.0		
35								35'
Boring terminated at 35'								
Groundwater was encountered at a depth of 13' during drilling. Approximately 15 minutes after water was encountered, the water level was measured at a depth of 13' and the boring was open to a depth of 13.6'.								





# LOG OF BORING

PROJECT: Proposed San Jacinto College Maritime Facility  
Phase II

BORING NO.: 5  
BORING LOCATION: See Figure 2  
BORING TYPE: Auger 0 - 20'  
Rotary 20' - 35'  
HTS PROJECT NO.: 13-S-342  
DATE: August 9, 2013

PROJECT LOCATION: Harris County, Texas

CLIENT: San Jacinto College District

Depth (ft.)	Sample		Penetrometer Reading (tsf)	SPT Blows Per Foot	Description of Stratum
	Type	No.			
1		1	4.25		Gray and brown LEAN CLAY (FILL), hard w/ calcareous nodules
2					2'
3		2	4.5		Gray FAT CLAY (FILL), firm to hard w/ calcareous nodules
4			1.0		
5		3	1.25		
6					6'
7		4	1.5		Gray FAT CLAY (CH), stiff to very stiff
8					- light brown w/ ferrous nodules and calcareous nodules at 8'
9		5	1.25		
10					
11		6	3.0		
12					
13					13'
14		7	1.25		Light brown LEAN CLAY (CL), firm to stiff w/ sand fissures and slickensides
15					▼ 15'
16					
17					
18					18'      ▽ 18'
19		8	0.25		Light brown CLAYEY SAND (SC), very loose to loose w/ ferrous nodules and calcareous nodules
20			1.0		
21					
22					
23					23'
24	X				Brown SILTY SAND (SM), medium dense
25		9		6-12-14	

See page 2 of 2 for continuation of Log of Boring No. 5



# LOG OF BORING

**PROJECT:** Proposed San Jacinto College Maritime Facility  
Phase II

**BORING NO.:** 5  
**BORING LOCATION:** See Figure 2  
**BORING TYPE:** Auger 0 - 20'  
Rotary 20' - 35'  
**HTS PROJECT NO.:** 13-S-342  
**DATE:** August 9, 2013

**PROJECT LOCATION:** Harris County, Texas

**CLIENT:** San Jacinto College District

Depth (ft.)	Sample		Penetrometer Reading (tsf)	SPT Blows Per Foot	Description of Stratum
	Type	No.			
26					Brown SILTY SAND (SM), medium dense  27' Light brown FAT CLAY (CH), stiff to very stiff w/ sand fissures        - w/ ferrous nodules and calcareous nodules at 33'   35' Boring terminated at 35' Groundwater was encountered at a depth of 18' during drilling. Approximately 15 minutes after water was encountered, the water level was measured at a depth of 15' and the boring was open to a depth of 16.2'.
27					
28					
29		10	2.25		
30					
31					
32					
33					
34		11	3.0		
35					



# LOG OF BORING

**PROJECT:** Proposed San Jacinto College Maritime Facility  
Phase II

**BORING NO.:** 6  
**BORING LOCATION:** See Figure 2  
**BORING TYPE:** Auger

**PROJECT LOCATION:** Harris County, Texas

**HTS PROJECT NO.:** 13-S-342  
**DATE:** August 9, 2013

**CLIENT:** San Jacinto College District

Depth (ft.)	Sample		Penetrometer Reading (tsf)	SPT Blows Per Foot	Description of Stratum
	Type	No.			
1		1	4.5		Brown LEAN CLAY WITH SAND (FILL), very stiff to hard w/ calcareous nodules
2					
3					
4		2	4.5		- w/ ferrous nodules at 4'
5					
6		3	3.0		6'
7					
8		4	1.5		Light gray FAT CLAY (CH), stiff to very stiff w/ ferrous nodules
9					
10					
11		5	1.25		- light brown at 10'
12					
13		6	1.0		- brown w/ sand fissures, calcareous nodules, and slickensides at 13'
14					
15					
16		7	2.5	▼ 15'	
17					
18		8	3.0	▽ 18'	- tan and light brown at 18'
19					
20					
Boring terminated at 20'					
Groundwater was encountered at a depth of 18' during drilling. Approximately 15 minutes after water was encountered, the water level was measured at a depth of 15' and the boring was open to a depth of 19'.					



# LOG OF BORING

**PROJECT:** Proposed San Jacinto College Maritime Facility  
Phase II

**BORING NO.:** 7  
**BORING LOCATION:** See Figure 2  
**BORING TYPE:** Auger

**PROJECT LOCATION:** Harris County, Texas

**HTS PROJECT NO.:** 13-S-342  
**DATE:** August 9, 2013

**CLIENT:** San Jacinto College District

Depth (ft.)	Sample		Penetrometer Reading (tsf)	SPT Blows Per Foot	Description of Stratum
	Type	No.			
1		1	4.5		Brown LEAN CLAY (FILL), hard w/ ferrous nodules and calcareous nodules
2					
3		2	4.5		
4					
5		3	1.75		4'
6					
7		4	0.75		Brown FAT CLAY (CH), firm to stiff w/ ferrous nodules
8					
9		5	1.0		- tan and gray at 6'
10					
11		6	0.75		▼ 8' - light gray at 8'
12					
13		7	0.75		- light brown at 10'
14					
15		8	0.75		- light brown and tan at 13'
16					
17		8	1.0		▽ 15'
18					
19		8	0.75		18'
20					
					20'
Boring terminated at 20'					
Groundwater was encountered at a depth of 15' during drilling. Approximately 15 minutes after water was encountered, the water level was measured at a depth of 8' and the boring was open to a depth of 12.9'.					



# LOG OF BORING

**PROJECT:** Proposed San Jacinto College Maritime Facility  
Phase II

**BORING NO.:** 8  
**BORING LOCATION:** See Figure 2  
**BORING TYPE:** Auger

**PROJECT LOCATION:** Harris County, Texas

**HTS PROJECT NO.:** 13-S-342  
**DATE:** August 12, 2013

**CLIENT:** San Jacinto College District

Depth (ft.)	Sample		Penetrometer Reading (tsf)	SPT Blows Per Foot	Description of Stratum
	Type	No.			
1		1	3.75		Gray and tan LEAN CLAY (FILL), very stiff w/ roots  - w/ sand pockets at 2'
2					
3		2	2.75		4'
4					
5		3	2.0		Gray and tan FAT CLAY (CH), stiff to very stiff w/ sand pockets  - light gray and tan at 6'
6					
7		4	2.0		- w/ ferrous nodules and calcareous nodules at 8'
8					
9		5	2.25		10'
10					
Boring terminated at 10'					
Groundwater was not encountered during drilling. The boring wa backfilled with soil cuttings after the completion of drilling.					



# LOG OF BORING

**PROJECT:** Proposed San Jacinto College Maritime Facility  
Phase II

**BORING NO.:** 9  
**BORING LOCATION:** See Figure 2  
**BORING TYPE:** Auger

**PROJECT LOCATION:** Harris County, Texas

**HTS PROJECT NO.:** 13-S-342  
**DATE:** August 9, 2013

**CLIENT:** San Jacinto College District

Depth (ft.)	Sample		Penetrometer Reading (tsf)	SPT Blows Per Foot	Description of Stratum
	Type	No.			
1		1	4.5		Brown LEAN CLAY (FILL), hard w/ ferrous nodules and calcareous nodules  - w/ gravel at 4'  6'
2					
3		2	4.5		
4					
5		3	4.5		
6					
7		4	3.25		Tan and light brown FAT CLAY (CH), very stiff w/ sand pockets
8					
9		5	2.5		10'
10					
Boring terminated at 10'					
Groundwater was not encountered during drilling. The boring wa backfilled with soil cuttings after the completion of drilling.					



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**SECTION 03 15 19**

**BELOW SLAB VAPOR MEMBRANES**

CONDITIONS OF THE CONTRACT, SECTIONS AA THROUGH CB AND DIVISION 1 APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
- 01 Provide all vapor retarder membranes, vapor barrier membranes and related accessories as required forming a complete, 100% sealed membrane below building foundations.
  - 02 Coordinate work with other trades to seal all penetrations through the slab membrane.
- B. Related Work:
- 01 Section 01 45 23 – Testing and Inspection Services.
  - 02 Section 03 30 00 – Cast-In-Place Concrete.
  - 03 Section 07 17 13 – Bentonite Composite Sheet Waterproofing.

**1.2 SUBMITTALS**

- A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.
- C. Shop Drawings: Submit complete shop drawings consisting of design, fabrication and erection / installation of proposed assemblies.
- 01 Show profiles, sizes, spacing and locations of assembled components.
  - 02 Show details of shop fabrications, connections and details.
  - 03 Show details of field fabrications, connections and details.
  - 04 Provide calculations demonstrating compliance with wind load and other requirements.
  - 05 Shop drawings shall be sealed and signed by a Texas registered engineer.
- D. Installation Instructions: Submit manufacturer’s complete installation instructions, including fastening, for all products and / or assemblies proposed to be furnished.
- 01 Installation details submitted for review shall be specific to the work of this contract and accurately depict interface within the assembly(s) indicated on the Drawings.
  - 02 Generic details that do not depict actual conditions shall not be acceptable.
  - 03 Installation shall be in strict accordance with ASTM E1643.
  - 04 Provide details to be used to seal the perimeter of the vapor barriers to the foundation per ASTM E1642-11.
  - 05 Provide details to be used to seal other trade work that penetrates the slab membrane.
  - 06 Provide details to be used to seal penetrations made by temporary form stakes.
- E. Tests and Certifications:
- 01 Summary of test results per paragraph 9.3 of ASTM E1745.

- 1                   02       All mandatory ASTM E1745 testing must be performed on a single production  
2                   roll per ASTM E1745 Section 8.1.
- 3                   03       Upon completion of slab membrane installation and foundation preparation  
4                   immediately prior to placement of concrete, manufacturer's rep shall inspect  
5                   membrane installation and provide certification that installation is complete, and  
6                   in accordance with specified requirements.
- 7
- 8                   F.       Actual Samples of Proposed Materials:
- 9                   01       Vapor retarder membrane, 8" x 10" minimum size.
- 10                  02       Vapor barrier membrane, 8" x 10" minimum size.
- 11                  03       Membrane perimeter grade beam sealing device(s).
- 12                  04       Joint / seam tape, 12" minimum length.
- 13                  05       Pre-formed penetration boot (each type).
- 14

15       **1.3    REFERENCES**

16

- 17                  A.       American Concrete Institute (ACI):
- 18                   01       Detailing Manual.
- 19                   02       ACI 302.2R-06 – Guide for Concrete Slabs that Receive Moisture-Sensitive  
20                   Flooring Materials.
- 21
- 22                  B.       U.S. Federal Specifications:
- 23                   01       Fed. Spec. SS-S-158.
- 24                   02       Fed. Spec. SS-S-164.
- 25
- 26                  C.       American Society for Testing and Materials (ASTM):
- 27                   01       ASTM D882 – Standard Test Method for Tensile Properties of Thin Plastic  
28                   Sheeting.
- 29                   02       ASTM D1709 – Standard Test Methods for Impact Resistance of Plastic Film  
30                   by the Free Falling Dart Method.
- 31                   03       ASTM E154 – Standard Test Methods for Water Vapor Retarders Used in  
32                   Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
- 33                   04       ASTM E1643 – Selection, Design, Installation, and Inspection of Water Vapor  
34                   Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- 35                   05       ASTM E1745 Class A – Standard Specification for Plastic Water Vapor  
36                   Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
- 37

38       **1.4    SITE CONDITIONS**

39

- 40                  A.       Do not proceed with membrane installation until all subgrade testing is complete and  
41                   found to be in compliance with specified requirements.
- 42
- 43                  B.       Subgrade Conditions:
- 44                   01       Inspect subgrade conditions as required to confirm adequacy for installation of  
45                   slab membrane work in accordance with manufacturer's standards and specified  
46                   requirements.
- 47                   02       Verify that under-slab work of other trades is complete and does not present any  
48                   conditions that may prevent the proper installation of slab membrane work in  
49                   accordance with manufacturer's standards and specified requirements; or create  
50                   a potential for breaching the membrane after it is installed.
- 51                   03       Notify Contractor of any discrepancies, deficiencies and / or issues. Do not  
52                   proceed until fully resolved.
- 53
- 54
- 55
- 56



1 **PART 2 - PRODUCTS**

2  
3 **2.1 MANUFACTURERS**

- 4  
5 A. Stego Industries, "Stego Wrap Vapor Barrier 15" is basis of design.  
6  
7 B. Other acceptable manufacturers: the following manufacturers are acceptable provided  
8 proposed products meet or exceed all specified requirements.  
9 01 Reef Industries; "Griffolyn 15 mil".  
10 02 W.R. Meadows; "Perminator 15 mil"  
11 03 Henry Company; "Moistop Ultra"  
12 04 ISI Building Products; "Viper II"  
13 05 Raven Industries; "Vaporblock VB 15"  
14 06 Tex-Trude, LP; "Xtreme Vapor Barrier"  
15

16 **2.2 VAPOR RETARDER BELOW-SLAB MEMBRANES**

- 17  
18 A. Design of Vapor Retarder Membrane is based on Stego Industries 15 mil Stego Wrap  
19 Vapor Barrier membrane.  
20 01 Provide all materials and accessories as specified and recommended by the  
21 manufacturer for a complete under slab membrane system.  
22  
23 B. Provide vapor retarder membrane below all building slabs / foundations except areas  
24 described below to receive vapor barrier membrane.  
25  
26 C. Under Slab Vapor Retarder Membrane:  
27 01 Material: manufactured from a blend of the highest quality virgin polyolefin  
28 resins.  
29 02 Vapor Retarder / Slab Membrane shall be a manufacturer's complete system  
30 including but not limited to membrane, joint tape, penetration boots, mastic /  
31 sealant, and other accessories as supplied by the manufacturer.  
32 03 High strength, flexible, polyolefin resin based, low-permeance, geo-membrane  
33 vapor retarder system.  
34 04 Meeting or exceeding all requirements of ASTM E1745, Class A.  
35 05 Thickness: 15 mils minimum; no exceptions.  
36 06 Water Vapor Permeance rating: 0.01 perms or less.  
37 07 Puncture Resistance: Exceeds 2,300 grams per ASTM D1709 Method B.  
38 08 Tensile Strength: Exceeds 55 PSI per ASTM D882.  
39

40 **2.3 OTHER VAPOR MEMBRANES MATERIALS AND ACCESSORIES**

- 41  
42 A. Vapor Retarder Membrane Seam Tape and Perimeter Seal:  
43 01 Design is based on Stego Industries "Crete Claw" seam tape with a heavily  
44 textured top that forms a mechanical bond to the wet concrete.  
45 02 Width: minimum 6".  
46 03 High density polyethylene tape with pressure sensitive adhesive specifically  
47 formulated for use with the polyolefin membrane.  
48 04 Permeance: 0.03 maximum.  
49 05 Thickness: shall be same as membrane or thicker.  
50 06 In addition to application at membrane seams, apply tape on a maximum 10' x  
51 10' grid throughout the membrane surface to assure consistent and complete  
52 attachment to the structural concrete foundation.  
53  
54 B. Membrane Penetrations:  
55 01 All penetrations through the vapor barrier membrane shall be completely sealed.  
56 02 Methodology shall be as recommended by the manufacturer.

- 1                   03       Design is based on Stego Tape and Stego Mastic in accordance with  
 2                   manufacturer's standards and recommendations for the specific application.  
 3                   04       Other methods (i.e. preformed boots) will be consider based on manufacturer's  
 4                   recommendations, subject to approval by the Architect.  
 5  
 6           C.       System Requirements:  
 7                   01       The vapor retarder membrane shall be a system specifically designed or suited  
 8                   to be applied to a structural concrete foundation where the slab is elevated above  
 9                   grade.  
 10                  02       The vapor retarder system must adhere to the underside of the foundation and  
 11                  remain in place after deterioration of the cardboard carton forms used to form  
 12                  the structural slab.  
 13                  03       Attachment to the structural foundation by any means that penetrate the vapor  
 14                  barrier membrane shall not be accepted.  
 15                  04       The perimeter grade beams of the structural foundation shall bear on subgrade.  
 16                  The system shall extend to the outside face of the grade beams and be similarly  
 17                  permanently attached.  
 18  
 19           D.       Accepted methods of membrane attachment to underside of structural foundation:  
 20                   01       Use of a seam tape and / or seam tape grid that is capable of permanently  
 21                   bonding with the concrete at the time it is poured (basis of design).  
 22                   02       Use of a membrane that has an integral fleece back designed to permanently  
 23                   bond with the concrete at the time it is poured.  
 24

25   **PART 3 - EXECUTION**

26  
 27   **3.1    PREPARATION**

- 28  
 29           A.       Foundation Preparation: Verify the following is complete and acceptable prior to  
 30           installation of under slab membranes:  
 31                   01       Foundation formwork.  
 32                   02       Underground work of other trades.  
 33                   03       All work that will penetrate the vapor membrane.  
 34  
 35           B.       Verify the area to receive under slab membranes is free from other trade work,  
 36           obstructions and / or foreign objects that may puncture the membrane after installation.  
 37                   01       Notify Contractor of any issues and / or concerns and do not proceed until  
 38                   satisfactorily resolved.  
 39  
 40           C.       Drilled Piers / Plinths: Thoroughly clean concrete plinths and prepare for sealing under  
 41           slab membrane to pier tops / plinths in accordance with membrane manufacturer's  
 42           installation instructions.  
 43  
 44           D.       Provide a means of sealing form stakes and other temporary penetrations through the  
 45           under slab membrane.  
 46  
 47           E.       VaporStakes® or other approved permanent stakes, sealed with mastic or seam tape at  
 48           membrane penetration as recommended by the membrane manufacturer, and approved  
 49           by the Architect.  
 50  
 51           F.       Temporary form block-out that will allow patching membrane after the stake is removed;  
 52           leaving room for patching and sealing membrane.  
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1 **3.2 UNDER SLAB MEMBRANE INSTALLATION**

- 2
- 3 A. Install membrane systems in strict accordance with manufacturer’s recommendations and
- 4 requirements, and in accordance with ASTM E1643.
- 5 01 Installation shall provide a continuous, sealed membrane barrier beneath all
- 6 building foundation area and below all grade beams through to the top of the
- 7 exterior face.
- 8 02 If / where membrane is interrupted (i.e. drilled footings, plinths, and similar),
- 9 membrane shall be sealed to concrete surface per manufacturer’s
- 10 recommendations.
- 11 03 Membrane shall extend through and up outside face of perimeter grade beams
- 12 to finish grade line.
- 13 04 Membrane shall be integrally and continuously attached to grade beam outside
- 14 face per manufacturer’s recommendations.
- 15
- 16 B. Install Vapor Retarder membrane system below all building foundations on properly
- 17 compacted structural fill pad.
- 18
- 19 C. Lay out membrane in as full sheets as possible, minimizing the amount of joints / seams.
- 20
- 21 D. Lap joints / seams 6” minimum and seal continuously with membrane manufacturer’s
- 22 system joint tape covering full laps in accordance with manufacturer’s instructions.
- 23 01 Clean all debris, dirt and other contaminants from membrane surfaces to receive
- 24 joint tape.
- 25
- 26 E. Penetrations by Other Trades:
- 27 01 Work by other trades that penetrate membrane from subgrade to above slab shall
- 28 be sealed 100% to ensure and maintain under slab barrier effectiveness.
- 29 02 Provide manufacturer’s tape, mastic, preformed boots or accurately cut, site
- 30 fabricated membrane boots per manufacturer’s instructions and
- 31 recommendations.
- 32 03 All penetration sealing assemblies shall above finish slab elevation a minimum
- 33 of 6” and be sealed with seam tape and / or mastic to penetrating object.
- 34 04 Where multiple penetrations occur in close proximity, use mastic to completely
- 35 fill all voids and potential areas where water vapor could penetrate the assembly
- 36 in strict accordance with manufacturer’s standards recommendations.
- 37
- 38 F. Temporary Form Penetrations:
- 39 01 Where temporary forms are used to separate slab pours create slab recesses and
- 40 other types of offsets, supporting stakes penetrations through the slab membrane
- 41 shall be sealed 100%.
- 42 02 Acceptable permanent stakes to remain in the slab are acceptable, provided they
- 43 are sealed with mastic in accordance with manufacturer’s installation
- 44 instructions. Wood stakes are not acceptable permanent stakes.
- 45 03 Where temporary stakes are removed from the finished slab, provide an
- 46 acceptable means by which the hole through the membrane can be patched and
- 47 sealed with membrane, seam tape and / or mastic.
- 48 04 Completely fill stake voids with concrete as soon as practical while slab
- 49 concrete is still plastic.
- 50
- 51 G. Take all necessary precautions during concrete placement as required to prevent puncture
- 52 of the under slab membrane.
- 53 01 During concrete placement, continuously monitor / inspect the under slab
- 54 membrane.
- 55 02 Seal any / all membrane punctures before placement of concrete.
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**3.3 INSTALLATION CERTIFICATION**

- A. The vapor barrier membrane manufacturer shall provide the services of a qualified representative to provide the following services:
  - 01 Inspect the building foundation / slab prep to determine it is suitable for the membrane installation to commence.
  - 02 Inspect the membrane installation during installation to confirm all requirements, standards and recommendation are being strictly adhered to.
  - 03 Inspect the final foundation prep 24 hours prior to placement of concrete to verify that the vapor membrane system is correct.
  - 04 Be present during concrete placement to observe that all requirements regarding the vapor membrane system are being adhered to.
  
- B. Correct all deficiencies noted by the inspector as required for his approval.
  
- C. Provide a letter from the manufacturer certifying the installation is complete and acceptable to proceed with placement of concrete.

**END OF SECTION**

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**SECTION 03 30 00**

**CAST-IN-PLACE CONCRETE**

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
- 01 Provide all concrete and concrete accessories required for a complete installation.
  - 02 Building Foundation: Including drilled piers, grade beams, spread footings foundation walls, and / or slab on grade.
  - 03 Elevated slabs & reinforcement
  - 04 Site paving, curbs, flatwork and sidewalks.
  - 05 Foundations for site lighting or signs.
  - 06 HVAC equipment support structures and housekeeping pads
  - 07 Coordinate with all other trades to confirm requirements and scope required for all associated work.
- B. Related Work:
- 01 Section 01 45 23 – Testing and Inspection Services
  - 02 Section 03 15 19 – Below Slab Vapor Membrane
  - 03 Section 31 20 00 – Earth Moving
  - 04 Section 31 32 13.19 – Lime Soil Stabilization
  - 05 Section 32 13 13 – Concrete Paving and Flatwork

**1.2 SUBMITTALS**

- A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.
- C. Proposed mix designs for each different concrete mix proposed to be furnished, including adequate historical documentation of previous use to substantiate performance and strengths.
- D. Tests and Certifications:
- 01 Before starting any work under this section, make all required arrangements with the testing agency. The testing laboratory shall test and furnish certified reports on proposed cements, aggregates, mixing water and admixtures.
  - 02 Submit proposed design mixes for each type of concrete using previously tested and approved materials.
  - 03 Furnish certified reports of each proposed mix for each type of concrete.
  - 04 Proportion mixes by laboratory trial batch or field experience methods, using materials to be employed in the work for each class of concrete required, and report to the Architect.
  - 05 Refer to section 01 45 23 – Testing and Inspection Services for on-site procedures and testing requirements.
  - 06 Furnish ready mix delivery tickets.

- 1 C. Shop Drawings:
- 2 01 Shop drawings for all reinforcing steel. Show bending diagrams, splicing and
- 3 laps of rods, shapes, dimension and details of bar reinforcement and accessories.
- 4 02 Shop drawings showing location of all proposed construction and control joints,
- 5 keying / keyways, water stops, openings, depressions, trenches, sleeves, inserts,
- 6 and other items affecting reinforcement and placement of concrete.
- 7 03 Placement sequence schedule may be combined with Item 02.
- 8 04 Unless shown on the Site Plan, submit proposed layout for all expansion joints
- 9 in paving, flatwork and sidewalks.
- 10
- 11 D. Installation Instructions: Submit manufacturer's complete installation instructions,
- 12 including fastening, for all products and / or assemblies proposed to be furnished.
- 13 01 Installation details submitted for review shall be specific to the work of this
- 14 contract and accurately depict interface within the assembly(s) indicated on the
- 15 Drawings.
- 16 02 Generic details that do not depict actual conditions shall not be acceptable.
- 17
- 18 E. Maintenance Instructions: Submit manufacturer's complete maintenance instructions and
- 19 recommendations for all products and / or assemblies proposed to be furnished.
- 20 01 Include recommended cleaning products and instructions for use.
- 21 02 Where applicable, provide recommended maintenance schedules and
- 22 procedures.
- 23
- 24 F. Actual Samples of Proposed Materials: Provide two (2) actual samples of the following
- 25 products proposed to be furnished.
- 26 01 Plastic rebar chair supports
- 27 02 Water stops
- 28 03 Stains: full range of manufacturer's available color selections
- 29
- 30

31 **1.3 REFERENCES**

32

- 33 A. American Concrete Institute:
- 34 01 Detailing Manual
- 35 02 ACI 301 – Specifications for Structural Concrete
- 36
- 37 B. U.S. Federal Specifications:
- 38 01 Fed. Spec. SS-S-158
- 39 02 Fed. Spec. SS-S-164
- 40
- 41 C. American Society for Testing and Materials:
- 42 01 ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement
- 43 02 ASTM A615 - Steel Bars for Concrete Reinforcement
- 44 03 ASTM A704 - Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
- 45 04 ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens
- 46 in the Field
- 47 05 ASTM C33-379 – Standard Specifications for Concrete Aggregates
- 48 06 ASTM C94 – Standard Specifications Ready Mix Concrete
- 49 07 ASTM C150 – Standard Specifications for Portland Cement
- 50 08 ASTM C260, Specifications for Air Entraining Admixtures for Concrete
- 51 09 ASTM C309 - Standard Specification for Liquid Membrane-Forming
- 52 Compounds for Curing Concrete
- 53 10 ASTM C494 - Standard Specifications for Chemical Admixtures for Concrete
- 54 01 ASTM C 1315 - Standard Specification for Liquid Membrane-Forming
- 55 Compounds Having Special Properties for Curing and Sealing Concrete.
- 56

- 1 D. American Association of State Highway and Transportation Officials (AASHTO)  
2 01 AASHTO M-213-74 - Standard Specification for Preformed Expansion Joint  
3 Fillers for Concrete Paving and Structural Construction  
4 02 AASHTO M-148 – Standard Specifications for Liquid Membrane-Forming  
5 Compounds for Curing Concrete  
6  
7 E. Portland Cement Association: Joint Design for Concrete Highway and Street Pavement,  
8 Concrete-Typical Pavement Sections and Jointing Details.  
9

10 **1.4 SITE CONDITIONS**  
11

- 12 A. Environmental Conditions:  
13 01 Do not place concrete in contact with frozen earth.  
14 02 Do not commence concrete placement unless temperature is at least 35°F (2°C)  
15 and rising, or slabs until the temperature rises above 40°F.  
16 03 Discontinue concrete placement when air temperatures exceed 95°F.  
17 04 Do not place concrete during rain unless adequate protection is provided.  
18  
19 B. Subgrade Conditions:  
20 01 Inspect subgrade conditions as required to confirm adequacy for concrete work  
21 to proceed.  
22 02 Notify Contractor of any discrepancies, deficiencies and / or issues. Do not  
23 proceed until fully resolved.  
24  
25 C. Equipment and Manpower:  
26 01 Verify adequate equipment, in good working condition, is provided for all  
27 concrete pours.  
28 02 Verify adequate manpower is provided for concrete pours.  
29

30 **PART 2 - PRODUCTS**  
31

32 **2.1 MANUFACTURERS**  
33

- 34 A. Acceptable Manufacturers: Joint Sealant:  
35 01 Sonneborn  
36 02 Pecora  
37 03 Tremco  
38 04 W.R. Meadows  
39  
40 B. Acceptable Manufacturers: Reinforcing Chairs:  
41 01 OCM, Inc.  
42 02 Dayton Aztec Castle Chairs  
43 03 No other substitutions  
44  
45 C. Acceptable Manufacturers: Water-stops (also refer to structural drawings):  
46 01 Henry Company – Synko-Flex  
47 02 Durajoint – Seal-Tite  
48 03 Vinylex Corporation – Blue Stop  
49  
50 D. Acceptable Manufacturers: Curing Compound (sitework concrete only):  
51 01 Nox-Crete- Cure & Seal 100-300 E  
52 02 Sonneborn – Kure-N-Seal  
53 03 Shepler’s – Shep-Cure 309 Rez All  
54 04 W.R. Meadows – Vocomp-20  
55  
56

1 **2.2 CONCRETE MATERIALS**

- 2
- 3 A. Concrete:
- 4 01 General:
- 5 a. Ready-mixed concrete, ASTM C94
- 6 b. Comply with ACI 318.
- 7 c. Concrete must be approved by Architect through design mix and
- 8 cylinder test of testing laboratory.
- 9 02 Cement: Type 1, ASTM C150, unless approved otherwise by the Architect. Use
- 10 one brand of cement for entire project.
- 11 03 Aggregates:
- 12 a. Comply with ASTM C33. Aggregate shall be limestone at paving.
- 13 b. Maximum size not larger than one-fifth of the narrowest dimension
- 14 between forms of the member for which concrete is to be used. Not
- 15 larger than three-fourths of minimum clear spacing between reinforcing
- 16 bars.
- 17 c. Maximum 1 1/2 inches in building slabs.
- 18 04 Admixtures:
- 19 a. Approval necessary from Architect and testing laboratory
- 20 b. Calcium Chloride: Not permitted.
- 21 c. Color Pigment: At areas indicated on drawings provide pigment at 5
- 22 pounds per 94 pound sack of cement. Follow manufacturers'
- 23 recommendations.
- 24 05 Strengths:
- 25 a. 5 sack/3000 psi/28 days (minimum): all concrete including grade
- 26 beams, footings, slabs, pavements, walks.
- 27 b. Refer to Civil drawings for heavy duty pavements and their strength
- 28 requirements.
- 29 c. Strength recommendations on structural drawings supersede when they
- 30 are greater than specified here.
- 31 06 Water: Drinking quality
- 32 07 Slump:
- 33 a. Reinforced foundation walls and footing – 5-1/2 inch max.
- 34 b. Slabs, beams, columns and reinforced walls - 6 inch max.
- 35 c. Pavement – 5-1/2 inch max.
- 36
- 37 B. Metal Reinforcing Bars:
- 38 01 General : Conform to ACI Publication 315, latest edition.
- 39 02 Comply with ASTM A615, Grade 60.
- 40 03 #3 bars comply with ASTM A615, Grade 40
- 41
- 42 B. Welded Wire Mesh: NOT ALLOWED
- 43
- 44 C. Joints:
- 45 01 Construction Joint (Building Slab):
- 46 02 Standard type permanent galvanized keyed contraction expansion joints, with 5
- 47 stakes per 10 feet of joint length.
- 48 03 Joint may be left in place when concrete is placed on each side simultaneously.
- 49 Remove when mold as edge form prior to subsequent concrete placement.
- 50 04 Expansion Joint:
- 51 a. Fiber Joint Filler: 3/4 inch thick, pre-molded asphalt impregnated rigid
- 52 fiber board. Comply with AASHTO M-213-74 or redwood.
- 53 b. Cap sealant: Comply with Fed. Spec. TT-S- 00227E "Two
- 54 Component", 100% Urethane (light grey)
- 55 05 Tooled Joint: Scored 1/4" wide x 1/4" the thickness of the concrete in depth.
- 56 06 Saw-Cut Joint: 1/8" wide x 3/4" to 1" deep.



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- D. Waterstops - Flexible:
  - 01 Design based on Henry Company SF302 Synko-Flex Waterstop; or accepted equal.
  - 02 Asphalt based, non-hydrophilic / non-expanding waterstop.
  - 03 Continuous, flexible, moldable strip with protective wrapping.
  - 04 Size: 1" wide x 3/4" deep.
  
- E. Waterstops – Semi-Rigid:
  - 01 Design based on BoMetals, Inc. PVC Waterstops; or accepted equal.
  - 02 The PVC waterstop shall be extruded from an elastomeric plastic material, of which the basic resin is prime, virgin polyvinyl chloride.
  - 03 The PVC compound shall not contain any scrapped or reclaimed material or pigments whatsoever.
  - 04 Provide waterstops in the shapes (i.e. dumbbell, ribbed) as indicated on the Drawings.
  - 05 Provide in sizes as required to achieve a minimum 2" embedment in each section of concrete.
  - 06 Provide thermostatically controlled Teflon covered waterstop splicing irons for field splicing as provided by BoMetals, Inc.
  
- C. Rebar Chairs and Spacers:
  - 01 OCM, Inc. – “Plastic Cradle Chair”
  - 02 Aztec “Castle Chair”.
  - 03 Heavy-duty plastic-type sized to support all slab steel at proper height.
  - 04 Use type with sand cushion pads where concrete is on grade.
  
- D. Form Ties:
  - 01 Form Ties: Adjustable length and type which will not leave holes larger than 1 inch in diameter in the face of the concrete.
  - 02 Ties shall be such that when forms are removed, no metal will be within 1 inch of the finished concrete surface.
  - 03 The holes must be patched.
  
- E. Curing Compound: **FOR SITE WORK CONCRETE ONLY.** Design is based on WR Meadows VOCOMP-20; or equal by an acceptable manufacturer.
  - 01 Water based, dissipating curing compound for freshly placed concrete.
  - 02 Comply with ASTM C309 Type 1.
  - 03 Minimum 18% solids.
  - 04 Meets all VOC emission requirements.
  - 05 Initially non-clear for visual verification of adequate coverage.
  
- F. Cardboard Carton Void Forms: Permitted only if specifically indicated on the Drawings.
  - 01 Wax impregnated, trapezoidal shape.
  - 02 Use only if / where indicated on the structural drawings.

### 2.3 SLAB MEMBRANES

- A. Refer to section 03 15 19 – Below Slab Vapor Membranes.

1 **PART 3 - EXECUTION**

2  
3 **3.1 PREPARATION**

4  
5 A. General:

6 01 Clean all mixing and transportation equipment; remove debris from forms; wet  
7 forms thoroughly; remove ice or other coatings from reinforcement which might  
8 hinder good bond; remove water from place of deposit; and check reinforcement.  
9

10 B. Accessories: Install anchor bolts, slots, dove-tail anchor slots, boxes, sleeves and other  
11 required devices. Provide all such items not specified to be provided by other trades.

12 01 Provide temporary supports to maintain accessory location / position during  
13 concrete placement and initial finishing. Remove temporary supports as required.  
14

15 C. Coordination:

16 01 Unless specifically shown or allowed in other specification sections and / or  
17 drawings, no horizontal runs of conduit, piping or other work shall be allowed  
18 within the slab.

19 02 All underground conduit runs (if allowed) shall be trenched / installed within the  
20 building pad, a minimum 6" below the slab. Refer to electrical drawings and  
21 specifications.

22 03 Exception to 02: Only conduit runs to floor mounted or recessed receptacles at  
23 finish floor may be installed above the slab membrane provided all following  
24 conditions are met:

25 a. 3/4" maximum conduit size allowed provided the conduit is recessed  
26 below the slab thickness indicated.

27 b. Length of conduit run is minimized to turn up at the nearest available  
28 building component (partition, furring, etc.) to allow conduit to be  
29 concealed above the slab.

30 c. Such installations are not specifically excluded in other sections or the  
31 Drawings.

32 04 All penetrations through concrete grade beams and elevated beams shall be  
33 sleeved.

34 05 Coordinate with other contractors / trades as required for proper installation of  
35 interfacing work; and monitoring of such work during placement and finishing  
36 of concrete. All interfacing work displaced during concrete placement will be  
37 required to be moved to proper location.  
38

39 D. Subgrade:

40 01 Prior to placement of slab membrane, inspect the building pad / subgrade and  
41 verify that all foreign objects have been removed.

42 02 Verify that the subgrade is level, compacted and evenly graded. Hand rake where  
43 required.

44 03 Remove all material that could potentially puncture or stress the slab membrane.  
45

46 E. Drilled Piers:

47 01 Do not begin drilled pier operations until provisions are in place to assure that  
48 placement of reinforcing and concrete shall occur as soon as possible after  
49 finishing drilling the pier.

50 02 In no case shall drilled piers be left open / unfinished overnight.  
51

52 **3.2 INSTALLATION**

53  
54 A. Drilled Piers:

55 01 When drilled piers are shown to be vertical, bore shafts plumb within tolerance  
56 of up to 2" over the length of the shaft.

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- 02 To ensure proper bell / under ream size, use chains as required on the bell auger; or alternatively, use appropriate size bell auger.
- 03 Install closely spaced piers in alternating sequence as required to prevent caving and / or leakage of concrete.
- 04 Fill each pier with concrete as soon as practical. Under no circumstances shall drilled piers be left unfilled over night.
- 05 Keep bell / under ream base thoroughly clean and free of water before concrete is placed.
- 06 Fill bell / under ream with concrete and vibrate with a pencil vibrator. Do not over vibrate.
- 07 After bell / under ream is poured, set reinforcing cage as required to allow for minimum 3” coverage of concrete at base. Dropping reinforcing cages into pier shall not be allowed.
- 08 Fill pier shaft with concrete up to required elevation. Once placed, consolidate concrete with a pencil vibrator. Do not over vibrate.
- 17 B. Forms:
- 18 01 Conform to the shapes, lines and dimensions of the members as shown on the
- 19 drawings, except as modified under Section 31 20 00 – Earth Moving of these
- 20 specifications.
- 21 02 Care shall be taken to assure that formwork does not stain concrete surfaces.
- 22 03 Slab Block-Outs:
- 23 a. Diamond configuration at paving drains and building slabs.
- 24 b. Coordinate with concrete joints, verify with Architect.
- 25 04 Slope exterior concrete slabs away from building and slope interior slabs to floor
- 26 drains. Verify all slopes with Architect prior to start of concreting.
- 27 05 Forms:
- 28 a. Grade beams shall be formed to the sizes indicated on the drawings.
- 29 b. Where carton forms are not required, the contractor may omit forms of
- 30 grade beams provided the grade beam is widened 1 1/2 inches on each
- 31 side in contact with the earth,
- 32 c. The top 12 inches (minimum) of the outside faces of exposed perimeter
- 33 grade beams must be formed. Unformed perimeter grade beams shall
- 34 not be allowed above the surface of finish grading.
- 35 d. If forms are used, then the widening of the grade beams are not required.
- 36 06 Carton Forms: Permitted only if specifically indicated on the Drawings.
- 37 a. Where carton forms are required, both sides of the grade beam shall be
- 38 formed.
- 39 b. Fasten carton form in place to eliminate movement / shifting during
- 40 concrete placement.
- 41 c. Take all necessary precautions to keep carton forms dry prior to
- 42 concrete placement. In the event they become wet, remove and replace
- 43 with dry, rigid forms.
- 44 07 Slab Recesses and Sloped Surfaces:
- 45 a. Accurately form all slab recesses to depths indicated on the Drawings.
- 46 b. Where Drawings indicate slab(s) to slope, accurately form sloped areas
- 47 and screed to provide a uniform slope.
- 48 c. Contractor shall have the option to form recessed and sloped areas a
- 49 minimum of 2 inches deeper than indicated and top-out recess at a later
- 50 date to finished elevations.
- 51 08 Form Removal:
- 52 a. Ensure safety of the structure
- 53 b. In no case shall the supporting forms or shoring be removed until the
- 54 members have acquired sufficient strength to support their weight and
- 55 the load thereon.
- 56

- 1 C. Vapor Membrane:
- 2 01 Refer to section 03 15 19 – Below Slab Vapor Membrane.
- 3 02 Verify that vapor membrane installation is 100% complete and approved prior to
- 4 start of reinforcement installation and / or slab prep work.
- 5 03 Immediately repair and / or replace vapor membrane if damaged during concrete
- 6 work preparation or placement.
- 7
- 8 D. Reinforcing:
- 9 01 Cleaning Reinforcement: Free from rust, scale or other coatings which will
- 10 destroy or reduce the bond.
- 11 02 Placing Reinforcement:
- 12 a. Place accurately and adequately secure in position.
- 13 b. Reinforcement in all concrete slabs shall be held in proper locations by
- 14 use of plastic chairs spaced a maximum distance of 48 inches o.c.,
- 15 unless noted otherwise.
- 16 03 Coverage of Reinforcement: The metal reinforcement shall be protected by the
- 17 thickness of concrete indicated on the plans.
- 18 a. 3 inch: Concrete deposited against ground without use of forms.
- 19 b. 2 inch: Bars more than 5/8 inch diameter where concrete is exposed to
- 20 the weather, or exposed to the ground but placed in forms.
- 21 c. 1-1/2 inch: Bars 5/8 inch diameter where concrete is exposed to the
- 22 weather, or exposed to the ground but placed in forms.
- 23 d. 3/4 to 1 inch: In slabs and walks not exposed to the ground nor to the
- 24 weather, not less than 3/4 inch. Increase coverage and slab thickness at
- 25 auditorium seating to miss seat anchors. Refer to Structural Drawings.
- 26 e. Not less than 1 1/2 inches in beams, girders and columns not exposed
- 27 to the ground nor to the weather.
- 28 f. 1-1/2 to 1-3/4 inches from top: Paving
- 29 04 Mesh: Locate as shown on the drawings. Place on chairs. During concrete
- 30 placement, verify that mesh is pulled up into concrete pour.
- 31
- 32 E. Waterstops:
- 33 01 All non-rigid waterstops shall be installed in a continuous keyway cast into the
- 34 (receiving) concrete. Keyways shall be formed with 2x4's with canted sides to
- 35 form a trapezoid shape.
- 36 02 Concrete to receive waterstops shall be dry and free of contaminates.
- 37 03 Where required, prime concrete in accordance with manufacturer's standards and
- 38 recommendations.
- 39 04 Install waterstops in continuous lengths, firmly adhered to receiving concrete
- 40 surface.
- 41 05 Overlap at splice joints in accordance with manufacturer's standards and
- 42 recommendations.
- 43 06 Leave protective wrapping in place until ready to cover with fresh concrete.
- 44
- 45 F. Joints:
- 46 01 Construction Joints:
- 47 a. Floor slabs shall be formed using metal screed joints. Verify locations
- 48 of all control joints not indicated on the drawings with the Architect, in
- 49 ample time to avoid construction delay.
- 50 b. Use at cold joints in building.
- 51 02 Contraction Joints: Refer to Structural drawings.
- 52 03 Expansion Joints:
- 53 a. Where walks and paving terminates against curbs or buildings, and at
- 54 sides adjacent to curbs building or walls, whether detailed or not. Verify
- 55 locations with the Architect if either redwood or asphalt impregnated
- 56 fiber with sealant cap.

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- 04      Tooled Joints: Provide scored lines on exterior concrete slabs and walks.
  
- G.      Concrete:
  - 01      Batching, Mixing and Delivery Equipment: Use transit mixed concrete from approved batching and mixing plant. Batch, mix and transport concrete to the site in accordance with provisions of ASTM C94.
  - 02      Inspection: Examine all areas and conditions under which the work of this section will be performed. Correct any conditions detrimental to the approved completion of the work. Do not proceed until all such conditions are corrected.
  - 03      Concrete Placement (general):
    - a.      Place concrete in compliance with practices and recommendations of ACI-304, and as specified herein.
    - b.      Do not deposit concrete on concrete which has hardened sufficiently to form seams or planes of weakness within the section.
    - c.      Where a section cannot be placed continuously, provide construction joints.
    - d.      Place concrete at such a rate that concrete which is being integrated with fresh concrete is still plastic.
    - e.      Deposit concrete as nearly as practicable in its final location to avoid segregation due to re-handling and flowing. Do not subject concrete to any procedure which might cause segregation.
    - f.      Screed concrete which is to receive other construction to the proper level, to avoid excessive skimming and grouting.
    - g.      Do not use concrete which becomes non-plastic and unworkable, or does not meet the required quality control limits, or which has been contaminated by foreign materials.
  - 04      Placement Schedule: Place concrete in conformance with a placement schedule to ensure even distribution of loads.
    - a.      Alternate placement to allow for shrinkage.
    - b.      Where construction joints are shown or required, alternate panels, allowing a minimum of 7 days curing time prior to placing adjacent panels.
  - 05      Conveying:
    - a.      Handle concrete from point of delivery and transfer to conveying equipment to the location of final deposit as rapidly as practicable, and by methods which prevent segregation and loss of mix materials.
    - b.      Provide runways for wheeled conveying equipment from delivery point to location of final deposit.
    - c.      Keep interior surfaces of conveying equipment, including chutes and tremies, free from hardened concrete, debris, water and other deleterious materials.
    - d.      Pumps may be used only if they can pump the designed mix. Do not add fine aggregate or water to the mix to satisfy needs of a pumping device.
    - e.      Use chutes or tremies for placing concrete where a drop of 10'-0" or more is required.
  - 06      Slab Placement:
    - a.      Moisten subgrade the evening before and immediately prior to placement of all paving slabs.
    - b.      Deposit and consolidate concrete slabs in a continuous operation, within the limits of any construction joints, until the placing of a panel or section is completed.
    - c.      Consolidate concrete during placement by use of the specified equipment, thoroughly working concrete around reinforcement and into corners.

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- d. Consolidate concrete placed in beams and girders of supported slabs and against bulkhead of slabs on grade, as specified for formed concrete structures.
  - e. Consolidate concrete in remainder of slabs by vibrating bridge screeds, roller pipe screeds or other methods acceptable to the Architect.
  - f. Limit time of vibrating consolidation to prevent bringing an excess of fine aggregate to the surface.
  - g. Bring slab surfaces to correct level with a straight edge, and then strike off.
  - h. Use bull-floats or darbies to smooth the surface, leaving it free from bumps and hollows.
  - i. Do not sprinkle water on the plastic surface; do not disturb the slab surfaces prior to start of finishing operations.
- 07 Cold Weather Placing: Comply with ACI-306 to protect all concrete work from physical damage and reduce strength caused by frost, freezing actions, or low temperatures. Place no concrete against frozen earth.
- a. Use of Calcium Chloride accelerators
- 08 Hot Weather Placing: Prepare aggregates, mix water and other ingredients, and place, cure, and protect concrete in accordance with the requirements of ACI-305.
- 09 Consolidation:
- a. Consolidate all concrete footings, piers, grade beams, slabs, paving, etc. in accordance with provisions of ACI-309.
  - b. Consolidate each layer of concrete immediately after placing, using internal concrete vibrators supplemented by hand-spading, rodding or tamping.
  - c. During all phases of operation, maintain a frequency of not less than 10,000 vibrations per minute per internal vibrator.
  - d. Provide adequate number of units and power source at all times. Maintain spare units on hand to ensure adequacy.
  - e. If, in the opinion of the Architect, the equipment is not adequate to accomplish proper consolidation, he may order delay in further placement until adequate equipment is made available.
  - f. Maintain vibrators to assure peak efficiency at all times during placement.

H. WET CURING FOR ALL BUILDING SLABS WHETHER SLAB-ON-GRADE OR STRUCTURAL SLAB:

- 01 All slab areas shall be water cured for a minimum of five (5) days.
- 02 Maintain wetness of slab areas by suitable means (sprinklers, drip hoses, water blankets, etc.) for a minimum of five (5) days.

**3.3 FINISHES AND TOLERANCES**

- A. Finishes – Grade Beams and Vertical Surfaces:
- 01 Exposed surfaces of all concrete walls and grade beams shall receive a rubbed finish, unless otherwise noted. Immediately after forms are removed, grout pits and recesses and rub with carborundum stone to a smooth finish, free from marks or honeycomb to the Architect's satisfaction. Finish exterior surface 2 inches below finish grade.
  - 02 Rubbed finish shall be of the finest workmanship, with uniform texture and color.
  - 03 Prepare samples for approval of Architect.
  - 04 Protect all rubbed finish against damage during construction period. Immediately before requesting final acceptance of work, the Contractor shall remove protection and do such touch up and rubbing as necessary to leave rubbed surfaces in perfect condition.

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- 05 Miscellaneous Vertical Surfaces: Finish all vertical surfaces, including but not limited to curbs, risers, low walls and stringer, while concrete is strong enough to stay in place without forms yet green and able to be finished to a homogeneous appearance.
- B. Finishes – Interior Slabs:
- 01 Spreading of dry cement for finishing is not permitted.
  - 02 Flooding floor is not permitted during finishing. A limited, light / sprinkled application of water shall be permitted.
  - 03 Interior slabs to receive direct applied finish flooring: provide a troweled smooth flat matte finish.
  - 04 Interior slabs to remain concrete: Provide a smooth, hard troweled finish.
  - 05 Moisture mitigation required due to over troweling concrete slabs to the point that moisture is trapped within the concrete slab shall be at the Contractor's sole risk and responsibility; and shall not be at any additional cost to the Owner.
  - 06 Interior slabs to receive thickset / mud-bed finish flooring (mud-set terrazzo, thick-set quarry tile, etc.): floated, smooth finish. Coordinate exact requirements with flooring applicator.

### 20 3.4 FIELD QUALITY CONTROL

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- A. Testing Laboratory: Perform the appropriate tests upon notification by the Contractor. Refer to Section 01 45 23 - Testing and Inspection Services.
  - B. Contractor shall take necessary precautions to not over-trowel concrete slabs to the point that the finish closes pores in the concrete.
  - C. Tolerances – Interior Slabs at Finish Floor to Receive Adhered Flooring Materials:
    - 01 True to plane within 3/16" over any 10 foot length, non-cumulative; ACI F-32.
    - 02 Verify any additional requirements with the flooring installer.
  - D. Tolerances – Recessed Interior Slabs to Receive Composite Wood Flooring Assemblies:
    - 01 True to plane within 1/8" over any 10 foot length, non-cumulative; ACI F-50.
    - 02 Verify any additional requirements with the flooring installer.
  - E. Tolerances – Recessed Interior Slabs to Receive Built-Up or Thick-Set Flooring:
    - 01 True to plane within 5/16" over any 10 foot length, non-cumulative; ACI F-20.
    - 02 Verify any additional requirements with the surfacing installer.
  - F. Exterior Concrete Slabs: Refer to Section 32 13 13 – Concrete Paving and Flatwork.

### 42 3.5 PATCHING AND CLEANING

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- A. After forms are removed, remove projecting fins, bolts, form ties, nails, etc., not necessary for the work, or cut back 1 inch from the surface. Where, in the Architect's opinion, surface defects occur, such as honeycombing, repair the defective areas as directed by the Architect. Joint marks and fins in exposed work shall be smoothed off and cleaned as directed by the Architect.
  - B. Repair defects in concrete work per ACI-301, Chapter 9, and as directed by the Architect. Chip voids and stone pockets to a depth of 1 inch or more as required to remove all loose material. Voids, surface irregularities, chipped areas, etc., shall be filled by patching, gunite or rubbing, as directed by the Architect. Repaired surfaces shall duplicate appearance of unpatched work.

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C. Clean exposed concrete surfaces and adjoining work stained by leakage of concrete to the approval of the Architect.

D. Reinforce or replace any deficient work as directed by the Architect, and at no additional cost to the Owner.

**3.6 CLEAN - UP**

A. In addition to the requirements of General Conditions, clean up all concrete and cement work on completion of this portion of the work, except protective coating or building papers shall remain until floors have completely cured or until interior partitions are to be installed.

**END OF SECTION**



1 **SECTION 05 31 00**

2 **STEEL DECKING**

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5 CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

6  
7 **PART 1 - GENERAL**

8  
9 **1.1 DESCRIPTION**

- 10  
11 A. Refer to Section AB – Instructions to Proposers, Section AF – Subcontractor /  
12 Manufacturer Prequalification, and section 01 25 00 – Request for Substitution  
13 Procedures.  
14  
15 B. Scope of Work:  
16 01 Steel deck for floor and roof.  
17 02 Welding and accessories for metal deck.  
18 03 Cutting openings and reinforcing for openings 18 inches and smaller in any  
19 dimension.  
20  
21 C. Related Work:  
22 01 Section 05 12 00 – Structural Steel Framing.  
23 02 Section 05 21 00 – Steel Joist Framing.  
24 03 Section 05 50 00 – Metal Fabrications.  
25

26 **1.2 SUBMITTALS**

- 27  
28 A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.  
29  
30 B. Product Data: Submit manufacturer’s literature, product data, certifications and  
31 supporting information for all products proposed to be furnished, as necessary to  
32 demonstrate compliance with the specified requirements.  
33  
34 C. Shop Drawings: Submit complete shop drawings consisting of design, fabrication and  
35 erection / installation of proposed assemblies.  
36 01 Show profiles, sizes, spacing and locations of assembled components.  
37 02 Show details of shop fabrications, connections and details.  
38 03 Show details of field fabrications, connections and details.  
39 04 Detailed drawings showing layout of form sheets, anchorage details,  
40 supplementary framing, openings, special jointing or other accessories.  
41  
42 D. Installation Instructions: Submit manufacturer’s complete installation instructions,  
43 including fastening, for all products and / or assemblies proposed to be furnished.  
44 01 Installation details submitted for review shall be specific to the work of this  
45 contract and accurately depict interface within the assembly(s) indicated on the  
46 Drawings.  
47 02 Generic details that do not depict actual conditions shall not be acceptable.  
48

49 **1.3 REFERENCES**

- 50  
51 A. American Iron and Steel Institute (AISI):  
52 01 North American Specification for the Design of Light Gauge Structural  
53 Members.  
54  
55 B. Steel Deck Institute (SDI):  
56 01 Design Manual for Composite Decks, Floor Decks and Roof Decks.

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- 02 SDI Standards.
- C. ASTM International:
  - 01 ASTM A36: Standard Specification for Structural Steel.
  - 02 ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 03 ASTM A 780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
  - 04 ASTM A 924/A 924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
  - 05 ASTM A 1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- D. American welding Society (AWS):
  - 01 AWS D1.3 - Structural Welding Code – Sheet Metal.

**1.4 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Member in good standing of Steel Deck Institute (SDI).
- B. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's North American Specification for the Design of Cold-Formed Steel Structural Members and SDI RDDM Roof Deck Design Manual.
- C. Roof Decking:
  - 01 Deck shall meet the minimum design gage and yield strength specified on the drawings or meet minimum specified section properties at specified yield strength.
  - 02 Whenever possible, the deck shall be multi-span.
- D. Welding: Qualify procedures and personnel according to AWS D1.3, Structural Welding Code - Sheet Steel.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. The following manufacturers are acceptable to provide products of this section:
  - 01 Oates Metal Deck and Building Products.
  - 02 A.C.T. Metal deck Supply.
  - 03 Whitaker Metal Deck Sales.
  - 04 Vulcraft.
  - 05 New Millennium Building Systems.

**2.2 MATERIALS**

- A. Steel Roof Deck - General: Fabricate deck to comply with SDI RD - Standard for Steel Roof Deck, with the minimum section properties indicated. Deck type and thickness shall be as indicated on the Drawings.
- B. Design properties shall be computed in strict accordance with "Specifications for the Design of Light Gauge Structural Members", as published by the American Iron and Steel Institute, and Steel Deck Institute Standards.

- 1 C. Provide steel deck cut to required lengths where ever practical.  
2  
3 D. Steel deck shall meet the following finish requirements:  
4 01 All decks shall be galvanized to conform to ASTM A446.  
5 02 Steel roof deck and supporting members shall be retouched where shop coat  
6 has been damaged due to placing, handling or welding.  
7 03 Provide vented steel deck at all areas to receive insulating concrete fill.  
8

9 **2.3 ACCESSORIES**

- 10  
11 A. Manufacturer shall supply all ridge and valley plates, cant strips, sump pans and other  
12 accessories which must be attached directly to the steel form in order to provide  
13 finished surface for application of fill, roofing accessories and roofing.  
14 01 Coordinate with other trades as required for exact conditions and  
15 requirements.  
16  
17 B. Column closures, end closures, side closures and cover plates shall be the standard type  
18 provided by the deck manufacturer unless indicated otherwise on the Drawings.  
19  
20 C. Galvanizing Repair Paint for Roof Decks: High-zinc-dust content paint for re-  
21 galvanizing welds in galvanized steel conforming to ASTM A 780  
22  
23 D. Fasteners: As manufactured by Hilti, Buildex, Simpson Strong-Tie or approved equal.  
24  
25 E. Flexible Closure Strips.  
26

27 **PART 3 - EXECUTION**

28  
29 **3.1 EXAMINATION**

- 30  
31 A. Do not install roof deck until supporting construction is in place.  
32  
33 B. Examine support framing and field conditions for compliance with requirements for  
34 installation tolerances and other conditions affecting performance of work of this  
35 section.  
36  
37 C. If supporting construction is the responsibility of another installer, notify Architect of  
38 unsatisfactory preparation before proceeding.  
39

40 **3.2 PREPARATION**

- 41  
42 A. Clean surfaces thoroughly prior to installation.  
43  
44 B. Locate deck bundles to prevent overloading of support members.  
45

46 **3.3 INSTALLATION - GENERAL**

- 47  
48 A. Install deck panels and accessories in accordance with the Contract Documents  
49 approved installation drawings and requirements of this Section.  
50  
51 B. Place deck panels on structural supports and adjust to final position with ends aligned.  
52 Attach firmly to the supports immediately after placement in order to form a safe  
53 working platform.  
54  
55 C. Cut and neatly fit deck units and accessories around openings and other work projecting  
56 through or adjacent to the decking.

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- D. Trades that subsequently cut unscheduled openings through the deck are responsible for reinforcing the openings.

**3.4 INSTALLATION - ROOF DECK**

- A. Install and fasten deck and accessories in accordance with the Contract Documents, approved installation drawings and requirements of ANSI/SDI RD.
- B. End Bearing: Install deck ends over supports with a minimum end bearing of 1-1/2 inches (38 mm) unless otherwise shown on approved installation drawings.
- C. Side Closures: Fasten to supporting structure and deck in accordance with the Contract Documents, approved installation drawings and requirements of ANSI/SDI RD.
- D. Ridge and valley plates, flat plates at changes of deck direction and sump pans, shall be fastened to the deck in accordance with the Contract Documents, approved installation drawings and requirements of ANSI/SDI RD.

**3.5 INSPECTION AND REPAIR**

- A. Before roof insulation placement, the deck shall be inspected for tears, dents, or other damage that may prevent the deck from acting as a tight and substantial form. Replace decking which has been damaged or permanently deflected.
- B. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint.
- C. Repair Painting: Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.

**3.6 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION**

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**SECTION 05 50 00**

**METAL FABRICATIONS**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
- 01 Provide miscellaneous metal fabricated materials and assemblies as indicated on the Drawings
  - 02 Provide metal fabrications as required to complete all structural steel framing.
  - 03 Coordinate with other trades as required to provide all necessary metal fabrications required to install and interface with their work.
- B. Related Work:
- 01 Section 05 12 00 – Structural Steel Framing
  - 02 Section 05 31 00 – Steel Decking
  - 03 Section 05 51 00 – Metal Stairs
  - 04 Section 05 52 13 – Pipe and Tube Railing

**1.2 SUBMITTALS**

- A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.
- C. Shop Drawings: Submit complete shop drawings consisting of design, fabrication and erection / installation of proposed assemblies.
- 05 Show profiles, sizes, spacing and locations of assembled components.
  - 06 Show details of shop fabrications, connections and details.
  - 07 Show details of field fabrications, connections and details.
  - 08 Provide calculations demonstrating compliance with wind load and other requirements where applicable.
- D. Installation Instructions: Submit manufacturer’s complete installation instructions, including fastening, for all products and / or assemblies proposed to be furnished.
- 09 Installation details submitted for review shall be specific to the work of this contract and accurately depict interface within the assembly(s) indicated on the Drawings.
  - 10 Generic details that do not depict actual conditions shall not be acceptable.
- E. Maintenance Instructions: Submit manufacturer’s complete maintenance instructions and recommendations for all products and / or assemblies proposed to be furnished.
- 11 Include recommended cleaning products and instructions for use.
  - 12 Where applicable, provide recommended maintenance schedules and procedures.

**1.3 REFERENCES**

- A. ASTM International
- 01 ASTM A36 - Structural Steel

- 1                   02       ASTM A123 / A123M – Standard Specifications for Zinc (Hot Dip Galvanized)  
2                   Coatings on Iron and Steel Products.  
3                   03       ASTM A153 / A153M - Standard Specifications for Zinc (Hot-Dip) on Iron and  
4                   Hardware.  
5                   04       ASTM A307 - Carbon Steel Externally and Internally Threaded Standard  
6                   fasteners  
7                   05       ASTM A385 - Providing High-Quality Zinc Coating (Hot Dip)  
8                   06       ASTM A325 - High Strength Bolts for Structural Steel  
9                   07       ASTM A500 - Cold formed welded and seamless carbon sheet structural tubing  
10                  in rounds and shapes.  
11                  08       ASTM A992 - Steel for Structural Shapes for use in Building Framing  
12                  09       ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy  
13                  Extruded Bars, Rods, Wire, Profiles, and Tubes  
14  
15            B.       American Institute of Steel Construction  
16                  01       Steel Construction Manual, 15<sup>th</sup> Edition  
17  
18            C.       American Welding Society  
19                  01       American Welding Society Structural Welding Code D11.1-77  
20  
21            D.       American Iron and Steel Institute  
22                  01       Specification for Design Fabricated and Erection of Cold Formed Steel.  
23  
24            A.       Federal Specification: Fed. Spec. TT-P-664 and MIL-P-53030.

25  
26 **PART 2 - PRODUCTS**

27  
28 **2.1 MATERIALS**

- 29  
30            A.       Structural Steel: Comply with ASTM A36  
31  
32            B.       Welding: Comply with American Welding Society Code.  
33  
34            C.       Bolts:  
35                  01       Comply with ASTM A307  
36                  02       Size: 3/4 inch, unless otherwise noted.  
37                  03       Bolts used to fasten roof perimeter blocking to steel framing shall be carriage  
38                  type bolts.  
39  
40            D.       Anchors:  
41                  01       Expansion Bolts:  
42                      a.       Rawl Calk-Ins or Arrow Series 4000, 1/4 inch or less.  
43                      b.       Rawl Multi-Calks - greater than 1/4 inch. Top shall be 1/2 inch below  
44                      concrete surface.  
45                  02       Molly Screw Anchors:  
46                      a.       In walls 1/16 - 5/8 inch thick, use "S" length  
47                      b.       In walls 5/8 - 1 1/4 inch thick, use "L" length  
48                      c.       In walls 1 1/4 - 1 3/4 inches thick, use "XL" length.  
49  
50            E.       Shop Priming:  
51                  01       Shop coat any ungalvanized ferrous metal with primer.  
52                  02       Clean iron and metal to be primed of scale, dirt and dust by steel scrapers, wire  
53                  brushers or sandblasting. Remove oil and grease with petroleum naphtha.  
54                  03       Thoroughly work paint into all joints by brush. Overall application of brush or  
55                  spray coat of red lead primer per Fed. Spec. TT-P-86.

- 1                   04       Give any painted built-in portions one field coat of primer on all abraded parts  
2                   after installation.  
3  
4           F.       Galvanized Metal:  
5                   01       Comply with ASTM A123.  
6                   02       General: Galvanized all steel sections which are fully or partially exposed to  
7                   weather, regardless if they are scheduled to receive a finish coat of paint or not.  
8                   03       Galvanized items to be painted shall be primed as outlined in Painting and  
9                   Staining Section.  
10                  04       Hot-dip galvanized after fabrication.  
11                  05       Silicone protective coating shall not be used at galvanized items scheduled to  
12                  receive paint.  
13  
14           G.       Aluminum:  
15                   01       Extruded sections from alloy 6063-T52, meeting the requirements of ASTM  
16                   B221  
17                   Clear anodized finish samples to be submitted for approval on each item.  
18                   Submit sample of finish weld.  
19                   02       Custom fabricate as shown on the drawings. Grind all welds smooth and flush  
20                   to match adjoining exposed surfaces. Provide cast wall brackets - Julius Blum  
21                   #376  
22                   03       All fasteners shall be stainless steel with tamper proof bolts and no pop rivets.  
23                   Provide flush counter sunk heads.  
24                   04       All pipe rails shall be schedule 40 and have welded connections with  
25                   male/female splice connections, and have a completely smooth flush finish. All  
26                   corners and angles shall be custom prefabricated. All splices shall occur at  
27                   supports.  
28                   05       Exterior rails shall be all welded construction  
29                   06       Provide clear epoxy coating where aluminum is in direct contact with concrete  
30                   (only)  
31

32   **2.2    MISCELLANEOUS METAL ITEMS**

- 33  
34    A.       The following is a list of the principal miscellaneous metal items to be furnished under  
35              this section. This list is offered only as a guide and Contractor shall thoroughly check  
36              Drawings for other miscellaneous metals.  
37              01       All steel items exposed to the exterior shall be hot-dip galvanized after  
38              fabrication.  
39  
40    B.       Pipe Bollard / Guard Post: Provide and install schedule 40 steel pipe bollard / guard post,  
41              in fixed and / or removable configuration as detailed on the drawings.  
42              01       Provide casting anchors welded to the bollard as indicated on the Drawings  
43              02       Hot dip galvanized after fabrication.  
44              03       Fill with concrete after installation.  
45  
46    C.       Steel Handrails & Brackets: Furnish and install 1-1/2" O.D. schedule 40 steel pipe rails  
47              and handrails in configurations as indicated on the Drawings or refer to Section 05 52 13  
48              for Pipe and Tube Railings for specifics.  
49              02       Multi component handrail systems shall have welded connections.  
50              03       Design of wall brackets if needed, are based on Julius Blum # 306 cast malleable  
51              iron 3" handrail bracket; or equal approved by the Architect  
52              04       Include all other parts required for finished installation.  
53              05       All work shall be in accordance with ADA and Texas Accessibility Standards.  
54  
55    D.       Steel Ladders –  
56              01       Provide steel ladders at all roof hatch locations.





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**3.2 INSTALLATION**

- A. Install products in strict accordance with manufacturer’s instructions and final reviewed submittals.
- B. Separate all dissimilar metals.
- C. Where welding is exposed to view, welds shall be executed neatly then ground smooth. Pits and blemishes are not acceptable.
- D. For manufactured items, adhere to printed manufacturer's installation instructions.
- E. Refer to Painting Section for items that are to receive paint.

**END OF SECTION**



1                   03       Submit drawings and calculations stamped and signed from a registered  
2                   Professional Engineer currently licensed to practice in Texas, that the design of  
3                   the stair will comply with current applicable building codes.  
4

5   **1.4    DOCUMENT PRECEDENCE**

6  
7           A.       Requirements and notations on the structural drawings supersede conflicting requirements  
8           of this Section.  
9

10 **PART 2 - PRODUCTS**

11  
12 **2.1    MANUFACTURERS**

13  
14           A.       Manufacturers for pre-engineered stairs and rails: Shall have a minimum of ten (10) years  
15           experience and employ a registered Professional Engineer currently licensed in the State  
16           of Texas.  
17

18 **2.2    MATERIALS**

- 19  
20           A.       Steel Shapes, Bars, and Plates: ASTM A36 rolled to the tolerances of ASTM A6  
21  
22           B.       Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.  
23  
24           C.       Standard Bolts and Nuts: ASTM A307, Grade A  
25  
26           D.       Anchor Bolts: ASTM A36  
27  
28           E.       Pipe: ASTM A53, standard weight black steel pipe, sizes indicated on the drawings.  
29  
30           F.       Steel Sheet: ASTM A570, commercial quality, hot rolled, U.S. Standard gauges listed are  
31           for field fabricated stairs, pre-engineered stairs fabricated from sheet steel of gauge  
32           recommended by stair manufacturer.  
33

34 **2.3    STAIR COMPONENTS**

- 35  
36           A.       Stair Stringers: Stringers shall be structural steel tubes conforming to ASTM A 500, Grade  
37           B, in the size indicated. Cross-section of stringer shall be 2" minimum to allow railing  
38           system to be bolted to the top of the stringer without any overhang of the post plate or post.  
39           Depth of Stringer to be 12" minimum or as detailed.  
40           01       Railing posts shall be bolted to the stringer to avoid welding after the hot-dip  
41           process.  
42           02       Stringers shall extend 2" above landings to form an integral toe kick.  
43           03       Finish: Hot-dip galvanized after fabrication  
44  
45           B.       Treads, Risers and Landings:  
46           01       Treads shall be prefabricated Regular-Duty Carbon Steel, ADA approved,  
47           Welded Bar Grating, conforming to NAAMM MBG 531 Metal Bar Grating  
48           Manual, and the American Welding Society D1.1.  
49           02       Manufacturer: Alabama Metal Industries Corporation (AMICO).  
50           03       Type: Regular Duty, ADA Approved, Welded  
51           04       Uniform Load: 100psf minimum  
52           05       Concentrated Load: 300lb per foot of grating width  
53           06       Allowable Deflection: 0.250" maximum in any direction.  
54           07       Style: 11-W4-53, P 1¼" x 3/16" Bearing Bar spaced 11/16" o.c.  
55           08       Section Modulus: 0.852 in<sup>3</sup>  
56           09       Nosing: Checkered Plate

- 1                   10        Size: Minimum depth 12" x width of stair run
- 2                   11        Landings: Fill landings with similar grating in direction similar to treads.
- 3                   12        Risers: Provide toe kick plate welded at back of tread to close off riser per code.
- 4                   13        Finish: Hot-dip galvanized after fabrication

5

6           C.        Pipe Railing System: See Section 05 52 13 – Pipe and Tube Railing

7

8   **2.4    GALVANIZING**

- 9
- 10           A.        Minimum Preparation: Remove loose mill scale, loose rust, and other foreign materials to
  - 11                   the standards SSPC.
  - 12
  - 13           B.        All exterior stairs & railing assemblies shall be hot dip galvanized after fabrication,
  - 14                   whether called out to be painted or not.
  - 15                   01        Apply zinc coating by the hot-dip process to structural steel according to ASTM
  - 16                            A123/A 123M.
  - 17                            a.        Fill vent and drain holes that will be exposed in the finished Work unless
  - 18   they will function as weep holes, by plugging with zinc solder and filing
  - 19   off smooth.
  - 20                   02        Bolts, Fasteners, Connectors and Anchors shall also be hot-dip galvanized. See
  - 21                            Section 05 12 00 – Structural Steel Framing.
  - 22

23   **PART 3 - EXECUTION**

24

25   **3.1    FABRICATION**

- 26
- 27           A.        Design and fabricate steel stairs and railings to sizes and details indicated on the drawings.
  - 28                   Field verify dimensions prior to fabrication. Construct work true to lines, planes, and
  - 29                   design with tight, close fitting joints.
  - 30
  - 31           B.        Install treads, risers, and platforms to profiles and depths indicated on drawings. Each run
  - 32                   of the stair shall be shop prefabricated and hot-dip galvanized after fabrication. Connection
  - 33                   of runs of stairs and landings if assembled in field shall have bolted connections to avoid
  - 34                   welding after fabrication. Reinforce underside of treads or landings as needed with
  - 35                   properly sized angle or tee stiffeners spaced to eliminate bouncing and springing action.
  - 36                   Provide all necessary supports whether indicated or not.
  - 37
  - 38           C.        Assemble railings in longest practicable lengths to hold field splices to a minimum. Make
  - 39                   changes in direction with closely fitted joints to attain uniform dimensions of members.
  - 40
  - 41           D.        Provide anchors, bolts, expansion devices, and miscellaneous accessory items necessary
  - 42                   for installation.
  - 43
  - 44           E.        Where fastenings other than welds are used for connections, countersink and finish flush
  - 45                   with exposed surface.
  - 46

47   **3.2    INSTALLATION**

- 48
- 49           A.        Install pre-engineered stairs per manufacturer's recommendations.
  - 50
  - 51           B.        Any shimming required to correct elevation shall be added below the first riser. Shimming in
  - 52                   excess of one inch will not be acceptable.
  - 53

54

55   **END OF SECTION**

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**SECTION 05 52 13**

**PIPE AND TUBE RAILING**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
- 01 Prefabricated steel stairs and landings, with integral handrails and balusters, plates, angles, hangers, struts and welds for securing to building structure. Since this project is on the coast, every effort has been made to prefab steel components and hot-dip galvanize them after fabrication. Bolted connections are preferable to welding in the field after the hot-dip process to avoid corrosion. The manufacturer/fabricator of the pipe railing shall design with this in mind.
- B. Related Work:
- 01 Section 03 30 00 – Cast-In-Place Concrete
  - 02 Refer to Section 05 50 00 –Metal Fabrications
  - 03 Section 05 51 00 – Metal Stairs
  - 04 Section 09 91 00 – Painting and Re-Painting

**1.2 SUBMITTALS**

- A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.
- C. Shop Drawings: Submit complete shop drawings consisting of design, fabrication and erection / installation of proposed assemblies.
- 01 Show profiles, sizes, spacing and locations of assembled components.
  - 02 Show details of shop fabrications, connections and details.
  - 03 Show details of field fabrications, connections and details.
  - 04 Indicate bolted and welded connections, both shop and field, using standard AWS welding symbols. Indicate net weld lengths.
  - 05 Indicate that railing systems will meet all loading criteria as required to meet Building Code, ADA and TAS requirements.
- D. Installation Instructions: Submit manufacturer’s complete installation instructions, including fastening, for all products and / or assemblies proposed to be furnished.
- 01 Installation details submitted for review shall be specific to the work of this contract and accurately depict interface within the assembly(s) indicated on the Drawings.
  - 02 Generic details that do not depict actual conditions shall not be acceptable.
- E. Maintenance Instructions: Submit manufacturer’s complete maintenance instructions and recommendations for all products and / or assemblies proposed to be furnished.
- 01 Include recommended cleaning products and instructions for use.
  - 02 Where applicable, provide recommended maintenance schedules and procedures.

- 1 F. Finish Samples  
2 01 Provide two (2) samples of welded in-line pipe rail connection and a rail to  
3 post connection after galvanizing, for review of welding workmanship. Welds  
4 shall be ground smooth and flush. Architect will review and approve control  
5 sample prior to final fabrication.  
6 02 Provide a piece of galvanized grating stair tread, size: depth of tread by 6-9  
7 inches long.  
8

9 **1.3 QUALITY ASSURANCE**

- 10 A. Reference Standards:  
11 01 ASTM A53 - Welded and Seamless Steel Pipe  
12 02 ASTM A123 – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron  
13 and Steel Products  
14 03 ASTM A385 – Practice for Providing High Quality Zinc Coatings (Hot-Dip)  
15 04 ASTM A269 - Specification for Seamless and Welded Austenitic Stainless  
16 Steel Tubing for General Service.  
17 05 ASTM A666 - Specification for Annealed or Cold-Worked Austenitic  
18 Stainless Steel, Sheet, Strip, Plate, and Flat Bar.  
19 06 FS TT-P-86 - Paint, red-lead base, ready mixed  
20 07 Top Rail of Guardrails must be capable of withstanding the following loads  
21 applied as indicated:  
22 a. Concentrated load of 200 pound load applied at any point, in any  
23 direction.  
24 b. Uniform load of 50lb/ft applied horizontally and concurrently with  
25 uniform load of 100lb/ft applied vertically downward.  
26 c. Concentrated and uniform loads above need not be assumed to act  
27 concurrently.  
28 08 Americans With Disabilities Act (ADA) and Texas Accessibility Standards  
29 (TAS)  
30 09 AWS D1.6, - Structural Welding Code—Stainless Steel  
31  
32

33 **1.4 WARRANTY**

- 34 A. Warrant the work specified herein for one year against becoming unserviceable or  
35 causing an objectionable appearance, resulting from either defective or nonconforming  
36 materials and workmanship.  
37  
38 B. Warrant that all assemblies, components, and parts specified comply with the Contract  
39 Documents and local restrictions, and are compatible with each other, adjoining  
40 substrates, materials, work, and other conditions of installation and expected use.  
41  
42

43 **PART 2 - PRODUCTS**

44 **2.1 MATERIALS**

- 45 A. Pipe: Welded and seamless steel type, ASTM A53, type S, schedule 40, plain finish  
46  
47 B. Bolts, Nuts and Washers: High strength steel type, ASTM A325  
48  
49 C. Welding Materials: Applicable AWS D1.1, type required for materials being welded.  
50  
51 D. Brackets, Flanges and Anchors: Cast or formed metal of same type of material and  
52 finish as supported rails, unless otherwise indicated.  
53  
54 E. Grout and anchoring cement:  
55  
56

- 1                   01       Non-shrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining,
- 2                                    noncorrosive, nongaseous grout complying with ASTM C 1107. Provide
- 3                                    grout specifically recommended by manufacturer for interior and exterior
- 4                                    applications.
- 5                   02       Product below is recommended by manufacturers for interior and exterior
- 6                                    applications.
- 7                   03       Erosion-Resistant Anchoring Cement: Factory-packaged, non-shrink, non-
- 8                                    staining, hydraulic-controlled expansion cement formulation for mixing with
- 9                                    water at Project site to create pourable anchoring, patching, and grouting
- 10                                  compound. Provide formulation that is resistant to erosion from water
- 11                                  exposure without needing protection by a sealer or waterproof coating and that
- 12                                  is recommended by manufacturer for exterior use

13

14       **2.2       GENERAL FABRICATION**

- 15
- 16       A.       Verify dimensions on site prior to shop fabrication.
- 17
- 18       B.       Fabricate integral railings and component connections capable of resisting a lateral
- 19                                  force of 150 lbs. minimum, at any single point, without permanent set or damage.
- 20
- 21       C.       Fit and shop assemble sections in largest practical sizes.
- 22
- 23       D.       Accurately form and fit components and connections. Grind exposed edges and welds
- 24                                  smooth and flush.
- 25
- 26       E.       Accurately form components required for proper anchorage of stairs, landings and
- 27                                  integral railings to each other and to building structure.
- 28
- 29       F.       Thoroughly clean surfaces of rust, scale, grease, and foreign matter prior to prime
- 30                                  painting. Allow to dry thoroughly before applying priming materials.
- 31
- 32       G.       Shop prime in two coats having a total dry film thickness of 2.0 mils. Do not prime
- 33                                  surfaces to be field welded or cast in concrete.
- 34

35       **2.3       PIPE RAILING SYSTEM FOR METAL STAIRS & MEZZANINE FLOOR LEVEL**

- 36
- 37       A.       Posts: 1-1/4 inch standard steel pipe members of welded construction.
- 38
- 39       B.       Rails: 1-1/4 inch standard steel pipe rails of welded construction.
- 40
- 41       C.       Handrails: 1-1/4 inch standard steel pipe rails of welded construction. Handrail bracket
- 42                                  shall be designed to provide proper clearance to meet ADA and TAS requirements.
- 43
- 44       D.       Wire Mesh Railing Infill Panels: Galvanized Woven Wire mesh panels shall use
- 45                                  2"x2"x.162" wire diameter, weight 0.843 lb/ft<sup>2</sup>, Pre-crimped, mesh inserts, surrounded
- 46                                  by a 1/2" x 1" rectangular shaped welded frame on four sides. Panels shall be secured to
- 47                                  adjacent posts and railings with pre-welded and galvanized standoff tabs. Tab on panel
- 48                                  and tab on railing or post shall be secured with galv. bolts with washers.
- 49
- 50       E.       Brackets and Mounting: Steel of sizes required or as noted on drawings. Brackets of
- 51                                  handrails shall be welded to the posts. Handrails shall be bolted to the brackets to avoid
- 52                                  welding after the hot-dip galvanizing process. No escutcheon needed at stair, but will
- 53                                  be needed at Mezzanine level floor.
- 54
- 55       F.       Provide a matching swing gate at edge of Mezzanine for hoisting of items from first
- 56                                  floor to Mezzanine. Swing gate shall have the typical Wire Mesh Railing Panels,

1 welded on hinges, and welded plates suitable for pad lock. See drawings for  
2 configuration and location.

3  
4 G. Finish: Hot dip galvanized after fabrication.

5  
6 **2.4 GALVANIZING**

7  
8 A. Minimum Preparation: Remove loose mill scale, loose rust, and other foreign materials  
9 to the standards SSPC.

10  
11 B. All exterior stairs & railing assemblies shall be hot dip galvanized after fabrication,  
12 whether called out to be painted or not.

13 01 Apply zinc coating by the hot-dip process to structural steel according to  
14 ASTM A123/A 123M.

15 a. Fill vent and drain holes that will be exposed in the finished Work  
16 unless they will function as weep holes, by plugging with zinc solder  
17 and filing off smooth.

18 02 Bolts, Connectors and Anchors shall also be hot-dip galvanized. See Section  
19 05 12 00 – Structural Steel Framing.

20  
21 **PART 3 - EXECUTION**

22  
23 **3.1 ERECTION**

24  
25 A. Erect handrails square, level, plumb and free from distortion or defects detrimental to  
26 appearance and performance.

27  
28 B. Provide necessary anchors, plates, and sleeves as required for connecting handrail to the  
29 structure.

30  
31 C. Ensure alignment with adjacent construction. Coordinate with related work to ensure  
32 no interruption in installation.

33  
34 D. Perform necessary cutting and altering for the installation of work of other sections. Do  
35 not perform any other additional cutting without the review of the Architect.

36  
37 E. Field bolt and weld to match standard of shop bolting and welding. Welding in field is  
38 not recommended as the assemblies will be hot-dip galvanized after fabrication. Prior to  
39 any welding after the hot-dip process, notify the Architect for acceptance. Hide bolts  
40 and screws whenever possible. If bolts and screws are not hidden, use flush  
41 countersunk fastenings, unless indicated otherwise. Make mechanically fastened joints  
42 flush (hairline or better). Grind welds smooth and flush.

43  
44 F. Install wire mesh panel inserts as shown on drawings.

45  
46  
47  
48 **END OF SECTION**  
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**SECTION 06 10 00**

**ROUGH CARPENTRY**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Refer to Section AB – Instructions to Proposers, Section AF – Subcontractor / Manufacturer Prequalification, and section 01 25 00 – Request for Substitution Procedures.
- B. Scope of Work:
  - 01 Provide wood blocking at all door and window openings in exterior walls as indicated on the Drawings.
  - 02 Provide wood blocking at all roof edge and other conditions of the building envelope as indicated on the Drawings and as required for a complete installation.
  - 03 Provide wood blocking in metal framed drywall partitions and other assemblies as required for the secure attachment of built-in assemblies / products and assemblies / products that anchor to drywall partitions.
  - 04 Coordinate with all trades and material suppliers to ascertain wood blocking requirements for proper installation of their work..
- C. Related Work:
  - 01 Section 06 40 00 – Finish Carpentry.
  - 02 Division 7 – Roofing and Roof Accessories.
  - 03 Division 8 – Doors, Windows and Glazing.

**1.2 SUBMITTALS**

- A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.
- C. Shop Drawings: Submit complete shop drawings consisting of design, fabrication and erection / installation of proposed assemblies.
  - 01 Show details of field fabrications, connections and details.
- D. Certificates: Certification from the treatment plant certifying wood treatment applied complies with the criteria and physical requirements for preservative-treated wood products as specified herein.
  - 05 Test Reports: Certified test reports showing compliance with the specified performance characteristics and properties.

**1.3 STANDARDS AND GRADING**

- A. All lumber used structurally shall be graded and marked with grade and trademark of a lumber grading organization approved by the Architect, except that a certification of grade from such a grading organization may be accepted in lieu of grade and trademarks when approved by the Architect. Trademark of manufacturer shall also appear on each piece.

- 1 B. Each piece of plywood used structurally shall carry the American Plywood Association  
2 trademark.
- 3
- 4 C. Grading Rules: Conform with all applicable requirements of American Lumber  
5 Standards "Simplified Practice Recommendations R-16" and to grading rules of  
6 manufacturer's association under whose rules the lumber is produced.
- 7
- 8 D. Reference Standards: Conform with all requirements; and where standards differ, the  
9 mores stringent of the two.
  - 10 01 U.S. Dept. of Commerce Product Standards.
  - 11 02 American Wood Preservers Assoc. (AWPA) Standards
  - 12 03 Architectural Woodwork Institute (AWI) "Quality Standards".
  - 13 04 Western Wood Products Association Manual.
- 14
- 15 E. National Fire Protection Association:
  - 16 01 NFPA 285 – Standard Fire Test Methods for Evaluation of Fire Propagation  
17 Characteristics of Exterior Wall Assemblies Containing Combustible Materials

18 **PART 2 - PRODUCTS**

19 **2.1 MATERIALS**

- 20
- 21 A. Lumber:
  - 22
  - 23 01 Treated No. 2, S4S Southern Yellow Pine:
    - 24 a. Comply with NWMA Standards.
    - 25 b. Use for blocking, stripping, grounds, cants and miscellaneous wood  
26 items.
  - 27
  - 28 02 No. 2, S4S Southern Yellow Pine: Use for framing, blocking, stripping and  
29 miscellaneous concealed interior lumber not exposed to concrete, roofing  
30 weather or moisture, when FRS lumber is not required by building code.
  - 31 03 Fire Retardant No, 2, S4S Southern Pine: Lumber shall be pressure-  
32 impregnated with non-combustible fire retardant chemicals in accordance with  
33 U.L. FRS Fire Hazard Classification. All lumber must be dried following  
34 treatment in accordance with AWPA Standard C-20. Use for all blocking in  
35 partitions; and other locations where required by building code or indicated on  
36 the Drawings.
  - 37
- 38 B. Preservative Wood Pressure Treatment:
  - 39 01 Wood blocking products shall be pressure treated with waterborne, alkali-based  
40 wood preservatives listed in Section 4 of AWPA Standards U1, excluding those  
41 which contain arsenic and / or chromium.
  - 42 02 Copper Azole Type-C (CA-C) with minimum treatment rate of 0.15 PCF.
  - 43 03 Micronized Copper Azole (MCA) with minimum treatment rate of 0.15 PCF.
  - 44 04 Residual copper retention rates after curing shall be minimum 0.054 PCF.
  - 45 05 Use galvanized fasteners where not exposed to direct moisture. Use stainless  
46 steel fasteners where exposed to direct moisture.
  - 47
- 48 C. Fire Retardant Pressure Treatment of Lumber and Plywood:
  - 49 01 Lumber: Comply with AWPA U1 UCFA, Type A or ICC-ES ESR 2645.
  - 50 02 Plywood: Comply with AWPA U1, UCFA, Type A or ICC-ES ESR 2645.
  - 51 03 Surface Burning Characteristics: UL FR-S rating; or flame spread and smoke  
52 developed ratings of 25 or less in a test of 30 minutes' duration in accordance  
53 with IBC section 2303.2.
  - 54 04 Kiln dry after treatment to 19 percent maximum moisture content for lumber  
55 and 15 percent for plywood.
  - 56 05 Treatment: Viance "D-Blaze FRT"; Dricon "Dricon FRT"; or approved equal.

- 1                   06     Provide fire retardant wood where ever part of a fire rated assembly; where  
2                   required by code; and where required by local jurisdiction.  
3                   07     Provide fire retardant wood in exterior wall assemblies as required to meet  
4                   NFPA 285 requirements.  
5  
6           D.     Plywood:  
7           01     General: Comply with APA Standards.  
8           02     APA A-D, Group 1 Interior used where appearance of only one side is exposed  
9           to view for interior locations.  
10           03     Exterior plywood, Group 1, APA rated sheathing. Use where miscellaneous  
11           plywood is exposed to concrete or weather.  
12           04     Fire Retardant Treated Plywood - Identical to "C.03" with pressure-  
13           impregnated non-combustible fire retardant chemicals in accordance with U.S.  
14           FRS Fire Hazard Classification, AWPAs Standards C-27. Use when required by  
15           building code or noted on drawings.  
16           05     Flooring Underlayment: APA rated Sturdi-floor, exterior grade, tongue and  
17           groove edges.  
18  
19           E.     Sheetmetal Blocking:  
20           01     Sheetmetal blocking may be an acceptable alternative to wood blocking for  
21           wall attached equipment and assemblies.  
22           02     Minimum Size: 16 gauge x 6" height sheetmetal.  
23           03     Pre-galvanized or hot-dipped galvanized material.  
24           04     Sheetmetal blocking shall be continuous, and extend to the next stud beyond  
25           the equipment or assembly.  
26  
27           F.     Rough Hardware:  
28           01     Nails, Spikes, and Staples:  
29           a.     Galvanized for exterior locations, high humidity locations, treated  
30           wood not directly exposed to moisture, and fire retardant treated wood.  
31           b.     Type 304 or 316 stainless steel for for treated wood directly exposed  
32           to moisture.  
33           c.     Plain finish for other interior locations.  
34           d.     Use largest size and type to suit application.  
35           02     Bolts, Nuts, Washers, Lags, and Screws:  
36           a.     Medium carbon steel, A-307 or A-325; size and type to suit  
37           application if not noted on the Drawings.  
38           b.     Galvanize for exterior locations, high humidity locations, treated wood  
39           not directly exposed to moisture, and fire retardant treated wood.  
40           c.     Type 304 or 316 stainless steel for treated wood directly exposed to  
41           moisture.  
42           d.     Plain finish for other interior locations.  
43           e.     Carriage bolts shall be used to connect roof edge wood blocking to the  
44           steel perimeter angle.  
45           03     Fasteners: Toggle bolt type for anchorage to hollow masonry. Expansion  
46           shield and lag bolt type for anchorage to solid masonry and concrete. Bolts or  
47           power activated type for anchorage to steel.  
48  
49           G.     Treated Wood Isolation: All treated material shall be installed with an isolation sheet  
50           between the wood and adjacent metal surface.  
51           01     Provide 15 lb. asphalt impregnated building felt or other isolation material as  
52           recommended by the treatment manufacturer.  
53  
54           H.     Technology / Punch-Down Boards:  
55           01     Use grade stamped DFPA, grade A/D.

- 1                    02        Provide 4' x 8' sheets of 3/4 inch plywood for telephone boards in mechanical
- 2                                   rooms; telephone rooms and other areas where needed for attachment of
- 3                                   equipment of other trades.
- 4                    03        Provide 3/4 inch plywood up to 8'-0" above finish floor behind finished gyp
- 5                                   board at all walls of the technology Head End Room (alternate names include
- 6                                   M.D.F. Room, Building Demarcation Room).
- 7                    04        Provide 3/4 inch plywood up to 8'-0" above finish floor behind finished gyp
- 8                                   board at all wall(s) in IDF Rooms where wall mounted equipment is indicated.
- 9                    05        Where exposed, paint as scheduled in Section 09900.

10  
11 **PART 3 - EXECUTION**

12  
13 **3.1        INSTALLATION**

14  
15        A.        General: Blocking in metal framed drywall partitions shall be required at, but not limited

16        to the following locations:

- 17                01        All recessed or semi-recessed equipment and assemblies.
- 18                02        All wall hung surface equipment and assemblies.
- 19                03        All wall attached equipment and assemblies.
- 20                04        Other equipment or assemblies as recommended by the manufacturer for proper
- 21                               installation.

22  
23        B.        Wood Blocking:

- 24                01        Use standard 2x lumber materials for blocking, nailers and other similar
- 25                               applications. Provide 1x materials where indicated or necessary to achieve the
- 26                               required thickness.
- 27                02        Rip, chamfer and / or cut material as required fit the application / assembly.
- 28                03        Non-continuous blocking supporting continuous 2x blocking or nailers shall be
- 29                               a minimum of 16" long and installed so the maximum gap is 24".
- 30                04        Blocking at all recessed equipment and fixtures shall be continuous all sides.
- 31                05        Bolt nailers and blocking to steel, masonry or concrete members with bolts or
- 32                               proportionate strength of members attached from each end, except as otherwise
- 33                               noted on plans.
- 34                06        Blocking Locations: Provide wood blocking at all built-in work, in walls for
- 35                               anchoring cabinets, and other locations as indicated on the drawings.
- 36                07        Provide blocking, bucks and framing as necessary and for other trades as
- 37                               required.

38  
39        C.        Roof Edge Wood Blocking:

- 40                01        Provide continuous wood blocking at roof perimeter as indicated on the
- 41                               Drawings.
- 42                02        Anchor to steel perimeter angle at 24" O.C. maximum using a 3/8" minimum
- 43                               carriage bolt, inserted from the underside of the perimeter angle.
- 44                03        Counter-sink wood blocking 3/4" maximum depth to accommodate the bolt
- 45                               washer, nut and any protruding thread.
- 46                04        Size length of bolt to not protrude above the top surface of the wood blocking.

47  
48  
49  
50        D.        Plywood:

- 51                01        Install plywood over framing in accordance with instruction of American
- 52                               Plywood Association Construction Guide Form No. E30C.
- 53                02        Install underlayment plywood in accordance with instructions of American
- 54                               Plywood Association.
- 55                03        Space panel joints and edges 1/32 inch.
- 56                04        Fill and sand panel edge joints, surface roughness, and damaged or open areas.
- 57                05        Fasten with screws spaced at 6 inches at edges and 8 inches in field each way.

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- E. Sheetmetal Blocking:
- 01 Contractor shall submit requested locations or conditions proposed to use sheetmetal blocking to the Architect for review and acceptance.
  - 02 Where accepted, sheetmetal blocking shall be fastened / screwed to each metal stud in a minimum of two (2) locations per stud. Use standard drywall screws for fasteners.

**END OF SECTION**

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**SECTION 07 11 13**

**BITUMINOUS DAMPPROOFING**

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
  - 01 Dampproofing shall be applied to exterior of all gypsum sheathing and masonry back up walls.
- B. Related Work:
  - 01 Section 06 10 00 – Rough Carpentry
  - 02 Section 09 21 16 – Gypsum Board Assemblies

**1.2 SUBMITTALS**

- A. Provide all submittals in accordance with Submittal Procedures.
- B. Product Data: Manufacturer’s specifications and information for all products propose to be furnished.
- C. Certification of compatibility with specified rigid insulation.
- D. Manufacturer’s installation instructions.
- E. Sample Panel: Sample panel shall be 8' long x 8' high panel showing completed through-wall flashing and dampproofing assembly, complete with exterior sheathing, rigid insulation (where applicable). Coordinate as required with other trades.
  - 01 Once accepted by the Architect, the sample panel shall be the standard by which installed is judged.
  - 02 Sample panel shall remain at the jobsite until all through-wall flashing and dampproofing is completed.

**1.3 WARRANTY**

- A. Refer to Section 01 77 00 - Close-Out Procedures.
- B. Provide two (2) full years/continuous warranty without failure.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Design is based on Henry Company, HE789 Fibered Asphalt Emulsion Dampproofing.
- B. The following manufacturers are acceptable for use for this Section, provided all specified requirements are met or exceeded.
  - 01 Henry Company
  - 02 W.R. Grace
  - 03 BASF / Sonneborn
  - 04 Poly-Guard
  - 05 ChemMasters

1 **2.2 MATERIALS**

- 2
- 3 A. Bituminous dampproofing shall be a fiber reinforced, water based, asphalt emulsion
- 4 material suitable for brush-on, roll-on or spray application.
- 5
- 6 B. The material shall be specifically intended for use above grade in exterior cavity wall
- 7 assemblies.
- 8
- 9 C. The material shall be compatible for application on masonry, drywall, steel and wood
- 10 materials.
- 11
- 12 D. Meets or exceeds requirements of ASTM D1127, Type II Class 1; and ASTM D1187.
- 13
- 14 E. Technical Data / Performance: Shall meet or exceed the following:
- |    |    |                         |                                   |
|----|----|-------------------------|-----------------------------------|
| 15 | 01 | Permeability            | 0.10 Perms Per Inch               |
| 16 | 02 | Flammability            | Flash Point > 212o F              |
| 17 | 03 | Fire Resistance         | UL 790 Pass                       |
| 18 | 04 | Asphalt By Weight       | ASTM D2939 41 – 51%               |
| 19 | 05 | Solids by Weight        | ASTM D2939 45 – 55%               |
| 20 | 06 | Ash by Weight           | ASTM D2939 5 – 25%                |
| 21 | 07 | Behavior at 140o F      | No blistering, sagging or sliding |
| 22 | 08 | Pliability at 32o F     | No cracking or separation         |
| 23 | 09 | Firm Set (70o+ @ 50 RH) | 24 hours maximum                  |
- 24
- 25 F. Provide primers, glass fabric scrim tape, mastic and other materials not specifically
- 26 described, as required for a complete and proper installation and as recommended by the
- 27 manufacturer.
- 28

29 **PART 3 - EXECUTION**

30

31 **3.1 PREPARATION**

- 32
- 33 A. All dust, dirt, old loose or scaling coatings should be removed from the surfaces before
- 34 coating.
- 35
- 36 B. All cracks, joints, penetrations, and splits in substrate materials shall be sealed with
- 37 minimum 4” wide glass fabric scrim tape embedded in bituminous dampproofing.
- 38 01 Scrim tape shall be compatible for use on applicable substrate. Provide test
- 39 area(s) as requested by the Architect to demonstrate compatibility.
- 40 02 Scrim tape shall have full adhesion to the applicable substrate; or other suitable
- 41 means of securing in place.
- 42
- 43 C. Dusty or porous masonry surfaces should be dampened with water.
- 44
- 45 D. Highly porous masonry / CMU shall be primed prior to application of dampproofing.
- 46
- 47 E. Cleaned metal surfaces shall be primed prior to application of dampproofing.
- 48
- 49 F. Coordinate work with installation of self-adhered sheet flashing materials.
- 50
- 51 G. Architect shall approve the taping of joints and surface preparation prior to the application
- 52 of the dampproofing.
- 53

54 **3.2 INSTALLATION**

- 55
- 56 A. Working Conditions: Apply under normal working conditions above 45°F and rising. Do
- 57 not apply when rain is imminent.

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- B. Application:
  - 01 When brush applied, use soft brushes free from stiff bristles should be used and the material applied in even strokes.
  - 02 When spray applied, apply with a 50% overlap of the spray pattern to obtain a uniform and continuous coating.
- C. Ensure continuous coating free of breaks, voids and pinholes.
- D. Thoroughly cover all cracks, joints, and corners.
- E. Provide dampproofing in all exterior cavity walls on concrete masonry units, and on all gypsum board sheathing including areas above soffits, doors, and windows.
- F. Coverage: Minimum 3/32 inch (2.4 mm) dry film thickness. Note: required DFT exceeds manufacturer's recommendations.
- G. Apply in multiple coats if required DFT exceeds manufacturer's recommendations for single coat application.
- H. The completed installation shall provide 100% coverage on all cavity wall substrates.

**3.3 TESTING AND INSPECTING**

- A. Twenty days after completion of this portion of the work, at the discretion of the Architect, demonstrate by running water test that the work of this section will successfully repel water.
  - 01 Notify the Architect at least 72 hours in advance, and conduct the test in the Architect's presence.
  - 02 By means of an outrigger, or similar acceptable equipment, place the nozzle of a 3/4 inch garden hose at a point approximately 10'-0" away from top of wall where approved by the Architect, aiming the nozzle at slight downward angle to direct full stream of water onto wall.
  - 03 Run water onto wall at full available force for not less than four hours.
  - 04 Upon completion of the four-hour period, inspect interior surfaces of wall for evidence of moisture penetration.
- B. If evidence of moisture penetration is discovered, apply an additional coat of approved water repellent to exterior surface in areas directed by the Architect. Repeat application and testing at no additional cost to the Owner, until no evidence of moisture penetration is found.

**END OF SECTION**



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**SECTION 07 17 16**

**BENTONITE COMPOSITE SHEET WATERPROOFING**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
  - 01 The work includes furnishing labor, materials and installation of below grade waterproofing for pipe or conduit penetrations of slabs and grade beams where needed.
- B. Related Work:
  - 01 Section 03 30 00 – Cast-In-Place Concrete
  - 02 Section 31 20 00 – Earth Moving
  - 03 Section 31 23 33 – Trenching and Backfilling

**1.2 SUBMITTALS**

- A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.
- C. Shop Drawings: Submit complete shop drawings consisting of design, fabrication and erection / installation of proposed assemblies.
  - 01 Show details of field fabrications, connections and details.
- D. Installation Instructions: Submit manufacturer’s complete installation instructions, including fastening, for all products and / or assemblies proposed to be furnished.
  - 01 Installation details submitted for review shall be specific to the work of this contract and accurately depict interface within the assembly(s) indicated on the Drawings.
  - 02 Generic details that do not depict actual conditions shall not be acceptable.
- E. Maintenance Instructions: Submit manufacturer’s complete maintenance instructions and recommendations for all products and / or assemblies proposed to be furnished.
  - 01 Include recommended cleaning products and instructions for use.
  - 02 Where applicable, provide recommended maintenance schedules and procedures.
- F. Warranty: Submit specimen of manufacturers’ standard warranty.

**1.3 REFERENCES**

- A. U.S. Army Corps of Engineers, CECS-07111 Elastomeric Membrane Waterproofing.
- B. Federal Construction Guide Specification, FCGS-07111, Elastomeric Waterproofing.

1 **1.4 QUALITY ASSURANCE**

- 2
- 3 A. Manufacturer: Provide Geotextile / Bentonite Clay waterproofing membrane produced by
- 4 a manufacturer with a minimum of five (5) years experience in the waterproofing
- 5 industry.
- 6
- 7 B. Installer: A firm with a minimum of two (2) years experience in installing bentonite clay
- 8 or other related waterproofing products.
- 9

10 **1.5 WARRANTY**

- 11
- 12 A. Upon completion and acceptance of the work required by this section, the manufacturer
- 13 will issue a warranty agreeing to promptly replace defective materials for a period of five
- 14 (5) years.
- 15

16 **PART 2 - PRODUCTS**

17 **2.1 MANUFACTURERS**

- 18
- 19
- 20 A. Design of bentonite composite sheet waterproofing is based on products manufactured by
- 21 Carlisle Coatings & Waterproofing Inc.
- 22
- 23 B. The following additional manufacturers are acceptable provided proposed products meet
- 24 or exceed all specified requirements.
- 25 01 Cetco – Volclay
- 26 02 Tremco
- 27

28 **2.2 PRODUCTS**

29  
30 Design of bentonite composite sheet waterproofing is based on Carlisle Coatings & Waterproofing  
31 Inc. MiraCLAY.

32

33 A. Physical Properties for CCW MiraCLAY Bentonite Clay Waterproofing Membrane:

34 <u>Property</u>	35 <u>Test Method</u>	36 <u>Value</u>
37 Bentonite Content	—	1.0 lb./ft <sup>2</sup> (.488 kg/m <sup>2</sup> ) @ 12% MC
38 Nominal Dry Thickness	—	0.25 in. (6.4 mm)
39 Weight	—	75 lb. (34.05 kg)
40 Permeability	ASTM D5084	5 x 10 <sup>-9</sup> cm/sec
41 Grab Tensile Strength	ASTM D4632	95 lb. (422 N)
42 Grab Elongation	ASTM D4632	150%
43 Puncture Resistance	ASTM D4833	120 psi (828 kPa)
44 Hydrated Internal Shear	ASTM D5321	500 psf (24 kPa)
45 Swell Index	ASTM D5890	2g (24 ml) min.
46 Fluid Loss	ASTM D5891	18 ml max

- 47 B. Waterproofing system accessories supplied by waterproofing membrane manufacturer:
- 48 01 Mastic: CCW MiraCLAY Mastic is used for detailing at terminations and
  - 49 penetrations. Also used to fill minor voids in concrete and as a fillet in angle
  - 50 changes.
  - 51 02 Granules: CCW MiraCLAY Granules used for horizontal to vertical transitions
  - 52 and for detailing at seams and slab penetrations.
  - 53 03 Water Stop: CCW MiraSTOP used as a water stop at cold concrete pours,
  - 54 shotcrete cold joints and between pre-cast concrete panels.
  - 55
  - 56 C. Membrane to Substrate Fasteners: Fasteners, of the type and length suitable for the
  - 57 substrate, shall be used in conjunction with washers, of at least 1” diameter, to attach the
  - geotextile/bentonite clay waterproofing membrane to the substrate.

- 1 D. Membrane to Membrane Fasteners: Mechanically fasten membrane sheets together with a  
2 box-stapler or similar device for horizontal applications.  
3  
4 E. The Geotextile/Bentonite membrane shall consist of geotextile panels of sodium  
5 bentonite clay sandwiched between two layers of needle-punched woven and non-woven  
6 polypropylene fabrics.  
7  
8 F. Drainage Composite: Shall be CCW MiraDRAIN® as recommended by the manufacturer  
9 for each condition.  
10  
11 G. Perimeter Drainage System: Where required shall be CCW QuickDRAIN™.  
12  
13 H. Protection Board - .125 inch minimum thickness as recommended by manufacturer.  
14

### 15 **PART 3 - EXECUTION**

#### 16 **3.1 INSPECTION**

- 17  
18  
19  
20 A. Examine substrate and condition under which waterproofing will be installed. Do not  
21 proceed with the work until unsatisfactory conditions have been corrected.  
22

#### 23 **3.2 SURFACE PREPARATION**

- 24  
25 A. Grade Substrates: Shall be level and uniform that is compacted to a minimum of 85%  
26 modified proctor.  
27  
28 B. Concrete Application:  
29 01 Apply CCW MiraCLAY Mastic to all construction joints at a minimum of 1/4"  
30 (7mm) thickness and a 3" (8cm) minimum width.  
31 02 Remove projections from the wall surface in excess of 3/4" (20mm).  
32  
33 C. Honeycombing, voids and aggregate pockets exceeding 1 inch in diameter or have a  
34 depth greater than 3/4 inch should be filled with a non-shrink cementitious grout. Fill tie-  
35 rod holes with a non-shrink cementitious grout.  
36

#### 37 **3.3 INSTALLATION**

- 38  
39 A. Prevent geotextile/bentonite clay waterproofing membrane from hydrating before being  
40 covered with overburden. When threat of rain is imminent or backfill is not immediate,  
41 geotextile/bentonite clay waterproofing membrane should be covered with polyethylene  
42 sheeting.  
43  
44 B. Underslab Application: (Concrete slab shall have a minimum thickness of 4" if reinforced  
45 or 5" if not reinforced).  
46 01 Install CCW MiraCLAY with the white non-woven side up, facing the installer.  
47 02 Overlap edges a minimum of 4" (10cm).  
48 03 Protect CCW MiraCLAY from damage caused by chairs with sharp edges or  
49 points by placing a patch of CCW MiraCLAY under the chair.  
50 04 Staple joints often enough to prevent excessive movement.  
51 05 Pour CCW MiraCLAY Granules or trowel CCW MiraCLAY Mastic around all  
52 penetrations and press in "cut to fit" collars of CCW MiraCLAY.  
53 06 Extend the installation of CCW MiraCLAY 12" (31cm) up or beyond the  
54 perimeter slab forms.  
55 07 Inspect and repair any damaged material before concrete pour.  
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- C. Concrete Wall Application:
  - 01 Install CCW MiraCLAY with the white non-woven side out, facing the installer.
  - 02 Starting at the bottom of the wall, unroll CCW MiraCLAY and nail across top of panel one nail per 12" (31cm) on center. Allow sheet to hang down nailing only as required to stabilize.
  - 03 Install adjacent membrane by overlapping edges a minimum of 4" (10cm).
  - 04 Fasten membrane once every 18" (45cm) on seams or as required to prevent blousing with 3/4" (20mm) to 1" (25mm) concrete nails with washers.
  - 05 Extend waterproofing membrane to 6-inches below grade and fasten membrane to the substrate to maintain constant compression using a 1/8" X 1" (3 X 25 mm) minimum termination bar. Trowel a 1/2" (12mm) thick and 2" (5cm) wide bead of CCW MiraCLAY Mastic at top edge of membrane and cover termination bar.
  - 06 Create a cant at any vertical to horizontal transition by applying a 1.5" to 2" (4cm to 5cm) cant of CCW MiraCLAY Granules or CCW MiraCLAY Mastic.
  - 07 Strip in all corners and transitions with a 12" to 15" (31cm to 39cm) piece of CCW MiraCLAY membrane to double cover these areas.
  - 08 Backfill must be compactable soils free of construction debris and must be uniformly compacted to a minimum 85% Modified Protor on each lift.

**3.4 PROTECTION AND DRAINAGE**

- A. Protect the geotextile/bentonite clay waterproofing membrane with CCW MiraDRAIN Drainage Composite as recommended by the manufacturer for the specific installation requirements of the project
- B. Install the CCW MiraDRAIN Drainage Composite as recommended by the manufacturer for the specific installation requirements of the project.

**3.5 BACKFILL**

- A. Backfill with smooth and uniform material with no sharp projections or stones larger than 3/4-inch. Compact backfill to an 85% Modified Proctor. Insure backfill material is not contaminated with salt or other materials that could prevent the CCW MiraCLAY from hydrating.

**END OF SECTION**

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**SECTION 07 21 00**

**THERMAL INSULATION**

CONDITIONS OF THE CONTRACT, AND DIVISION 1 APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
  - 01 Provide all thermal batt / roll insulation at wall and roof of pre-engineered metal building as indicated.
- B. Related Work:
  - 01 Section 07 11 13 – Bituminous Dampproofing
  - 02 Section 07 44 63 – Fiber-reinforced Cementitious Panel Assemblies
  - 03 Section 13 34 29 – Metal Building Systems

**1.2 SUBMITTALS**

- A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.
- C. Shop Drawings: Submit complete shop drawings consisting of design, fabrication and erection / installation of proposed assemblies.
  - 01 Show profiles, sizes, spacing and locations of assembled components.
  - 02 Show details of shop fabrications, connections and details.
  - 03 Show details of field fabrications, connections and details.
  - 04 Provide calculations demonstrating compliance with wind load and other requirements.
  - 05 Shop drawings shall be sealed and signed by a Texas registered engineer.
- D. Installation Instructions: Submit manufacturer’s complete installation instructions, including fastening, for all products and / or assemblies proposed to be furnished.
  - 01 Installation details submitted for review shall be specific to the work of this contract and accurately depict interface within the assembly(s) indicated on the Drawings.
  - 02 Generic details that do not depict actual conditions shall not be acceptable.
- E. Maintenance Instructions: Submit manufacturer’s complete maintenance instructions and recommendations for all products and / or assemblies proposed to be furnished.
  - 01 Include recommended cleaning products and instructions for use.
  - 02 Where applicable, provide recommended maintenance schedules and procedures.
- F. Sample / Mock-Up Panel: Sample / mock-up panel shall made as per Section 07 44 63 Fiberglass-reinforced Cementitious Panel Assemblies.
  - 01 Wall insulation and thermal breaks shall be furnished and installed in mock-up in the proper location as one part of the assembly.
  - 02 Once accepted by the Architect, the sample panel shall be the standard by which installed is judged.

1 **1.3 REFERENCES**

- 2
- 3 A. American Society for Testing and Materials (ASTM):
- 4 01 C167 - Test Methods for Thickness and Density of Blanket or Batt Thermal
- 5 Insulations
- 6 02 C168 - Terminology Relating to Thermal Insulation
- 7 03 C177 - Test Method for Steady-State Heat Flux Measurements and Thermal
- 8 Transmission Properties by Means of the Guarded Hot-Plate Apparatus
- 9 04 C390 - Practice for Sampling and Acceptance of Thermal Insulation Lots
- 10 05 C653 - Guide for Determination of the Thermal Resistance of Low Density
- 11 Blanket-Type Mineral Fiber Insulation
- 12 06 C665 - Specification for Mineral-Fiber Blanket Thermal Insulation for Light
- 13 Frame Construction and Manufactured Housing
- 14 07 C991 - Specification for Flexible Fibrous Glass Insulation for Metal Buildings
- 15 08 C1104 - Test Method for Determining the Water Vapor Sorption of Unfaced
- 16 Mineral Fiber Insulation
- 17 09 C1304 - Test Method for Assessing the Odor Emission of Thermal Insulation
- 18 Materials
- 19 10 C1338 - Test Method for Determining Fungi Resistance of Insulation
- 20 Materials and Facings
- 21 11 E84 - Standard Test Method for Surface Burning Characteristics of Building
- 22 Materials
- 23
- 24 B. Underwriters Laboratory (UL):
- 25 01 UL 723 – Surface Burning Characteristics of Building Materials.
- 26
- 27 C. National Fire Protection Association (NFPA):
- 28 01 NFPA 259 – Standard Test Method for Potential Heat of Building Materials.
- 29 02 NFPA 285 – Standard Fire Test Method for Evaluation of Fire Propagation
- 30 Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing
- 31 Combustible Components.
- 32
- 33 D. North American Insulation Manufacturers Association
- 34 01 202-96 (Revision 2000) Standard
- 35

36 **PART 2 - PRODUCTS**

37

38 **2.1 MATERIALS**

- 39
- 40 A. Fiberglass batt insulation to be used in the Metal Building System shall be based on
- 41 products manufactured by CertainTeed Corporation. All insulation shall meet the
- 42 standard of NAIMA 202-96 (2000 Revision) and shall be labeled as such.
- 43
- 44 B. The following manufacturers are acceptable provided proposed products meet or exceed
- 45 all specified requirements.
- 46 01 Johns Manville.
- 47 02 Owens Corning
- 48 03 Knauf Insulation.
- 49
- 50 C. Metal Building System Wall Insulation:
- 51 01 Insulation assembly shall consist of an R-10 faced batt insulation at exterior
- 52 walls between wall girts and metal siding.
- 53 02 Exposed insulation to be faced with a white polypropylene/scrim/core/metalized
- 54 polyester, complying with ASTM C1136, Type 1, Type “WMP-50 Facing” as
- 55 manufactured by Lamtec Corporation.
- 56 a. White Film: Polypropylene 0.0015 inch (face white side towards inside)



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**3.2 PROTECTION**

- E. Upon completion of batt insulation, use all means necessary to protect material from becoming wet.
  - 01 In the event batt or acoustical insulation comes in direct contact with moisture or becomes wet, remove and discard, and replace insulation with dry material.
  - 02 In the event batt insulation becomes damp or moist, thoroughly dry insulation prior to covering up.
  - 03 Use all means necessary to assure that batt and acoustical insulation is completely dry at the time of cover-up and will not promote the growth of mold.
  
- F. Protect rigid insulation as required to prevent damage and delamination.

**END OF SECTION**



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**SECTION 07 44 63**

**FIBER-REINFORCED CEMENTITIOUS PANEL ASSEMBLIES**

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND DIVISION 1 APPLY TO THIS SECTION.

**PART 1 -GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work: Provide and install a pre-finished fiber-cement panel system with concealed fasteners including all necessary trim, sub-girts or furring members, panel clips and special pieces for a complete system and one-source responsibility.
- B. References:
  - 01 Section 06 10 00 - Rough Carpentry
  - 02 Section 07 11 13 – Bituminous Dampproofing
  - 03 Section 07 65 26 – Self-Adhering Sheet Flashing (at openings and base of wall)
  - 04 Section 07 92 00 – Joint Sealants
  - 05 Section 13 34 19 – Metal Building Systems

**1.2 SUBMITTALS**

- A. Provide all submittals in accordance with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s data/ literature for all products proposed to be furnished necessary to demonstrate compliance with the specified requirements.
- C. Shop Drawings:
  - 01 Produce and submit shop drawings TO SCALE, showing all conditions in both elevation and detailed sections applicable to this project. Do not submit generic details or elevations that are not project specific.
  - 02 Indicate all joints and use materials to provide the longest pieces to avoid vertical jointing whenever possible.
- D. Samples:
  - 01 Each type of panel proposed to be furnished in quantities sufficient to show range of color where applicable.
  - 02 Custom color shall be selected from samples made by the manufacturer. After Architect, Owner, Contractor and Nichiha representative view the existing Maritime Center, up to four (4) color shades will be selected for samples to be made to match the color of the building. Two (2) samples, sized 12”x18”, of each of the proposed colors on Nichiha panels will be fabricated and submitted to the Architect for review & approval of color & texture.

**1.3 MOCK-UP PANEL**

- A. Mock-Up Panel: Mock-up panel shall be fabricated and shall be 8' long x 6' high panel showing selected panel color range and texture, bonding, mortar color, joint shape, and quality workmanship.
  - 01 Panel shall be “L” shaped fastened to the actual clip system over metal siding substrate and girt framing to indicate the actual wall conditions. Support of girt framing as needed.
  - 02 Include a matching outside corner.

- 1           03       Coordinate as required with other trades.
- 2           04       Include door frame (or partial frame) to show the interface between the door jamb
- 3                   and siding.
- 4           05       Once accepted by the Architect, the sample panel shall be the standard by which
- 5                   installed panels shall be judged.
- 6           06       Sample wall shall remain in place until all exterior wall work is complete.

7

8   **1.3    REFERENCES**

9

- 10   A.       American Architectural Manufacturers Association (AAMA):
- 11       01       AAMA 509-09 – Voluntary Test and Classification Method of Drained and Back
- 12                   Ventilated Rain Screen Wall Cladding Systems
- 13
- 14   B.       ASTM International (ASTM):
- 15       01       ASTM C518 - Standard Test Method for Steady-State Thermal Transmission
- 16                   Properties by Means of the Heat Flow Meter Apparatus.
- 17       02       ASTM C1185 - Standard Test Methods for Sampling and Testing Non-Asbestos
- 18                   Fiber Cement.
- 19       02       ASTM C1186 – Standard Specification for Flat Fiber-Cement Sheets.
- 20       03       ASTM E84 - Standard Test for Surface Burning Characteristics of Building
- 21                   Materials.
- 22       04       ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and
- 23                   Materials
- 24       05       ASTM E228 - Standard Test Method for Linear Thermal Expansion of Solid
- 25                   Materials with a Vitreous Silica Dilatometer.
- 26       06       ASTM E330 - Standard Test Method for Structural Performance of Exterior
- 27                   Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- 28       07       ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows,
- 29                   Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- 30       08       ASTM G23 - Standard Practice for Operating Light-Exposure Apparatus
- 31                   (Carbon-Arc Type) with and without Water for Exposure of Nonmetallic
- 32                   Materials, Replaced by G152 and G153.
- 33
- 34   C.       Florida Building Code - Test Protocol HVHZ:
- 35       01       Testing Application Standard (TAS) 201, 202, 203 – Impact Test Procedures
- 36
- 37   D.       National Fire Protection Association (NFPA):
- 38       01       NFPA 285 - Fire Test Method for Exterior Wall Assemblies Containing
- 39                   Combustible Material.
- 40       02       NFPA 268 – Ignition Resistance of Exterior Wall Assemblies.

41

42   **1.4    PERFORMANCE CRITERIA**

43

- 44   A.       This project is in the TWIA, Inland I catastrophic area as defined by The Texas
- 45                   Department of Insurance. The panel system shall meet all requirements of TWIA and the
- 46                   local building code.
- 47       a.       See structural drawings for additional wind loading requirements.
- 48       b.       Provide engineering services by a registered Professional Engineer currently
- 49                   licensed in the State of Texas to ensure furring channels and fasteners are
- 50                   properly designed for the wind requirements. Engineer shall stamp and sign the
- 51                   documents for submittal.
- 52
- 53   B.       Fiber cement panels shall meet or exceed the following requirements.
- 54       01       ICC Evaluation Service Inc. (ICC-ES) Evaluation Report No. ESR-1694.
- 55       02       ICC-ES Legacy Report No. 5915.
- 56       03       Canadian Construction Materials Center (CCMC) Evaluation Report No. CCMC

- 1 13083-R.  
2 04 Refer to applicable building code compliance reports for the uniform wind load.  
3  
4 B. Panel Properties:  
5 01 Linear Variation with Change in Moisture Content – M.D. 0.006 in/ft., C.D. 0.003  
6 in/ft.  
7 02 Wet Flexural Strength – average 1155.51 psi.  
8 03 Water tightness – no water droplets were observed on any specimen.  
9 04 Freeze-thaw – no damage or defects were observed.  
10 05 Warm water – no evidence of cracking, delamination, swelling, or other defects  
11 were observed.  
12 06 Heat-Rain – no crazing, cracking, or other deleterious effects, surface or joint  
13 changes were observed in any specimen.  
14 07 Mean Coefficient of Linear Thermal expansion – average  $3.18 \times 10^{-6}$  in/in ft.  
15 08 Surface burning – flame spread of 0, smoke developed at 5.  
16 09 Wind Load – positive, average 148.03 psf and negative, average 120.29 psf  
17 10 Water Penetration – no water leakage was observed into wall cavity.  
18 11 Weather Resistant – no cracking, checking, crazing, erosion, or other detrimental  
19 effects were observed.  
20 12 Steady-state heat flux and thermal Transmission Properties Test – the test results  
21 show that Nichiha Fiber Cement Panels to have a thermal resistance of R Value  
22 of 1.23 F.  
23 13 Fire Resistant – the walls successfully endured a 60-minute fire exposure without  
24 developing excessive unexposed surface temperature or allowing flaming on the  
25 unexposed side of the assembly.  
26

## 27 1.5 QUALITY ASSURANCE

- 28  
29 A. Manufacturer Source: Provide metal wall panel system and panel accessories from a single  
30 manufacturer.  
31  
32 B. Installer Qualification: Experienced Installer with minimum of five (5) successful  
33 completed projects of similar materials and scope, approved by manufacturer, and  
34 employing workers trained by manufacturer to install specified products.  
35  
36 C. Calculations: Calculations supporting structural performance of the wall panels shall be  
37 prepared by a professional Structural Engineer.  
38

## 39 1.6 DELIVERY, STORAGE AND HANDLING

- 40  
41 A. Store panels flat, above ground, and away from contact with water or vapor. Keep panels  
42 and accessories under weatherproof coverage at all times. Panels exposed to water or  
43 water vapor prior to installation shall be dried completely before installation. Installation  
44 of damp panels may result in panel shrinkage.  
45  
46 B. Transport panels on edge. Do not carry or lift panels flat.  
47  
48 C. Direct contact between the panels and the ground should be avoided at all times. It is  
49 necessary to keep panels clean during installation process.  
50

## 51 1.7 WARRANTIES

- 52  
53 A. Section 01 77 00 - Closeout Procedures; product warranties and product bonds.  
54  
55 B. Provide manufacturer's 50 year warranty against defects in panel construction.  
56

1 C. Provide manufacturer's 15 year warranty against defects in panel finish.

2  
3 **PART 2 - PRODUCTS**

4  
5 **2.1 MANUFACTURER**

- 6  
7 A. Manufacturer subject to compliance with requirements, provide products from the  
8 following:  
9 01 Nichiha Corporation; Houston call Stephen Crane at 832-493-2543.

10  
11 **2.2 MATERIALS**

- 12  
13 A. Designer Series "Illumination" (Basis of Design)  
14 01 Autoclaved, wood fiber reinforced cement panels fabricated of wood fibers  
15 mixed with Portland cement and silica.  
16 02 Size: Nominal 18 x 72 inches  
17 03 Thickness: 5/8 inch  
18 04 Edges: Factory-made corners with 3-1/2" returns in matching color  
19 05 Vertical Joints: vertical joints (Bead Reveal, H-Mold), terminations (J-Mold, L-  
20 Mold)  
21 06 Weight: 3.8 lb/sq.ft.  
22 07 Coverage: 9 sq. ft. per panel (6'), 15 sq. ft. per panel (10')  
23 08 Colors: Color will be selected to be complimentary or match the existing  
24 adjacent Maritime Technology Center. Samples will be made by the  
25 manufacturer to ascertain the correct color as selected by the Architect.  
26  
27 B. Accessories:  
28 01 Manufacturer's panel clips, corner clips, shims, trim and other components  
29 necessary for complete installation.  
30 02 Fasteners: Stainless steel, type recommended by manufacturer for intended use;  
31 length as needed to penetrate stud flange minimum 1/2 inch.  
32 03 Sealant: in accordance with Section 07 90 00.  
33 04 Sub-girts or Zee furring members shall be fabricated from minimum 16 gage zinc  
34 coated steel conforming to ASTM A653 SQ Grade 37, G90 coating.

35  
36 **PART 3 - EXECUTION**

37  
38 **3.1 PREPARATION**

- 39  
40 A. Cutting:  
41 01 Cut panels in accordance with manufacturer's instructions.  
42 02 Cut panels in a well-ventilated area.  
43 03 Wear safety glasses and OSHA approved respirator when cutting, drilling,  
44 sawing, sanding or abrading panels.

45  
46 **3.2 INSTALLATION**

- 47  
48 A. General: Install products in accordance with manufacturer's instructions.  
49 a. Use the longest lengths whenever possible to avoid intermediate joints.  
50

- 1 B. Fasten zee-furring or sub-girts through sheathing to cold formed structural metal stud  
2 framing substrate using self-drilling screws as recommended by the manufacturer and  
3 engineering.  
4  
5 C. To ensure no water migration penetrates the building envelope through the fasteners, the  
6 leg of the furring shall be waterproofed as such: Install a 4 inch wide strip of self-  
7 adhesive membrane along the full-length of the open zee furring leg that is fastened to the  
8 sheathing. On the opposite side of the same leg, where the leg bends outward and at the  
9 top of the leg, install a continuous bead of compatible sealant as recommended by the  
10 manufacturer.  
11  
12 D. Install panels using concealed clips in accordance with the following:  
13 01 Install starter track at the bottom of walls to receive panels. Provide 6 inches  
14 clearance from bottom edge of first panel to grade or unpaved surfaces, and 2  
15 inches clearance from bottom edge to paved surfaces.  
16 02 Install panel clips along the tops of panels, fastened to each stud.  
17 03 Install panel clips at the bottom of each vertical panel joint, secured to the top of  
18 the panel below.  
19 04 Install joint clip at the top of each vertical panel joint, fastened to stud framing.  
20  
21 E. Install closure trim at exposed edges around openings and penetrations. Panel edges shall  
22 not be exposed in finished construction. Provide ¼ inch clearance between panel edges  
23 and adjacent construction.  
24  
25 F. Fit panels together tightly on all sides, creating tight, uniform joints.  
26  
27 G. Install panel corner trim at outside corners.  
28  
29 H. Provide expansion joints where indicated, or if not indicated, at 30 feet oc maximum.  
30

### 31 **3.3 CLEANING AND PROTECTION**

- 32  
33 A. Section 01 77 00 Closeout Procedures for final cleaning and protection of installed  
34 construction.  
35  
36 B. Clean panels in accordance with manufacturer's instructions.  
37  
38 C. Protect completed construction from damage in accordance with manufacturer's  
39 instructions.  
40  
41 D. Repair or replace damaged panels prior to final completion.  
42  
43  
44  
45

**END OF SECTION**

1 **SECTION 07 92 00**

2  
3 **JOINT SEALANTS**

4  
5 CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

6  
7  
8 **PART 1 - GENERAL**

9  
10 **1.1 DESCRIPTION**

- 11  
12 A. Scope of Work:
- 13 01 This Section includes exterior building and site work sealants.
  - 14 02 Sealants for moving joints.
  - 15 03 Interior caulking.
  - 16 04 Provide foam backer rods where shown or required for proper installation of
  - 17 sealants.
- 18
- 19 B. Related Work:
- 20 01 Section 08 16 13 – Fiberglass Doors & Frames
  - 21 02 Section 08 80 00 – Glazing
  - 22 03 Section 08 90 00 – Louvers and Vents
  - 23 04 Section 13 34 19 – Metal Building Systems
  - 24 05 Section 32 13 13 – Concrete Paving.

25  
26 **1.2 SUBMITTALS**

- 27
- 28 A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- 29
- 30 B. Product Data: Submit manufacturer’s literature, product data, certifications and
- 31 supporting information for all products proposed to be furnished, as necessary to
- 32 demonstrate compliance with the specified requirements.
- 33 01 If products from an acceptable manufacturer are being submitted, specifically
  - 34 cross reference the proposed products to the listed as the basis of design products.
- 35
- 36 C. Shop Drawings: Submit complete shop drawings consisting of design, fabrication and
- 37 erection / installation of proposed assemblies.
- 38 01 Show details of field fabrications, connections and details.
- 39
- 40 D. Installation Instructions: Submit manufacturer’s complete installation instructions,
- 41 including fastening, for all products and / or assemblies proposed to be furnished.
- 42 01 Installation details submitted for review shall be specific to the work of this
  - 43 contract and accurately depict interface within the assembly(s) indicated on the
  - 44 Drawings.
  - 45 02 Generic details that do not depict actual conditions shall not be acceptable.
- 46
- 47 E. Maintenance Instructions: Submit manufacturer’s complete maintenance instructions and
- 48 recommendations for all products and / or assemblies proposed to be furnished.
- 49 01 Include recommended cleaning products and instructions for use.
  - 50 02 Where applicable, provide recommended maintenance schedules and procedures.
- 51
- 52 F. Color / Finish Samples:
- 53 01 Provide two (2) samples of each finish for selection by the Architect.
  - 54 02 Finish samples shall be provided of / on actual material; paper or digital samples
  - 55 shall not be accepted.
- 56  
57

- 1 G. On-site sample for Architect's approval of colors.  
2  
3 H. For warranties longer than one (1) year, submit a sample of the warranty proposed to be  
4 furnished.  
5

### 6 **1.3 REFERENCES**

- 7  
8 A. ASTM International  
9 01 ASTM C 510 - Standard Test Method for Staining and Color Change of Single-  
10 or Multicomponent Joint Sealants.  
11 02 ASTM C 661 - Standard Test Method for Indentation Hardness of Elastomeric  
12 Type Sealants by Means of a Durometer.  
13 03 ASTM C 719 - Standard Test Method for Adhesion and Cohesion of Elastomeric  
14 Joint Sealants Under Cyclic Movement (Hockman Cycle).  
15 04 ASTM C 794 - Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.  
16 05 ASTM C 834 - Specification for Latex Sealants.  
17 06 ASTM C 920 - Specification for Elastomeric Joint Sealants.  
18 07 ASTM C 1087 - Test Method for Determining Compatibility of Liquid-Applied  
19 Sealants with Accessories Used in Structural Glazing Systems.  
20 08 ASTM C 1193 - Guide for Use of Joint Sealants.  
21 09 ASTM C 1247 - Standard Test Method for Durability of Sealants Exposed to  
22 Continuous Immersion in Liquids.  
23 10 ASTM C 1248 - Test Method for Staining of Porous Substrate by Joint Sealants.  
24 11 ASTM C 1311 - Specification for Solvent Release Sealants.  
25 12 ASTM C 1330 - Cylindrical Sealant Backing for Use with Cold Liquid Applied  
26 Sealants.  
27 13 ASTM D 412 - Test Methods for Vulcanized Rubber and Thermoplastic  
28 Elastomers—Tension.  
29 14 ASTM D 624 - Test Method for Tear Strength of Conventional Vulcanized  
30 Rubber and Thermoplastic Elastomers.  
31 15 ASTM D 2203 - Standard Test Method for Staining from Sealants.  
32 16 ASTM D 2240 - Test Method for Rubber Property - Durometer Hardness.  
33  
34 B. NSF International:  
35 01 NSF Standard 51 – Food Equipment Materials.  
36  
37 C. U.S. Food and Drug Administration (FDA):  
38 01 21 CFR 177.2600 - Title 21 Part 177 Indirect Food Additives: Polymers  
39

### 40 **1.4 WARRANTY**

- 41  
42 A. Warrant the work specified herein for two (2) years against becoming unserviceable or  
43 causing an objectionable appearance, resulting from either defective or nonconforming  
44 materials or workmanship.  
45  
46 B. Warrant exterior joints against failure of the joint to effectively seal out water or moisture.  
47 Warrant interior joints against cracking, crazing separation of the material from the  
48 substrate or other joint failure.  
49

## 50 **PART 2 - PRODUCTS**

### 51 **2.1 MANUFACTURERS**

- 52  
53  
54 A. Design is based on products manufactured by Tremco.  
55

- 1 B. Acceptable Manufacturers: The following manufacturers are acceptable to provide  
2 products of this section, provide all proposed products meet or exceed the specified  
3 requirements.  
4 01 Dow Chemical Co.  
5 02 Sonneborn.  
6 03 Pecora, Inc.  
7 04 Manufacturers of products bearing the Thiokol Corporation seal of approval. All  
8 polysulfide sealants shall bear the seal.  
9

10 **2.2 MATERIALS**

- 11  
12 A. Caulking for exposed non-working interior locations at all hollow metal frames and  
13 abutting surfaces at ceiling, wall angles and all other locations for finished appearance:  
14 01 Type: Tremco “THC-901”.  
15 02 A multi-component, polyurethane sealant providing a fast-setting pliable seal  
16 with minimal shrinkage.  
17  
18 B. Exterior concrete horizontal joints, including drives, parking, sidewalks, play surfaces and  
19 other flatwork:  
20 01 Type: Tremco Vulkem 45SSL.  
21 02 High performance multi-component, chemically curing polyurethane sealant.  
22  
23 C. Exterior highly active joints in walls, masonry or concrete fences:  
24 01 Type: Tremco Dymeric.  
25 02 Gun grade, general purpose multi-component, chemically curing polyurethane  
26 sealant.  
27  
28 D. Exterior joints around windows, glazing, entrances, soffit joints and other general sealant  
29 areas:  
30 01 Tremco Spectrem 2.  
31 02 Medium-modulus, one-part, high performance, neutral-cure silicone sealant.  
32  
33 E. Exterior joints of concrete tilt-wall panels.  
34 01 Tremco Dymonic 100.  
35 02 High performance, medium-modulus, low VOC, UV-stable, non-sagging  
36 polyurethane sealant.  
37  
38 F. Interior Expansion Contraction or Control Joints where movement is to be accommodated:  
39 Tremco “Mono”.  
40 01 Tremco Spectrem 2.  
41 02 Medium-modulus, one-part, high performance, neutral-cure silicone sealant.  
42  
43 G. Interior General Purpose:  
44 01 Tremco Tremflex 834.  
45 02 High performance, one-part acrylic latex sealant.  
46  
47 H. mers, Cleaners, Top Coats: Use only materials listed as suitable in resistance to staining,  
48 compatibility and durability before proceeding.  
49  
50 I. Back-Up Filler: Closed cell or open cell, non-gassing filler as recommended by sealant  
51 manufacturer.  
52  
53 J. Sealant colors shall be as selected by the Architect from manufacturer’s full range of color  
54 selections.  
55  
56



1 **PART 3 - EXECUTION**

2  
3 **3.1 PREPARATION**

- 4  
5 A. Examine all assemblies to receive sealant and verify all work is complete as required for  
6 the proper installation of sealant.  
7  
8 B. Do not accept joints that are wider than joint width limitations of the sealant to be used.  
9  
10 C. Notify Contractor of any irregularities and / or discrepancies and do not proceed until fully  
11 resolved.  
12

13 **3.2 APPLICATION**

- 14  
15 A. Temperatures: Do not install sealants when air temperature is under 40°Fahrenheit.  
16 Sealants may be warmed to ease installation when recommended by the manufacturer.  
17  
18  
19 B. Tooling:  
20 01 Tool exposed joints to a slightly concave surface using slicking materials  
21 recommended by the manufacturer.  
22 02 The tooling procedure shall press sealant against the sides of the groove.  
23 03 No materials shall be left "feathered" out or smeared on the abutting materials.  
24 04 If necessary, protect adjacent surfaces with tape.  
25 05 Completed joints shall have a uniform professional appearance.  
26 06 Use an anti-tack compound on sealant that does not set up fast enough to avoid  
27 dust collection.  
28  
29 C. Sealant Back-Up: Provide a back-up filler where groove depth is too great to fill with  
30 sealant. Review joint design with Architect.  
31  
32 D. Compressive Filler: Seal vertical expansion joints with fillers. Provide compressible filler  
33 twice the width of the joint and with a depth of one and one-half times the compressed  
34 width. Lap ends a minimum of 2 inches.  
35  
36 E. Seal ends together in such a manner to allow natural drainage.  
37 01 Install filler by compressing material and sliding into joint.  
38 02 Align filler on one face of the joint before it expands to the full joint width.  
39

40 **3.3 CLEAN-UP**

- 41  
42 A. Immediately following installation of sealants, remove all excess sealant as required to  
43 result in clean sealant lines and applications.  
44  
45 B. Protect sealant installations as required until sealant has reached final set.  
46  
47  
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49 **END OF SECTION**

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**SECTION 08 16 13**

**FIBERGLASS DOORS & FRAMES**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
  - 01 Furnish and install prefinished doors & frames of FRP composite construction in accordance with details and schedule shown on the project drawings and as specified herein. Door and frame products of aluminum, steel or wood constructions that use FRP face sheets are strictly excluded.
  - 02 FRP is defined as "Fiberglass Reinforced Polyester".
- B. Related Sections
  - 01 Section 05 50 00 – Metal Fabrications
  - 02 Section 08 71 00 – Door Hardware
  - 03 Section 13 34 19 – Metal Building Systems

**1.2 QUALITY ASSURANCE**

- A. Referenced Standards
  - 01 Society of Automotive Engineers (SAE)
  - 02 International Building Code, Plastics (Chapter 26)
  - 03 ANSI A250.4 Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcements 1,000,000 cycle test
  - 04 SFBC PA 201 Impact procedures for large missile impact.
  - 05 SFBC PA 202 Uniform static load on building components
  - 06 SFBC PA 203 Products subjected to cyclic wind pressure.
  - 07 SFBC 3603.2 Forced Entry Test
  - 08 ASTM E 1886 Performance of Exterior Protective Systems
  - 09 ASTM E 1996 Impact Performance of Exterior Protective Systems
  - 10 ASTM C 518 Heat Transfer Properties of Materials
  - 11 ASTM D 1761 Mechanical Properties of Fasteners
- B. Experience: Manufacturer shall be ISO 9001 certified and been engaged in the manufacture of FRP door and frame systems for a minimum of five (5) years documented experience prior to the start of this work, and who has a history of successful production acceptable to the Architect.
- C. Referenced Standard: Where labeled fire doors are required, Fiberglass Doors and frames shall be UL listed and shall be tested successfully to UL10B / UL10C, UBC 7-2 standards.
- D. Process: Certify that FRP doors are manufactured via press-molding technology.
- E. Warranty: Provide written limited guarantee for FRP doors and frames as follows:
  - 01 Extreme Duty Hurricane doors are guaranteed for the life of the product against delamination and failure due to corrosion from the specific chemical environment named at the time of purchase. Furthermore, all products are inspected prior to shipment and guaranteed against defective workmanship for a period of ten (10) calendar years after the date of purchase.

1 **1.3 SUBMITTALS**

- 2
- 3 A. Manufacturer shall provide certification that door and frame assembly meets the
- 4 Hurricane/ Impact Resistance requirements of Texas Windstorm Insurance (TDI) for
- 5 Inland I Classification and the wind load requirements of 120mph.
- 6
- 7 B. Product Data: Provide catalog cut of FRP door detailing internal construction and
- 8 reinforcements, materials used and description of molding process.
- 9
- 10 C. Shop Drawings: To include the following specific information:
- 11 01 Specifications relating to FRP door thickness, resin type, core material, method
- 12 of construction, finish color, type of glass and glazing, anchor systems, joint
- 13 construction and complete warranty information.
- 14 02 Complete schedules or drawings of FRP doors and frames (and associated
- 15 Builders Hardware) showing identifying mark numbers, door and frame types,
- 16 typical elevations, nominal sizes, handing, actual dimensions and clearances,
- 17 and required hardware preps and reinforcements.
- 18 03 Supporting reference drawings pertaining to frame mounting details, door light
- 19 or louver installation, hardware locations, and factory hardware cutouts and
- 20 reinforcements.
- 21
- 22 D. Color Samples: Provide a complete set of available finish colors from the manufacturer
- 23 for color selection upon request.
- 24
- 25 E. Installation instructions: Include manufacturer’s specific information describing
- 26 procedures, sequence and required fasteners for frame and door installation.
- 27
- 28 F. Production of FRP doors and frames shall not proceed until final approval of submittals
- 29 and all necessary manufacturing information is received from customer.
- 30

31 **1.4 PERFORMANCE REQUIREMENTS**

- 32
- 33 A. All exterior fiberglass door and frame units shall meet the requirements for
- 34 Hurricane/Impact Resistant certification / approval of Texas Department of Insurance
- 35 (TDI).
- 36
- 37 B. Wind Load Requirements:
- 38 01 TWIA Zone: Inland I (with modified wind speed)
- 39 02 Exposure: B
- 40 03 Importance Factor: 1.15
- 41 04 Wind Speed: 143 MPH, 3 second gusts.
- 42
- 43 C. Doors, frames and hardware, including installation requirements shall be provided in strict
- 44 accordance with TDI requirements.
- 45
- 46 D. Hollow metal door / frame assemblies shall bear the TDI Certification label.
- 47

48 **1.5 DELIVERY, STORAGE AND HANDLING**

- 49
- 50 A. FRP doors and frames are to be delivered to jobsite in adequate crating with foam sheet
- 51 separations between all components.
- 52
- 53 B. Upon receipt of shipment, remove and inspect the doors and frames for damage. Note
- 54 any damage on the shipping papers prior to accepting. If there is any noted (visible or
- 55 concealed) damage, notify manufacturer immediately.
- 56
- 57 C. Handling and storage of the doors and frames after receipt is the responsibility/liability of
- 58 the customer. It is recommended that the doors be stored indoors in a vertical position,
- 59 clear of the floor, with blocking between the doors to permit air circulation between the

1 doors and prevent damage to the door faces. Rain/water or condensation must not be  
2 allowed to collect or lay between stored doors. Do not wrap in plastic sheeting as it will  
3 promote condensation formation within. Permanent discoloration can result. Failure to  
4 comply with the receiving and reporting instructions shall void the warranty.  
5

- 6 D. Use care in handling FRP doors and frames to prevent damage to factory finishes. Wear  
7 protective gloves and do not slide or drag doors or frames against one another.  
8

9 **PART 2 - PRODUCTS**

10  
11 **2.1 MANUFACTURER**

- 12  
13 A. Chem-Pruf Door Co., Ltd, Brownsville, TX (basis of design) and TDI approved.  
14

15 **2.2 ALTERNATE MANUFACTURERS**

- 16  
17 A. The following manufacturers will be considered provided their products meet or exceed  
18 the specified products, including the requirement to meet Texas Department of Insurance  
19 for Windstorm and Impact Resistance for the Catastrophic zone Inland 1.  
20 01 Overly Door Company, "Extreme Duty Series", Greensburg, PA.  
21 02 Corrim Company, Oshkosh, WI  
22

23 **2.3 MATERIALS**

- 24  
25 A. Hurricane Rated Fiberglass Doors:  
26 01 Design: FRP doors shall be of seamless fiberglass reinforced plastic, press-  
27 molded construction, Class 1 premium resin. Laminated FRP face sheets shall  
28 be applied while wet and uncured to an internal door stile and rail subframe/core  
29 assembly and then press-molded under heat and pressure. The composite door  
30 panel must be integrally fused over its entire surface area, not just adhesive-  
31 bonded at perimeter stiles and rails. Doors shall remain under pressure during  
32 curing for flat, warp-free surfaces.  
33 02 Stiles & Rails: A high-modulus pultruded FRP square or rectangular tube  
34 subframe is to be provided within the door. Tubes are to be mitered and joined  
35 internally at the corners with solid polymer blocks to yield a one-piece unit that  
36 does not require any secondary external sealing. Provide a tubular midrail  
37 across width of door at lock height, and additional horizontal rails where  
38 specific design conditions dictate. Doors shall incorporate molded-in FRP edge  
39 strips, chemically bonded to the subframe stiles, for machining of hardware  
40 mortises so as not to cut or otherwise compromise the integrity of the pultruded  
41 stiles, nor allow moisture to penetrate into the core of the door. All connections  
42 shall be chemically welded. No mechanical fasteners will be allowed. The use  
43 or inclusion of aluminum, steel, gypsum or wood into stile and rail construction  
44 is not permitted.  
45 03 Core: For maximum rigidity and compressive strength a triangular shaped 3/8"  
46 cell phenolic resin impregnated kraft paper honeycomb core shall be used.  
47 Molding pressure and resin gel time shall be sufficient to allow for penetration  
48 of resin into the cellular structure of the core to maximize shear and peel  
49 strengths at the skin/core interface and eliminate the possibility of delamination.  
50 The honeycomb is to be completely enclosed within the stile and rail subframe.  
51 Use of foam or balsa wood is not permitted.  
52 04 Internal Reinforcement: High-modulus pultruded tubular FRP, high-density  
53 polymer compression blocks, or plastic compression blocking at all hardware  
54 locations, and corner locations. No wood blocking, steel or aluminum  
55 reinforcing plates, ribs or fittings shall be used. A minimum of 900 lbs of  
56 pullout strength is required for each factory supplied hinge screw.

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- 05 Faces: Door facings shall utilize a chemical resistant thermosetting polyester resin system with fiber reinforcing layers. Supplier shall furnish door faces as shown on the drawings and in the door elevations. Chopped strand mat layers shall be used to provide bond integrity between gelcoat, laminated facings and the internal door structure. Structural reinforcement shall be in the form of a knitted multi-layer material with layers of uni-directional glass fiber oriented in both the vertical and horizontal directions for high stiffness, impact resistance and resistance to warping. Gelcoat surface integrally molded to be 25/30 mils thick (wet) ultra-violet light stabilized marine grade NPG-isophthalic polyester gelcoat.
- 06 Finish: The exposed FRP door faces shall have a 3-4 mils (wet) factory applied two-part aliphatic polyurethane fully cured coating of industrial urethane. Coating shall have a minimum hardness of H to 2H. Finish shall be a slightly textured semi-gloss to minimize the visual effects of wear and tear. Color selection will be all 27 pre-matched colors.
- 07 Astragals: All pairs of doors shall be furnished with an astragal from door manufacturer made of same pultruded FRP material as door stile, rail and edge as required. Astragal shall be located on the meeting stile edge of each inactive leaf of double door pairs. Architect shall advise active leaf of door, and astragal shall be installed to cover meeting stile gap to effect seal and security.
- 08 Lights: Glass required shall be factory furnished, glazed and installed. Glass supplied shall be that as required to maintain Hurricane and Impact ratings as tested. Centered glazing shall be installed between 45 degree pultruded FRP glazing stops and vinyl foam tape with concealed compression retainers. No exposed fasteners or exposed silicone will be allowed for securing glazing. Metal, pvc, or vinyl "Glass Kit" type lights are not acceptable for hurricane rated openings.
- 09 Provisions for lights and louvers shall be performed during manufacture and shall not be attempted in the field. Cutouts are to be totally enclosed by pultruded FRP stiles and rails incorporated into the door structure. Light cutouts that expose core material are not acceptable.

B. Hurricane Rated Fiberglass Frames:

- 01 Design: FRP Door frames furnished under this specification shall utilize a high-modulus pultruded structural FRP shape. The frame section shall be standard Style 4, double rabbeted 5-3/4" deep x 2" face, 3/16" thick, with integral 5/8" doorstop with 1 15/16" soffits, to match typical hollow metal configurations.
- 02 Corner Joints: Frame jambs and header shall be joined at corners via miter connections with hidden FRP angle clips and associated fasteners. Post and beam corners will not be acceptable. Exposed fasteners for miter connections will not be acceptable except for wrap wall applications.
- 03 Hardware Reinforcements: FRP reinforcing shall be chemically welded to door frame material at required locations. Minimum screw pullout strength of 1100 lb per #12 x 1" sheet metal screw is required. Mechanically fastened reinforcements are not permitted.
- 04 Finish: Frames shall have a 3-4 mils (wet) factory applied two-part aliphatic polyurethane fully cured coating of industrial urethane. Industrial urethane chemical coating color topcoat, to match the color and sheen of the doors, for superior weatherability. **Gelcoat may not be sprayed onto the frame as a secondary coating.** Color selection will be from all 27 pre-matched colors.

2.4 MECHANICAL PROPERTIES AND TEST PERFORMANCE

- A. Pultruded structural shapes for stiles; rails, frames, and astragals shall exhibit the following minimum longitudinal coupon properties (per ASTM):
  - 01 Tensile strength (D638) 30,000 psi
  - 02 Comprehensive strength (D695) 30,000 psi

- 1                   03       Flexural strength (D790) 30,000 psi  
2                   04       Flexural modulus (D790) 1,600,000 psi  
3                   05       Shear strength (D2846) 4,500 psi  
4                   06       Impact, notched (D256) 25 ft-lb/in  
5                   07       Barcol hardness (D2853) 50  
6  
7       B.       Core material shall exhibit the following minimum coupon properties (per ASTM):  
8                   01       Core material must comply with the International Building Code (IBC) chapter  
9                                26 requirements for use with a plastic skin.  
10                  02       Shear strength, longitudinal direction (C273) 68.2 psi  
11                  03       Shear strength, transverse direction (C273) 25.8 psi  
12                  04       Shear modulus, longitudinal direction (C273) 6940 psi  
13                  05       Shear modulus, transverse direction (C273) 1878 psi  
14                  06       Shear elongation, longitudinal direction (C393 short beam) 1.79%  
15                  07       Shear elongation, transverse direction (C393 short beam) 2.72%  
16                  08       Maximum facing stress, longitudinal direction (C393 short beam) 735 psi  
17                  09       Maximum facing stress, transverse direction (C393 short beam) 289 psi  
18                  10       Maximum core shear stress, longitudinal direction (C393 short beam) 63.8 psi  
19                  11       Maximum core shear stress, transverse direction (C393 short beam) 24.9 psi  
20                  12       Modulus of elasticity (EI) per 1" width, longitudinal direction (C393 short  
21                                beam) 4.92E+04 psi  
22                  13       Modulus of elasticity (EI) per 1" width, transverse direction (C393 short beam)  
23                                1.97E+04 psi  
24                  14       Maximum facing stress, longitudinal direction (C393 long beam) 9011 psi  
25                  15       Maximum facing stress, transverse direction (C393 long beam) 4727 psi  
26                  16       Maximum core shear stress, longitudinal direction (C393 long beam) 48.3 psi  
27                  17       Maximum core shear stress, transverse direction (C393 long beam) 23.5psi  
28                  18       Modulus of elasticity (EI) per 1" width, longitudinal direction (C393 long beam)  
29                                1.14E+05 psi  
30                  19       Modulus of elasticity (EI) per 1" width, transverse direction (C393 long beam)  
31                                7.23E+05 psi  
32                  20       Stiffness "D", longitudinal direction (C393 long beam) 379,270 psi  
33                  21       Stiffness "D", longitudinal direction (C393 long beam) 260,608 psi  
34                  22       Compressive strength (C365) 53 psi  
35                  23       Compressive modulus (C365) 2110 psi  
36                  24       Density (C271) 2.42 lb/ft<sup>3</sup>  
37  
38       C.       Adhesive shall exhibit the following minimum coupon properties (per SAE)  
39                   01       Tensile Strength (D882-83A modified) minimum 2000 psi  
40                   02       8 day 25° C at 100% humidity Cross Peel (SAE J1553) minimum 330 psi  
41                   03       7 day immersion in seawater Cross Peel (SAE J1553) minimum 330 psi  
42                   04       30 day immersion in saltwater Cross Peel (SAE J1553) minimum 330 psi  
43                   05       72 hour immersion in gasoline Cross Peel (SAE J1553) minimum 330 psi  
44                   06       72 hour immersion in 20% sulfuric acid Cross Peel (SAE J1553) minimum 300  
45                                psi.  
46  
47       D.       ANSI A250.4 1,000,000 cycle test  
48                   01       4' x 8' door (up to a full light) and frame successfully tested in excess of  
49                                1,000,000 cycles with no failure of any of the design features of the door or  
50                                frame.  
51  
52       E.       Doors and Frames shall exhibit the following minimum properties:  
53                   01       ASTM E 283-91(99), "Standard Test Method for Rate of Air Leakage Through  
54                                Exterior Windows, Curtain Walls and Doors Under Specified Pressure  
55                                Differences Across the Specimen."

- 1                    02        ASTM E 331-00, “Standard Test Method for Water Penetration of Exterior  
2                    Windows, Curtain Walls, and Doors by Uniform Static Air Pressure  
3                    Difference.”  
4                    03        ASTM E 330-02, Standard Test Method for Structural Performance of Exterior  
5                    Window, Doors Skylights and Curtain Walls by Uniform Static Air Pressure  
6                    Difference.  
7                    04        AAMA 1304-02, Voluntary Specification for Forced Entry Resistance of Side-  
8                    Hinged Door Systems.  
9                    05        ASTM E1886-02, Standard Test Method for Performance of Exterior Windows,  
10                    Curtain Walls, Doors and Storm Shutters Impacted by Missile(s) and Exposed to  
11                    Cyclic Pressure Differentials.  
12                    06        ASTM E1996-02, Standard Specification for Performance of Exterior Windows,  
13                    Curtain Walls, Doors and Storm Shutters Impacted by Windborne Debris in  
14                    Hurricanes.  
15                    07        ANSI/SDI A250.13-03, Testing and Rating of Severe Windstorm Components  
16                    for Swinging Door Assemblies, Section 8.2 Stiffness Classification.  
17

18        **2.5        FASTENERS**

- 19  
20            A.        All fasteners for all hardware shall be type 304 CRSS (18-8 series corrosion resistant  
21            stainless steel) with no exception. No carbon steel or aluminum components shall be  
22            used.  
23

24        **2.6        HARDWARE**

- 25  
26            A.        Hardware used must meet the hurricane ratings of the door being provided. Hardware as  
27            specified must be furnished and installed by the door frame manufacturer to maintain  
28            product quality and function as well as to ensure sufficient support/reinforcement,  
29            precision tooling and proper sealing methods are provided.  
30  
31            B.        Doors and Frames shall be factory prepped for all hardware requiring mortises, with  
32            #12x1” long stainless steel screws pre-installed for hinge attachment.  
33  
34            C.        Hardware shall be furnished as listed in section 08 70 00 or as so designated in  
35            appropriate section, and shall be coordinated by GC and installed by experienced  
36            mechanics.  
37  
38            D.        Supplier shall furnish manufacturer’s standard templates, installation instructions, or full  
39            size approved door and frame preparation instructions as approved by the architect and as  
40            required by door and frame manufacturer prior to door and frame factory initiated  
41            manufacture. Standard factory lead-time for production of FRP doors and frames shall  
42            commence only and when all distributors required preparation information is received  
43            and acknowledged by the door and frame manufacturer.  
44  
45

46        **PART 3 - EXECUTION**

47  
48        **3.1        IDENTIFICATION**

- 49  
50            A.        Factory mark all doors and frames using a chemical resistant plastic tag or indelible  
51            marker with identifying number, keyed to shop drawings, prior to shipment.  
52

53        **3.2        INSTALLATION**

- 54  
55            A.        Frames: Install in strict accordance with manufacturer’s printed instructions. Set plumb  
56            and square, using shims for bolt-in of existing openings, or wood bracing prior to

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grouting of jambs. Use at least two 2x6 wood spreaders inside frame to maintain critical opening dimensions during grouting.

- B. Doors: Hang per manufacturer’s printed instructions using special screws provided for hinge attachment. Install doors to swing freely and to stand open at any angle. After installation make final adjustments to hardware to allow for proper door operation and latching. All surface applied hardware shall be thru bolted.

**3.3 CLEANING**

- A. Clean exposed surfaces of fiberglass doors and frames with a mild, non-abrasive cleaner and water.

**END OF SECTION**



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**SECTION 08 36 13**

**SECTIONAL OVERHEAD DOORS**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
- 01 Sectional Overhead Doors
  - 02 Furnish and install Metal Panel Infill glazed into system where indicated, refer to **Section 08 80 10 – Metal Window Panels.**
  - 03 Electric Door Operator & switches
  - 04 Operating Hardware, tracks, and structural support members.
- B. Related Work:
- 01 Section 03 30 00 - Cast-In-Place Concrete
  - 02 Section 05 50 00 - Metal Fabrications
  - 03 Section 06 10 00 - Rough Carpentry
  - 04 Section 07 92 00 - Building Sealants
  - 05 Section 08 80 10 – Metal Window Panels
  - 06 Division 26 - Electrical

**1.2 SUBMITTALS**

- A. Provide all submittals in accordance with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
- 01 Preparation instructions and recommendations.
  - 02 Storage and handling requirements and recommendations.
  - 03 Installation methods.
- C. Shop Drawings: Indicate plans and elevations including opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- E. Operation and Maintenance Data.

**1.3 REFERENCES**

- A. American National Standard Specifications for Sectional Overhead Type Doors - ANSI/DASMA 102
- B. International Building Code version 2018.
- C. International Energy Conservation Code 2015

**1.4 DESIGN / PERFORMANCE REQUIREMENTS**

- A. Wind Loads: Design and size components to withstand loads caused by pressure and suction of wind acting normal to plane of wall as calculated in accordance with applicable

1 code. Document and provide engineering data confirming door is in compliance with  
2 Texas Windstorm Insurance Requirements, for an Inland 1 Catastrophic Area and IBC  
3 2018 wind criteria. Provide stamped engineered drawings by a registered Professional  
4 Engineer currently licensed in the State of Texas.  
5

6 B. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one  
7 manufacturer for each type of door. Provide secondary components from source  
8 acceptable to manufacturer of primary components.  
9

10 C. Glazing: For sectional doors with glass panels, sectional door manufacturer shall provide  
11 a turnkey one-source responsibility for all glass units. He shall be responsible for securing  
12 the glass, fabricating the glass units and installing them in the door prior to delivery to the  
13 site and furnishing the required warranty for the insulated glass assembly.

14 01 Insulated glass for sectional doors are identified in Section 08 44 00, but are the  
15 responsibility of the sectional overhead door manufacturer.  
16

17 D. Wiring Connections: Requirements for electrical characteristics:

18 01 115/208V, single phase, 60hz.  
19

## 20 1.5 QUALITY ASSURANCE

21  
22 A. Manufacturer Qualifications: Company specializing in manufacturing products specified  
23 in this section with minimum five years documented experience.  
24

25 B. Installer Qualifications: Authorized representative of the manufacturer with minimum five  
26 years documented experience.  
27

28 C. Products Requiring Electrical Connection: Listed and classified by Underwriters  
29 Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose  
30 specified.  
31

## 32 1.6 DELIVERY, STORAGE, AND HANDLING

33  
34 A. Store products in manufacturer's unopened labeled packaging until ready for installation.  
35

36 B. Protect materials from exposure to moisture until ready for installation.  
37

38 C. Store materials in a dry, ventilated weathertight location.  
39

## 40 1.7 PROJECT CONDITIONS

41  
42 A. Pre-Installation Conference: Convene a pre-installation conference just prior to  
43 commencement of field operations, to establish procedures to maintain optimum working  
44 conditions and to coordinate this work with related and adjacent work.  
45

## 46 PART 2 - PRODUCTS

### 47 48 2.1 MANUFACTURERS

49  
50 A. Overhead Door Corporation; Overhead Door Company of Houston, (713) 714-1070. –  
51 Basis of Design.  
52

53 B. The following Alternate Manufacturers will be considered provided their products meet  
54 or exceed the specified Door system. The Architect will be the final judge on quality of  
55 the alternate door.

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- 01 Crawford (ASSA Abloy)
- 02 Raynor
- 03 Wayne Dalton
- 04 Haas Door

C. Glazed Sectional Overhead Doors: 511 Series Aluminum Doors by Overhead Door Corporation.

- 01 Door Assembly: Stile and rail assembly secured with 1/4 inch (6 mm) diameter through rods. Lift Clear application.
  - a. Panel Thickness: 1-3/4 inches.
  - b. Center Stile Width: 2-11/16 inches.
  - c. End Stile Width: 3-5/16 inches.
  - d. Intermediate Rail Pair Width: 3-11/16 inches.
  - e. Top Rail Width: 3-3/4 inches.
  - f. Bottom Rail Width: 4-1/2 inches.
  - g. Stiles and Rails: 6063 - T6 aluminum.
  - h. Springs: 10,000 cycles.
- 02 Glazing Panel Infill: 1/2" thick insulated glass – Clear Tempered insulated glass units to be furnished by door manufacturer.
- 03 Solid Panel Infill: At bottom row of glass lites, substitute Metal Window Panels in lieu of glass. Refer to **Section 08 80 10 Metal Window Panels**.
- 04 Aluminum Finish: Class 1, Clear anodized.
- 05 Windload Design: Provide to meet the Design/Performance requirements specified and the model building code in force and TDI Windstorm, Inland 1 Area.
- 06 Hardware: Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races.
- 07 Lock: Interior galvanized single unit.
- 08 Weatherstripping:
  - a. Flexible bulb-type strip at bottom section.
  - b. Flexible Jamb seals.
  - c. Flexible Header seal.
- 09 Track: Provide track as recommended by manufacturer to suit loading required and clearances available. Track shall be extended to bottom of exposed structural steel structure above.
- 10 Electrical Motor Operation: Provide 115/208V, 1Ø, UL listed electric operator, size and type as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second. Operator shall meet UL325/2010 requirements for continuous monitoring of safety devices.
  - a. Entrapment Protection: Required for momentary contact, includes radio control operation.
    - 1. Photoelectric sensors monitored to meet UL 325/2010.
  - b. Operator Controls:
    - 1. Push-button operated control stations with open, close and stop buttons.
    - 2. Surface mounting, both interior and exterior location.
  - c. Special Operation:
    - 1. Provide card reader control as indicated.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Do not begin installation until openings have been properly prepared.

- 1 B. Verify wall openings are ready to receive work and opening dimensions and tolerances  
2 are within specified limits.
- 3
- 4 C. Verify electric power is available and of correct characteristics.
- 5
- 6 D. If preparation is the responsibility of another installer, notify Architect of unsatisfactory  
7 preparation before proceeding.
- 8

9 **3.2 PREPARATION**

- 10 A. Clean surfaces thoroughly prior to installation.
- 11
- 12
- 13 B. Prepare surfaces using the methods recommended by the manufacturer for achieving the  
14 best result for the substrate under the project conditions.
- 15

16 **3.3 INSTALLATION**

- 17
- 18 A. Install overhead doors and track in accordance with approved Shop Drawings and the  
19 manufacturer's printed instructions.
- 20
- 21 B. Coordinate installation with adjacent work to ensure proper clearances and allow for  
22 maintenance.
- 23
- 24 C. Furnish and install required steel or aluminum structural members to suitably anchor door  
25 and frame to adjacent surfaces. Anchor assembly to wall construction and building  
26 framing without distortion or stress.
- 27
- 28 D. Securely brace door tracks suspended from structure. Secure tracks to structural members  
29 only.
- 30
- 31 E. Fit and align door assembly including hardware.
- 32
- 33 F. Coordinate installation of electrical service. Complete power and control wiring from  
34 disconnect to unit components.
- 35

36 **3.4 CLEANING AND ADJUSTING**

- 37
- 38 A. Adjust door assembly to smooth operation and in full contact with weatherstripping.
- 39
- 40 B. Clean doors, frames and glass.
- 41
- 42 C. Remove temporary labels and visible markings.
- 43

44 **3.5 PROTECTION**

- 45
- 46 A. Do not permit construction traffic through overhead door openings after adjustment and  
47 cleaning.
- 48
- 49 B. Protect installed products until completion of project.
- 50
- 51 C. Touch-up, damaged coatings and finishes and repair minor damage before Substantial  
52 Completion.
- 53
- 54

55 **END OF SECTION**



1 **1.4 QUALITY ASSURANCE**

- 2
- 3 A. Supplier Qualifications: A recognized finish hardware supplier who has been furnishing
- 4 hardware in the Project's vicinity for a period of not less than 2 years, and who is, or
- 5 employs an experienced hardware consultant (AHC) who is available, at reasonable times
- 6 during the course of the Work, for consultation about Project's hardware requirements,
- 7 to Owner, Architect and Contractor.
- 8
- 9 B. Coordination and Schedules: Hardware units and usage specified in Part 2 of this Section
- 10 and scheduled on the Drawings establish quality, quantity, function and finish required
- 11 for each door opening. Review, coordinate and confirm that hardware specified for each
- 12 opening is the proper function. In case of controversy, make appropriate notations of
- 13 proposed changes from specified requirements on supplier's hardware schedule and
- request written clarification from the Architect prior to proceeding.
- 14
- 15 C. Fire-Rated Openings: Provide door hardware for fire rated openings that comply with
- 16 NFPA Standards No. 80 and requirements of authorities having jurisdiction. Provide
- 17 only items of door hardware that are listed and tested by UL or Warnock Hersey for given
- 18 type/size opening and degree of label. Provide proper latching hardware, door closers,
- 19 approved-bearing hinges and seals whether listed in the Hardware Schedule or not. All
- 20 hardware shall comply with standards UBC 702 (1997) and UL 10C.
- 21 01 Where emergency exit devices are required on fire-rated doors (with
- 22 supplementary marking on doors' UL labels indicating "Fire Door to be
- 23 equipped with Fire Exit Hardware") provide UL label on exit devices indicating
- 24 "Fire Exit Hardware".

25 **1.5 DELIVERY, STORAGE, AND HANDLING**

- 26
- 27 A. Tag each item or package separately with identification related to final hardware
- 28 schedule, and include basic installation instructions with each item or package.
- 29
- 30 B. Packaging of door hardware is the responsibility of supplier. As material is received by
- 31 hardware supplier from various manufacturers, sort and repackage in containers clearly
- 32 marked with appropriate hardware set number to match set numbers of approved
- 33 hardware schedule. Two or more identical sets may be packed in same container.
- 34
- 35 C. Inventory door hardware jointly with representatives of hardware supplier and hardware
- 36 installer until each is satisfied that count is correct.
- 37
- 38 D. Deliver individually packaged door hardware items promptly to place of installation
- 39 (shop or Project site).
- 40
- 41 E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed.
- 42 Control handling and installation of hardware items that are not immediately replaceable
- 43 so that completion of the Work will not be delayed by hardware losses both before and
- 44 after installation.
- 45

46 **1.6 WARRANTY**

- 47
- 48 A. Special warranties:
- 49 01 Door Closers: Thirty year period
- 50 02 Exit Devices: Three year period
- 51 03 Automatic Door Operators: Two year period
- 52 04 Locks and Cylinders: Three year period
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**1.7 MAINTENANCE**

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner’s continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Parts kits: Furnish manufacturer’s standard parts kits for locksets, exit devices, and door closers.
- C. Attic Stock: In order to keep the building functioning safely and securely at all time, the following item of hardware are to be delivered to the owner by the hardware supplier upon occupancy of the building:
  - 01 Cylinders: 5 each master key set, keyed different
  - 02 Locks: 2 each function
  - 03 Exit Devices: 1 each function
  - 04 Closers: 2 each size
  - 05 Miscellaneous items: 1 each item

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- D. General: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws. With each hardware item, furnish machine screws for installation into steel, and provide threaded to the head wood screws for installation into wood; all-purpose threads are not acceptable. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed screws to match the hardware finish. Provide concealed fasteners for hardware units that are exposed when the door is closed, except to the extent no standard units of the type specified are available with concealed fasteners. Provide through bolts for closer installation.

**2.2 HARDWARE UNITS AND USAGE**

- A. Units specified below establish the design, grade, function, finish, size, and other qualities required for this Project. Provide the following hardware units in the quantities specified and locations indicated on the Door Schedule. Provide US 26D finish for interior hardware and US 32D for exterior hardware unless otherwise specified. Refer to Door Schedule on Drawings for door sizes, fire ratings, hardware function, exit devices, door closers, and other requirements at each door opening
  - 01 Butt Hinges: Provide the following butt hinges produced by Ives, or equivalent butt hinges produced by Select or Stanley as approved. Provide 1-1/2 pair per door leaf up to 7’-6” high and one additional hinge per leaf for each additional 2’-6” of door height. Provide 5” hinge height for doors 3’-6” to 4’-0” wide and 6” hinge height for doors over 4’-0” wide.
    - a. Out-Swinging Exterior Doors Except Storefront: Ives 5BB1HW 4.5 x 4.5 NRP x non-ferrous.
    - b. In-swinging Exterior Doors: Ives 5BB1HW 4.5 x 4.5 non-ferrous.
    - c. Out-Swinging Interior High Frequency Doors: Ives 5BB1HW 4.5 x 4.5 x NRP.
    - d. In-Swinging Interior High Frequency Doors: Ives 5BB1HW 4.5 x 4.5
    - e. Out-Swinging Interior Average Frequency Doors: Ives 5BB1 4.5 x 4.5 NRP.
    - f. In-Swinging Interior Average Frequency Doors: Ives 5BB1 4.5 x 4.5.
  - 02 Continuous Hinges:
    - a. Acceptable manufacturers: Ives or Select.

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- b. Continuous gear hinges to be manufactured of extruded 6063-T6 aluminum alloy with anodized finish, or factory painted finish as scheduled.
  - c. All hinges are to be manufactured to template. Uncut hinges shall be non-handed and shall be a pin less assembly of three interlocking extrusions applied to the full height of the door and frame without mortising.
  - d. Vertical door loads shall be carried on chemically lubricated polyacetal thrust bearings. The door and frame leaves shall be continually geared together for the entire hinge length and secured with a full cover channel. Hinge to operate to a full 180°.
  - e. Hinges to be milled, anodized and assembled in matching pairs. Fasteners supplied shall be 410 stainless steel, plated and hardened.
  - f. Provide UL listed continuous hinges at fire doors. Continuous hinges at fire doors (suffix -FR) shall meet the required ratings without the use of auxiliary fused pins or studs.
- 03 Door Closers: All closers to have cast iron body with forged arms. Adjust closers to comply with ADA requirements. Provide type of arm recommended by closer manufacturer for door conditions (use, door hand and swing) indicated.
- a. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UBC 7-2 (1997) and UL 10C.
  - b. Door closer shall have fully hydraulic, full rack and pinion action. Closer shall have 1-1/2-inch in diameter piston.
  - c. Hydraulic fluid shall be of a type requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to minus 30 degrees F.
  - d. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Closers shall have separate adjustment for latch speed, general speed, and back check.
  - e. Provide surface mounted mechanical closers certified to exceed ten million (10,000,000) full load cycles by a recognized independent testing laboratory.
  - f. Provide powder coating certified to exceed 100 hours salt Spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.
  - g. Pressure relief valves are not accepted.
  - h. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors shall provide for corridor clear width as required by code. Where possible, mount closers on room side of door.
  - i. Door closers meeting this specification: LCN 4040 Series. NO SUBSTITUTION.
- 04 Heavy Duty Locks:
- a. Provide cylindrical locksets that comply with ANSI A156.2, Series 4000, Grade 1; tested to exceed 3,000,000 cycles. Functions as listed in Hardware Sets.
  - b. Provide mortise locksets if indicated, that comply with ANSI A156.13, Grade 1.
  - c. Provide cylindrical locksets that meet ANSI A117.1, Accessibility Code.
  - d. Provide cylindrical locksets that meet UL A label; to have a minimum listing for single doors 4' x 8'
  - e. Lockset to have the ability to incorporate either a rigid or free-wheeling lever when in locked mode.



- 1 f. Levers to be bi-directional, independent assemblies.
- 2 g. Levers are to be solid. Manufacturers utilizing fillers of any kind are
- 3 not acceptable.
- 4 h. Levers are to be plated to match BHMA finishes.
- 5 i. Levers to have grooved tactile warnings on back side of lever.
- 6 Manufacturers that insert devices and/or apply materials for warning
- 7 are not acceptable.
- 8 j. Thru-bolts to be a minimum of ¼” in diameter.
- 9 k. Adjustment plate to adjust for doors from 1 5/8” thickness to 2 1/8”
- 10 thickness.
- 11 l. Latchbolt to be steel with minimum ½” throw deadlatch on keyed and
- 12 exterior functions; ¾” throw anti-friction latchbolt on pairs of doors.
- 13 m. Strike to be ANSI curved lip, 1 ¼” x 4 7/8”, 16 gauge, with 1” deep
- 14 box construction.
- 15 n. Acceptable Manufacturers: Best Access Systems 93K Series with 14C
- 16 lever design. NO SUBSTITUTION EXCEPT AS REQUIRED TO
- 17 COMPLY WITH A TDI WINDSTORM PRODUCT EVALUATION.
- 18 SCHLAGE L9000 SERIES MORTISE LOCKSETS HAVE BEEN
- 19 TESTED BY TDI WINDSTORM AND ARE COMPLIANT.
- 20 05 Electronic Access Control Locks: as scheduled – NO SUBSTITUTION.
- 21 Schlage AD Series access door trim and interface devices shall be bid installed.
- 22 Installation, labor, programming and integration into the network access system
- 23 must be provided by a system integrator authorized and certified on the AD
- 24 Series product line. For a list of authorized and certified systems integrator call
- 25 Ingersoll Rand Security Technologies at 713-683-6400.
- 26 06 Exit Devices: Provide the following at the locations shown on the Door
- 27 Schedule:
- 28 a. Exit Devices shall be touchpad type, fabricated of bronze, brass,
- 29 stainless steel, or aluminum, plated to the standard architectural
- 30 finishes to match the balance of the door hardware.
- 31 b. All exit devices shall incorporate a fluid damper, which decelerates the
- 32 touchpad on its return stroke and eliminates noise associated with exit
- 33 device operation. Only compression springs will be used in devices,
- 34 latches, and outside trims or controls
- 35 c. Touchpad shall extend a minimum of one half of the door width.
- 36 Touchpad shall match exit device finish, and shall be stainless steel for
- 37 US26, US26D, US28, US32, and US32D finishes. All latch bolts to be
- 38 dead latching type, with a self-lubrication coating to reduce wear. End-
- 39 cap will install flush with the end of the device. Touchpad shall match
- 40 exit device finish, and shall be stainless steel for US26, US26D, US28,
- 41 US32, and US32D finishes
- 42 d. Exit devices shall be UL listed panic exit hardware. All exit devices
- 43 for fire rated openings shall be UL labeled fire exit hardware.
- 44 e. Lever trim for exit devices shall be vandal-resistant type, which will
- 45 travel to a 90-degree down position when more than 35 pounds of
- 46 torque are applied, and which can easily be re-set.
- 47 f. Vertical rods will not be accepted. Use keyed removable mullions at
- 48 pairs of doors.
- 49 g. Exit devices meeting this specification: Von Duprin 33A/99 Series.
- 50 NO SUBSTITUTION.
- 51 07 Kick Plates, Push, and Pulls: Provide the following at locations designated; Ives
- 52 or equivalent by Trimco.
- 53 a. Kick Plates shall be 10" high x 2" less than door width x minimum
- 54 0.0538" (1.3 mm) thick x B3E.
- 55 b. Mop Plates shall be 4" high x 1" less than door width x minimum
- 56 0.0538" (1.3 mm) thick x B3E.

- 1 c. Push/Pulls: 8200 6" x 16", 8302 6" x 16"; 8190-0; 9190-0.  
 2 08 Stops, Flush Bolts, Dust Proof Strikes, & Silencers: Provide the following at  
 3 locations designated; IVES. NO SUBSTITUTION.  
 4 a. Floor Stops: Ives FS436, FS41  
 5 b. Wall Stops: Ives WS407  
 6 c. Where a wall or floor stop cannot be used, provide an overhead stop.  
 7 Acceptable products are as manufactured by Glynn-Johnson. Use a  
 8 100 series concealed overhead stop where appearance is a primary  
 9 consideration or 450 series at interior and 90 series at exterior  
 10 locations.  
 11 d. Manual Flush Bolts: 1 set IVES FB458/FB358 x DP-1/DP-2 dustproof  
 12 strike as required at each inactive leaf of a pair of doors (except  
 13 equipped with exit devices).  
 14 e. Silencers: IVES SR 64; (3) per single leaf opening, (2) per double leaf  
 15 opening.  
 16 09 Weatherstripping, Seals and Thresholds: Provide the following at locations  
 17 designated; National Guard Products or equivalent by Zero Weatherstripping.  
 18

19 **2.3 KEYING REQUIREMENTS**

- 20  
 21 A. Keys and Keying:  
 22 01 All locks shall be keyed to the existing Best 7 pin interchangeable core system  
 23 as directed.  
 24 02 Provide brass construction cores installed in all locks and cylinders prior to  
 25 shipping to jobsite.  
 26 03 Mark permanent cylinders, cores and keys with applicable blind code for  
 27 identification. These visual key control marks or codes shall not include actual  
 28 key cuts.  
 29 04 Key Transcript (bitting list): Supply to Owner upon completion.  
 30 05 Provide 12 of each cut Master key and higher level.  
 31 06 Provide 3 each cut key per lock.  
 32 07 Provide 2 each emergency over-ride master keys for locksets that use these.  
 33 08 Provide 10 each construction master keys.  
 34 09 Provide 2 each control keys.  
 35  
 36 B. Key Control System:  
 37 01 Provide a Telkee (302) 678-7800 key control system, or equivalent by Lund  
 38 Equipment Co., Inc., Cleveland, OH (Tel) 330-659-4800. Include envelopes,  
 39 labels, tags with self-locking key clips, receipt forms, 3-way visible card index,  
 40 temporary markers, permanent markers, and standard metal wall cabinet, all as  
 41 recommended by system manufacturer, with capacity for 150% of the number  
 42 of locks required for the Project. Hardware supplier to assist Owner in setting  
 43 up key control system. Organize keys by room, by master, grand master and  
 44 key blanks, in key envelopes with neatly marked room numbers, as determined  
 45 at key meeting.  
 46

47 **2.4 GENERAL**

- 48  
 49 A. Package each item of hardware separately. Mark each package with item number  
 50 corresponding to item number shown in the hardware schedule.  
 51  
 52 B. Keying: [Typical]  
 53 01 Furnish cylinders with construction cores or construction master keyed, as  
 54 applicable for lock type specified.  
 55 02 Confer with Owner for precise keying requirements  
 56 03 Furnish three (3) keys each set.

- 1                   04     Visual Key Control: Stamp keys and cores with key set symbol.
- 2                   05     Master key and grand master key as directed.
- 3                   06     Provide cylinder keyed dogging for all panic exit devices.

4

5     **2.5     HARDWARE SCHEDULE**

6

7     ALL HARDWARE ON EXTERIOR DOORS IS TO BE TESTED AS PART OF THE

8     DOOR/HARDWARE SYSTEM AND APPROVED BY TEXAS DEPARTMENT OF

9     INSURANCE FOR TEXAS WINDSTORM COMPLIANCE – INLAND 1 CATASTROPHIC

10    ZONE.

11

12

13    **SET # 01 – WINDSTORM RATED**

14    For use on mark/door #(s): **101-2, 101-3**

15

16    Provide each SGL door(s) with the following:

Qty			Catalog Number	Finish	Mfr
3	EA	B.B. BUTT HINGE	5BB1 4.5 x 4.5 NRP	626	IVE
1	EA	CLASSROOM LOCK	LV9 07 Lfull face 4 9070 R	626	SCH
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ TBWMS	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B4E	630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW	630	IVE
1	EA	DOOR STOP	FS436/WS402CCV AS REQD	626	IVE
1	SET	SEALS	160S OR AS REQD FOR DOOR RATING	AL	NGP
1	EA	DOOR SWEEP	100VA OR AS REQD FOR DOOR RATING	CL	NGP
1	EA	THRESHOLD	425 OR AS REQD FOR DOOR RATING	AL	NGP

17

18    NOTE: COORDINATE AND CONFIRM ALL HARDWARE WITH DOOR SUPPLIER TO

19    MAINTAIN REQUIRED WINDSTORM RATING AND AVOID DUPLICATION OF

20    PRODUCT.

21

22

23

24    **SET # 02**

25    For use on mark/door#(s): **A201-1**

26

27    Provide each PR door(s) with the following:

Qty		Description	Catalog Number	Finish	Mfr
6	EA	HINGE	5BB1 4.5 X 4.5 NRP	626	IVE
1	EA	MANUAL FLUSH BOLT	FB458 24"	626	IVE
1	EA	STOREROOM LOCK	93K7D 14C S3	626	BES
1	EA	OH STOP	450S	630	GLY
1	EA	SURFACE CLOSER	4040XP CUSH TBWMS	689	LCN
1	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
1	SET	SEALS	5050B OR AS REQD FOR DOOR RATING	BRN	NGP
1	SET	ASTRAGAL	115NA	CL	NGP
2	EA	DOOR BOTTOM	320S	AL	NGP
1	EA	THRESHOLD	411	AL	NGP

28

29    NOTE: INSTALL CLOSER ON ACTIVE LEAF ONLY. INSTALL FLUSHBOLT AT TOP

30    OF INACTIVE LEAF ONLY.

1 **PART 3 - EXECUTION**

2  
3 **3.1 COORDINATION**

- 4  
5 A. Prepare a complete schedule, including all items proposed for each opening and other  
6 miscellaneous items. Submit four copies to the Architect for approval before purchase  
7 of the material.  
8  
9 B. Prior to the final inspection by the Architect, the supplier shall check all closers for proper  
10 operation after they have been installed and adjusted by the Contractor, and he shall make  
11 necessary adjustments to those closers, which prove to be difficult to adjust upon the  
12 initial attempt of the Contractor. He shall verify the keying to ensure proper locations of  
13 locksets and shall assist the Contractor in correcting faulty operation of any lock called  
14 to his attention by the Contractor.  
15  
16 C. Supplier shall attend and chair a keying meeting with the Owner, Architect and  
17 Contractor, once submittals have been reviewed.  
18  
19 D. Marking and Delivery: Mark each item of hardware for opening on which it is to be  
20 used, and deliver a complete schedule to the Contractor when the hardware is delivered.  
21 Should the marking of any item become separated from the item after delivery, the item  
22 will be returned to the supplier by the Contractor for remarking, before attempting to  
23 install it.  
24  
25 E. Master keys shall be hand delivered to the Owner by the hardware supplier within 24  
26 hours upon notification by the Architect.  
27  
28  
29

30 **END OF SECTION**

**SECTION 08 80 10**  
**METAL WINDOW PANELS**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 – GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
  - 01 Providing metal skins laminated to stabilizer substrates with an insulating core material. Panels are designed to be glazed into the window system of the Sectional Overhead Doors in lieu of glass where indicated.
  - 02 The manufacturer of the Sectional Overhead Doors will be responsible for purchasing and installing these panels in the doors where indicated.
- B. Related Work:
  - 01 Section 07 92 00 – Joint Sealants
  - 02 Section 08 36 13 – Sectional Overhead Doors

**1.2 SUBMITTALS**

- A. Provide all submittals in accordance with Section 01 33 00 – Submittal Procedure.
- B. Product Data:
  - 01 Manufacturer's specifications and other data needed to prove compliance with specified requirements.
  - 02 Manufacturer's installation instructions.
- C. Shop Drawings: Indicate thickness, dimension and components of parts. Detail glazing methods, framing and tolerances to accommodate thermal movement.
- D. Samples:
  - 01 Two (2) - 3 inch x 5 inch color samples on base metal material from manufacturer's standard colors for Architect's selection.
  - 02 Ten (10) inch square sample of actual panel in color selected by Architect for approval.
- E. Certifications:
  - 01 Letter of certification from manufacturer that installer is in compliance and meets specified requirements.
  - 02 Manufacturer's affidavit that materials used in Project contain no asbestos.

**1.3 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Shall have a minimum of 25 years experience manufacturing panels of the type specified for this Project. A letter certifying compliance should accompany the product material submittal.
- B. Installer's Qualifications: Installer shall be an approved installer, certified and authorized by the manufacturer as trained and qualified to install the manufacturer's product. Provide a letter of certification from manufacturer that installer has a minimum of three (3) years of metal panel installation experience preceding the date upon which work is to commence.
- C. Field measurements shall be taken prior to completion of manufacturing and cutting.

- 1  
2 D. Maximum deviation from vertical and horizontal alignment of installed  
3 panels is 1/8 inch in 20 feet 0 inches non-commutative.  
4

5 **1.4 REFERENCES**  
6

- 7 A. ASTM International (ASTM)  
8 01 E330, Structural Performance of Exterior Windows, Curtain  
9 Walls and Doors under the influence of wind loads  
10 02 D1781, Climbing Drum Peel Test for Adhesives  
11 03 D3363, Method for Film Hardness by Pencil Test  
12 04 D2794, Resistance of Organic Coatings to the Effects of Rapid  
13 Deformation (Impact)  
14 05 D3359, Method for Measuring Adhesion by the Tape Test  
15

16 **1.5 DELIVERY, STORAGE AND HANDLING**  
17

- 18 A. Protect finish and edge in accordance with panel manufacturer's recommendations.  
19  
20 B. Store materials in accordance with panel manufacturer's recommendations.  
21

22 **1.6 COORDINATION**  
23

- 24 A. Coordinate work with window installation specified in Section 08 80 00 and  
25 building sealants specified in Section 07 92 00.  
26

27 **1.7 WARRANTY**  
28

- 29 A. Warrant the work specified herein for 20 years against defects in materials for  
30 finish and against becoming unserviceable or causing an objectionable appearance  
31 resulting from defective or nonconforming workmanship.  
32  
33 B. The lamination of the skin to the core shall be 10 years against defects in materials  
34 against becoming unserviceable, delaminating or causing an objectionable appearance  
35 resulting from defective or nonconforming workmanship.  
36  
37 C. Defects shall include, but not be limited to the following:  
38 01 Crazing  
39 02 Cracking  
40 03 Peeling  
41 04 Fading  
42

43 **PART 2 - PRODUCTS**  
44

45 **2.1 APPROVED MANUFACTURER**  
46

- 47 A. Specification are based on laminated metal faced panels "Corelite" as  
48 manufactured by Mapes Panels, LLC., Lincoln, Nebraska; (800) 228-2391. Other  
49 manufacturers must have a minimum of 25 years experience manufacturing products  
50 meeting or exceeding the specifications and comply with Division 01  
51 requirements regarding substitutions to be considered.  
52

53 **2.2 PANEL FABRICATION**  
54

- 55 A. Panels shall be constructed of factory laminated components consisting of an exterior  
56 metal skin, high-density corrugated polyethylene substrate, insulative core and an interior  
57 metal skin. Panels are moisture resistant and designed for low impact infill in glazing  
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- assemblies.
- 01 Core: 2lb. Density Polystyrene
- 02 Substrates: HPDE (High Density Polyethylene)
- 03 Skins: 0.032" aluminum
- 04 Total thickness: 0.25 inch minimum
- 05 Finish: Standard Kynar, color to be determined at a later date.
- 06 Tolerances: 0.8 percent of panels dimension length and width or (+/-) 1/16 inch thickness

**2.3 ACCESSORIES**

- A. Type recommended to suit application and to complete installation as recommended by the panel manufacturer.
- B. Joint Sealants: As specified in Section 07 92 00.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Ensure windows are properly installed and ready to receive Work of this Section.
- B. Examine panel surfaces to ensure they are free from defects prior to installation.

**3.2 INSTALLATION**

- A. Install panels plumb, level and true.
- B. Glaze panels securely and in accordance with approved shop drawings and manufacturer's instructions to allow for necessary thermal movement and structural support and to ensure proper service life.
- C. Do not install panels that are observed to be defective including warped, bowed, dented, scratched and delaminated components.
- D. Weatherseal all joints as required using methods and materials in accordance with manufacturer's instructions and in accordance with provisions of Section 07 92 00.
- E. Separate dissimilar metals using gasketed fasteners and blocking to eliminate the possibility of electrolytic reaction.

**3.3 ADJUSTING AND CLEANING**

- A. Remove masking film as soon as possible after installation. Masking intentionally left in place after panel installation will be the responsibility of the contractor.
- B. Weep holes and drainage channels must be unobstructed and free from dirt and sealant.

**3.4 PROTECTION**

- A. Protect panels from damage and discoloration.
- B. Repair or replace damaged or discolored panels at no additional expense to Owner.

**END OF SECTION**

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**SECTION 08 90 00**

**LOUVERS AND VENTS**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
  - 01 Provide louvers and vents in exterior walls as indicated on the Drawings.
  - 02 Coordinate all work with Metal Building fabricator and HVAC equipment.
- B. Related Work:
  - 01 Section 07 65 26 – Self-Adhering Sheet Flashing.
  - 02 Section 07 92 00 – Joint Sealants
  - 03 Section 13 34 19 – Metal Building Systems
  - 04 Division 23 – HVAC equipment

**1.2 SUBMITTALS**

- A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.
- C. Shop Drawings: Submit complete shop drawings consisting of design, fabrication and erection / installation of proposed assemblies.
  - 01 Show profiles, sizes, spacing and locations of assembled components.
  - 02 Show details of shop fabrications, connections and details.
  - 03 Show details of field fabrications, connections and details.
- D. Installation Instructions: Submit manufacturer’s complete installation instructions, including fastening, for all products and / or assemblies proposed to be furnished.
  - 01 Installation details submitted for review shall be specific to the work of this contract and accurately depict interface within the assembly(s) indicated on the Drawings.
  - 02 Generic details that do not depict actual conditions shall not be acceptable.
- E. Color / Finish Samples:
  - 01 Provide two (2) samples of each finish for selection by the Architect.
  - 02 Finish samples shall be provided of / on actual material; paper or digital samples shall not be accepted.
  - 03 Minimum size shall be 3” x 3” but must be large enough to convey attributes of the proposed product.

**1.3 REFERENCES**

- A. American Architectural Manufacturer’s Association (AAMA):
  - 01 AAMA 605.2 - High Performance Organic Coatings on Architectural Extrusions and Panels.
- B. Air Movement and Control Association (AMCA):
  - 01 AMCA 500 - Test Methods for Louvers, Dampers and Shutters.



**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Design of louvers and vents is based on products Ruskin.
- B. Acceptable Manufacturers: the following manufacturers are acceptable to provide products of this section provided proposed products meet or exceed all specified requirements:
  - 01 Airstream Products.
  - 02 All-Lite.
  - 03 Construction Specialties, Inc.

**2.2 MATERIALS**

- A. Design of louvers is based on Ruskin Model ELF375DX fixed blade louver.
- B. Louver Materials and Fabrication:
  - 01 Performance Ratings: AMCA licensed.
  - 02 Size(s): As indicated on the Drawings.
  - 03 Frame:
    - a. Material: Extruded aluminum, Alloy 6063-T5.
    - b. Wall Thickness: 0.081 inch (2.1 mm), nominal.
    - c. Depth: 4 inches (102 mm).
    - d. Downspouts and caulking surfaces.
  - 04 Blades:
    - a. Style: Drainable.
    - b. Material: Extruded aluminum, Alloy 6063-T5.
    - c. Wall Thickness: 0.081 inch (2.1 mm), nominal.
    - d. Angle: 37.5 degrees.
    - e. Centers: 5-3/32 inches (129 mm), nominal.
  - 05 Bird Screen:
    - a. Material: Aluminum 1/2 inch mesh x 0.063 inch intercrimp.
    - b. Frame: Removable, rewireable.
    - c. Gutters: Drain gutter in head frame and each blade.
    - d. Downspouts: Downspouts in jambs to drain water from louver for minimum water cascade from blade to blade.
    - e. Vertical Supports: Hidden vertical supports to allow continuous line appearance up to 120 inches (3,048 mm).
    - f. Sill: Steeply angled integral sill eliminating areas of standing or trapped moisture where mold or mildew may thrive and effect indoor air quality.
    - g. Assembly: Factory assemble louver components. All welded construction.
- C. Performance Data
  - 01 Based on testing 48 inch x 48 inch size unit in accordance with AMCA 500.
  - 02 Free Area: 54 percent, nominal.
  - 03 Free Area Size: 8.58 square feet.
  - 04 Maximum Recommended Air Flow Thru Free Area: 873 feet per minute.
  - 05 Air Flow: 7,490 cubic feet per minute.
  - 06 Maximum Pressure Drop: 0.15 inches W.G.
  - 07 Water Penetration: Maximum of 0.01 ounces per square foot (3.1 g/m<sup>2</sup>) of free area at an air flow of 873 feet per minute (266 m/min) free area velocity when tested for 15 minutes.
- D. Design Load: Incorporate structural supports required to withstand wind load of 30 PSF.

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- E. Sub-Sill Flashing:
  - 01 All louvers shall be furnished with continuous sub-sill flashing, spanning the full width of the rough opening.
  - 02 Sub-sill flashing shall be minimum 0.065" aluminum with integral (turned up) end dams and back dams. Minimum height of dams shall be 1".
  - 03 Open vertical joint at end dam / back dam junction shall be TIG welded continuous to form a seamless dam component directing any / all trapped water to outside of building.
  - 04 Extend sub-sill flashing over the finish exterior cladding and turn down 1½" over top of cladding.
  - 05 Finish of sub-sill flashing shall match louver finish.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Coordinate with Contractor and other trades as required for rough opening and blocking requirements for proper installation of louver and vent assemblies.
- B. Confirm rough opening size and preparation are correct prior to start of installation.

**3.2 INSTALLATION**

- A. Install work of this Section in strict accordance with manufacturer's printed instructions and final accepted submittals.
- B. Louver sub-sill flashing shall be set in a full bed of sealant.
- C. Coordinate to have all sides of louver and vents sealed continuous to adjacent materials.
- D. For operable louvers and vents, completely test all functions to confirm all mechanical elements of the assembly are functioning correctly.
- E. Provide continuous sealant at perimeter of frame after installation.

**END OF SECTION**

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**SECTION 08 95 43**

**FLOOD VENTS**

CONDITIONS OF THE CONTRACT, AND DIVISION 1 APPLY TO THIS SECTION.

**PART 1 GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
  - 01 Furnish and install all flood vents exterior wall as indicated to comply with Harris County requirements.
- B. Related Sections:
  - 01 Section 06 10 00 - Rough Carpentry
  - 02 Section 07 44 63 - Fiber-reinforced Cementitious Panel Assemblies
  - 03 Section 13 34 19 – Metal Building Systems

**1.2 REFERENCES**

- A. ASCE/SEI 24-98, Flood Resistant Design and Construction.
- B. ASCE/SEI 24-05, Flood Resistant Design and Construction.
- C. ASCE/SEI 24-14, Flood Resistant Design and Construction.
- D. FEMA, 44-CFR, Part 59-60 and 60.3 National Flood Insurance Program (NFIP).
- E. FEMA TB 1-2008, Openings in Foundation Walls and Walls of Enclosures for Buildings Located in Special Flood Hazard Areas.
- F. FEMA TB 2-2008, Flood Damage-Resistant Materials Requirements.
- G. NER-624, National Evaluation Report No. NER-624, July 2007.
- H. International Code Council ICC-ES Acceptance Criteria for Automatic Foundation Flood Vents (AC-364), October 2007.
- I. International Code Council ICC-ES Acceptance Criteria for Mechanically Operated Flood Vents (AC-364), October 2013.
- J. UL - Test for Fire Dampers in conjunction with flood vents.
- K. 2018 IECC - International Energy Conservation Code.

**1.3 DESIGN / PERFORMANCE REQUIREMENTS**

- A. Flood Vents are Engineered Openings comply with the following:
  - 01 Certifications:
    - a. International Code Council - Evaluation Service Report (ESR-2074) including Florida Building Code Supplement, California Building and Residential Code Supplement.
    - b. Florida Building Product Approval (FL5822) approved for use in High Velocity Hurricane Zones (HVHZ) and impact rated garage doors.

- 1                   02    Compliance:
- 2                   a.    ICC-ES Acceptance Criteria for Mechanically Operated Flood Vents
- 3                   (AC308).
- 4                   b.    FEMA Technical Bulletin 1: Openings in Foundation Walls and Walls of
- 5                   Enclosures (TB-1).
- 6                   c.    NFIP Flood Insurance Manual.
- 7                   d.    American Society of Civil Engineers: Flood Resistant Design and
- 8                   Construction (ASCE 24).
- 9                   e.    International Residential Codes (IRC).
- 10                  f.    International Building Codes (IBC).
- 11                  g.    International Energy Conservation Code (IECC).
- 12                  h.    Florida Building Code (FBC).
- 13                  i.    California Building and Residential Code (CBC and CRC).
- 14                  j.    Houston, TX Code Of Ordinances Chapter 19 Floodplain.

15

16   **1.4    SUBMITTALS**

- 17
- 18           A.    Submit under provisions of Section 01 30 00 - Administrative Requirements.
- 19
- 20           B.    Product Data: Manufacturer's data sheets on each product to be used, including:
- 21                01    Preparation instructions and recommendations.
- 22                02    Storage and handling requirements and recommendations.
- 23                03    Installation methods.
- 24
- 25           C.    Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- 26

27   **1.5    QUALITY ASSURANCE**

- 28
- 29           A.    Manufacturer Qualifications: Company specializing in manufacturing products specified in
- 30           this section with minimum 5 years documented experience.
- 31
- 32           B.    Installer Qualifications: Installer with experience on projects of a similar size and scope
- 33           with similar installation conditions.
- 34

35   **1.6    DELIVERY, STORAGE, AND HANDLING**

- 36
- 37           A.    Deliver and store materials to site in manufacturer's original, unopened containers and
- 38           packaging, with labels clearly identifying product name and manufacturer.
- 39
- 40           B.    Store products in clean, dry area indoors until ready for installation. Store materials in
- 41           accordance with manufacturer's instructions.
- 42
- 43           C.    Protect materials and finish from damage during handling and installation.
- 44

45   **1.7    SEQUENCING**

- 46
- 47           A.    Ensure that locating templates and other information required for installation of products of
- 48           this section are furnished to affected trades in time to prevent interruption of construction
- 49           progress.
- 50
- 51           B.    Ensure that products of this section are supplied to affected trades in time to prevent
- 52           interruption of construction progress.
- 53

54   **1.8    WARRANTY**

- 55
- 56           A.    Provide the manufacturer's limited 15-year warranty.
- 57

1 **PART 2 PRODUCTS**

2  
3 **2.1 MANUFACTURERS**

- 4  
5 A. Acceptable Manufacturer: Smart Vent Products, Inc., Pitman, NJ  
6  
7 B. Requests for substitutions will be considered in accordance with provisions of **Section 01**  
8 **25 00 - Product Substitution Procedures.**  
9

10 **2.2 PRODUCTS**

- 11  
12 A. Flood Vents are constructed of Marine Grade 316 Stainless Steel formed and smooth-  
13 welded with a rigid construction. Frames are designed for installation in masonry, concrete,  
14 or framed walls, stud walls, garage doors and metal panels. Vents have a pivoting door  
15 assembly that is fitted with two patented sealed floats that provide vermin protection and  
16 immediately and automatically release the door upon contact with rising water to relieve  
17 unbalanced lateral forces on foundation walls. All flood vents are required to work bi-  
18 directionally, without human intervention.  
19  
20 B. Insulated Series: Provide flood protection only. Insulated Core with perimeter weather-  
21 stripping.  
22 01 "Flood Vent" Model #1540-520: Flush or Solid Insulated Door.  
23 a. Flood Coverage: 200 sq. ft.  
24 b. Insulated Core R-Value: 8.34  
25 c. Size: 16 inches W by 8 inches H.  
26 d. Rough Opening: 16-1/4 inches W by 8-1/4 inches H.  
27  
28 C. Accessories:  
29 01 Installation Clips, four for each vent.  
30 02 Sealant: HurriBond™ by vent manufacturer or equivalent adhesive for  
31 cementitious panel surfaces.  
32 03 Adjustable wrench for thru-bolted models and screwdriver for stud wall models.  
33 04 Trim and Sleeves: on Exterior Walls and to finish off the inside of openings:  
34 a. Adjustable Sleeve/Trim #1540-531-12: adjustable from 8 inches to 12  
35 inches deep.  
36  
37 D. Insulated Sealing Kit: Flood Vent Sealing Kit Model #1540-526 to provide tight seal  
38 behind the vent opening – must be used in conjunction with SMART VENT Insulated  
39 Model #1540-520.  
40 a. When a flood event occurs, the pre-cut Homasote® sealing material  
41 dislodges  
42 from the frame, creating an unobstructed opening to allow flood water to  
43 flow through freely.  
44 b. Installed on the interior wall.  
45 c. Finish: White.  
46

47 **PART 3 EXECUTION**

48  
49 **3.1 EXAMINATION**

- 50  
51 A. Do not begin installation until substrates have been properly prepared.  
52  
53 B. Verify vent locations are ready to receive work, and dimensions are as indicated on shop  
54 drawings or as instructed by manufacturers.  
55  
56 C. If substrate preparation is the responsibility of another installer, notify Architect of  
57 unsatisfactory preparation before proceeding.

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**3.2 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Review and coordinate setting drawings, templates, and related items that are to be embedded in concrete and masonry.
- C. Verify that no obstructions exist that will interfere with the proper operation of the vents.
- D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

**3.3 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install vents in at least two different walls spaced evenly around foundation perimeter, and located a maximum of 12 inches higher than the, interior or exterior grade, to the bottom of vent.
- C. Install vents plumb, level, square, true to line, and rigid.
- D. Attach vents securely in place using fasteners supplied or approved by manufacturer.
- E. Separate incompatible materials to prevent galvanic corrosion.
- F. Adjust flood vents for proper operation.

**3.4 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION**

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**SECTION 09 21 16**

**GYPSON BOARD ASSEMBLIES**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
  - 01 Interior metal framing – studs and joists.
  - 02 Interior gypsum board at walls, including trim, taping and floating.
  - 03 Interior gypsum board at ceilings, including trim, taping and floating.
- B. Related Work:
  - 01 Section 05 50 00 – Metals Fabrications.
  - 02 Section 06 10 00 – Rough Carpentry.
  - 03 Section 09 91 00 – Painting and Re-Painting.
  - 04 Section 13 34 19 – Metal Building Systems

**1.2 SUBMITTALS**

- A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.
- C. Shop Drawings: Submit complete shop drawings consisting of design, fabrication and erection / installation of proposed assemblies.
  - 01 Show profiles, sizes, spacing and locations of assembled components.
  - 02 Show details of shop fabrications, connections and details.
  - 03 Show details of field fabrications, connections and details.
  - 04 Where proposed framing solutions exceed specified maximum allowable unbraced heights, submit engineered calculations for each specific condition; sealed and signed by a Texas licensed structural engineer.
- D. Installation Instructions: Submit manufacturer’s complete installation instructions, including fastening, for all products and / or assemblies proposed to be furnished.
  - 01 Installation details submitted for review shall be specific to the work of this contract and accurately depict interface within the assembly(s) indicated on the Drawings.
  - 02 Generic details that do not depict actual conditions shall not be acceptable.

**1.3 REFERENCES**

- A. American Society for Testing and Materials (ASTM):
  - 01 ASTM C473 – Standard Test Methods for Physical Testing of Gypsum Panel Products.
  - 02 ASTM C475 – Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
  - 03 ASTM A653/A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by Hot-Dip Process.

- 1                    04        ASTM C840 – Standard Specification for Application and Finishing of Gypsum
- 2                                   Board.
- 3                    05        ASTM C954-10 – Standard Specifications for Steel Drill Screws for the
- 4                                   Application of Gypsum Panel Products to Steel Studs.
- 5                    06        ASTM C1002 – 07 – Standard Specifications for Steel Self-Piercing Tapping
- 6                                   Screws for the Application of Gypsum Panel Products to Steel Studs.
- 7                    07        ASTM C1178 – Standard Specification for Glass Mat Gypsum Substrate for
- 8                                   Use as Sheathing.
- 9                    08        ASTM C1280 – Standard Specification for Application of Gypsum Sheathing.
- 10                  09        ASTM C1396 – Standard Specification for Gypsum Board.
- 11                  10        D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface
- 12                                 of Interior Coatings in an Environmental Chamber.
- 13                  11        ASTM E119 – Standard Test Methods for Fire Tests of Building Construction
- 14                                 and Materials.
- 15
- 16                  B.        Gypsum Association:
- 17                    01        GA-214 – Recommended Levels of Gypsum Board Finish.
- 18                    02        GA-216 – Application and Finishing of Gypsum Panel Products.
- 19                    03        GA-253 – Application of Gypsum Sheathing.
- 20                    04        GA-290 – Area Separation Walls.
- 21                    05        GA-600 – Fire Resistance Design Manual.
- 22
- 23                  C.        National Fire Protection Association:
- 24                    01        NFPA 285 – Standard Fire Test Methods for Evaluation of Fire Propagation
- 25                                   Characteristics of Exterior Wall Assemblies Containing Combustible Materials.
- 26

27    **1.4    DESIGN REQUIREMENTS**

- 28
- 29                  A.        Non-Load-Bearing Metal Framing Deflection:
- 30                    01        L/360 at 5 PSF for veneer plaster and direct-applied finish materials that use
- 31                                   grout or mortar.
- 32                    02        L/240 at 5 PSF for typical gypsum board walls.
- 33
- 34                  B.        Fire-Resistive Rating: Where indicated on Drawings, provide materials and construction
- 35                    that are identical to those assemblies whose fire resistance rating has been determined
- 36                    per ASTM E119 by a testing and inspecting organization acceptable to authorities having
- 37                    jurisdiction.
- 38
- 39                  C.        Meet or exceed fire resistance requirements outlined under provisions of the GA-600 Fire
- 40                    Resistance Design Manual for wall and ceiling assemblies.
- 41
- 42                  D.        Meet or exceed Class A flame/fuel/smoke requirements of ASTM E84 surface burning
- 43                    characteristics for finish materials.
- 44
- 45                  E.        Sound Transmission Characteristics: For gypsum board assemblies with STC ratings,
- 46                    provide materials and construction identical to those tested in assembly indicated
- 47                    according to ASTM E90 and classified according to ASTM E413 by a qualified
- 48                    independent testing agency.
- 49
- 50                  F.        Impact-Resistant Characteristics: No structural failure at 400 foot pounds per ASTM
- 51                    E195.
- 52
- 53                  G.        Mold-Resistant Characteristics: Rating of 10 according to ASTM D3273 mold testing.
- 54



1 H. Recycled Content Certification: Provide gypsum board of at least 95 percent recycled  
2 content.

3  
4 **1.5 DELIVERY, STORAGE, AND HANDLING**

- 5  
6 A. Deliver materials in original packages, containers or bundles bearing name and  
7 identification of manufacturer or supplier.  
8  
9 B. Store materials inside under cover and keep dry and protected against damage from  
10 weather, direct sunlight, surface contamination, corrosion, construction traffic and other  
11 causes. Neatly stack gypsum boards flat to prevent sagging.  
12  
13 C. Handle gypsum board to prevent damage to edges, ends, and surfaces. Do not bend or  
14 damage metal corner beads and trim.  
15

16 **PART 2 - PRODUCTS**

17  
18 **2.1 MANUFACTURERS**

- 19  
20 A. The design of metal stud drywall framing and similar components is based on products  
21 manufactured by ClarkDietrich.  
22  
23 B. The following additional metal stud framing manufacturers are acceptable provided  
24 proposed products meet or exceed all specified requirements.  
25 01 Cemco.  
26 02 Marino/Ware.  
27 03 Semco.  
28 04 Telling Industries.  
29 05 The Steel Network.  
30  
31 C. Gypsum Wall Board: Provide domestically manufactured gypsum wall board.  
32 01 U. S. Gypsum Co.  
33 02 National Gypsum Company.  
34 03 American Gypsum.  
35 04 Georgia Pacific.  
36 05 Temple-Inland Forest Products Corp.  
37 06 James Hardie Industries.  
38  
39 D. Substitutions of above must be approved by the Architect 10 days prior to proposal / bid  
40 date  
41

42 **2.2 STUD FRAMING MATERIALS**

- 43  
44 A. The Drawings indicate locations of partitions / stud framing and the size of the stud to be  
45 used. The contractor is responsible for providing the appropriate stud mil thickness  
46 relative to the height and configuration of the assembly.  
47 01 The minimum thickness for all interior framing materials shall be 33 mils.  
48 02 Physical features of materials proposed to be furnished shall meet or exceed all  
49 requirements outlined below.  
50  
51 B. All metal framing members shall be channel type, screw type studs and runners, punched  
52 cee studs.  
53 01 33 mil and 43 mil material fabricated from steel with minimum 33 KSI yield  
54 strength.

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- 02 54 mil and heavier materials fabricated from steel with minimum 50 KSI yield strength.
- 03 Conforming to ASTM C645 Standard Specification for Non-Structural Steel Framing Members.
- 04 Minimum G-40 galvanized steel – ASTM A653. Galvannealed material is not acceptable. Coating equivalents are not acceptable.
- 05 Provide in sizes as indicated on the drawings and required for the actual installation assembly.

C. Interior partition and similar metal framing is based on three (3) primary stud thicknesses. The following is the minimum Mil thicknesses for studs:

- 01 33 Mils minimum stud thickness to be provided at any location; unless indicated otherwise on the Drawings or required to be heavier by specification or unbraced assembly height as determined by the installer.
- 02 43 Mils (18 Gauge).
- 03 54 Mils (16 Gauge).
- 04 68 Mils (14 Gauge).

D. Mil thicknesses of studs shall be based on 16” O.C. framing with the maximum, laterally unbraced height at each condition in accordance with the following schedule based on gypsum board applications:

- 01 5 PSF at L/240 conditions; standard gyp board drywall partitions to receive a painted or vinyl wall covering finish.

<u>Stud Size</u>	<u>Height</u> <u>33 Mils</u>	<u>Height</u> <u>43 Mils</u>	<u>Height</u> <u>54 Mils</u>	<u>Height</u> <u>68 Mils</u>
2-1/2”	13’-10”	N/A	N/A	N/A
3-5/8”	16’-9”	18’-3”	19’-6”	20’-10”
6”	24’-9”	27’-2”	29’-2”	31’-3”

- 02 5 PSF at L/360 conditions; gyp board drywall partitions to receive a finish material utilizing grout, mortar or plaster.

<u>Stud Size</u>	<u>Height</u> <u>33 Mils</u>	<u>Height</u> <u>43 Mils</u>	<u>Height</u> <u>54 Mils</u>	<u>Height</u> <u>68 Mils</u>
2-1/2”	11’-8”	N/A	N/A	N/A
3-5/8”	14’-8”	15’-11”	17’-1”	18’-3”
6”	21’-8”	23’-9”	25’-6”	27’-3”

- 03 Where heights exceed limits stated above, framing at less than 16” O.C. or use of heavier mil thicknesses shall be allowed, conditional on submittal of engineered calculations for each specific condition; sealed and signed by a Texas licensed structural engineer.

E. The gross Section Modulus (Sx) value for interior metal framing members shall be minimum:

<u>Member Size</u>	<u>33 Mil Sx</u>	<u>43 Mil Sx</u>	<u>54 Mil Sx</u>	<u>68 Mil Sx</u>
2-1/2”	0.180	0.238	0.288	0.355
3-5/8”	0.258	0.334	0.410	0.503
6”	0.520	0.675	0.832	1.026

F. All above material mil thicknesses, performance criteria and related values are minimum requirements.

- 01 Under NO circumstances shall any stud product less than 33 mils be acceptable.
- 02 Gauge equivalent / dimpled and similar products whose base materials do not meet the above criteria, performance and properties shall not be accepted under any circumstances.
- 03 The “ProSTUD 33” series as manufactured by ClarkDietrich meets all criteria and is acceptable. Track sections from the ProSTUD 33 system are acceptable.

- 1                   04       The “ViperStud 20 STR 33 mil” series as manufactured by Marino Ware meets  
2                                   all criteria and is acceptable. Track sections from the ViperStud 20 STR 33 mil  
3                                   system are acceptable.  
4
- 5           G.       Stud tracks shall be provided in the same mil thickness or heavier than the studs they are  
6                                   associated with.  
7                   01       Stud sill / floor track leg height shall be minimum 1-1/4”.  
8                   02       Head tracks which anchor to structural steel or floor / roof deck shall have a  
9                                   minimum 2” leg height (deep track) and be fabricated and installed to allow  
10                                  movement and flexibility of studs nested within the track.  
11
- 12           H.       Studs at all framed door and window openings shall be installed with full-height (floor  
13                                  to top of wall), double studs at jambs.  
14                   01       Double studs at opening shall be clipped / fastened together to result in a single  
15                                  composite assembly.  
16                   02       Coordinate with other trades where additional miscellaneous steel bracing is  
17                                  required.  
18                   03       Framed openings for mechanical ductwork and similar work shall be framed as  
19                                  required for the assembly.  
20                   04       Fastening studs directly to ductwork is not permitted. Coordinate with other  
21                                  trades as required. Adhere to U.L. requirements at fire rated partitions.  
22
- 23           I.       Metal framed partitions scheduled to receive tile finish or other applied finishes  
24                                  containing mortar or grout shall be increased to the next higher mil thickness for the  
25                                  height designated above.  
26                   01       Examples: 33 mil increased to 54 mil; 54 mil increased to 68 mil.  
27                   02       No increase is required for 68 mil framing.  
28                   03       Contractor’s option: stud framing size / mils based on height limitations per  
29                                  above may be installed at 8” O.C. in lieu of the stated increase in mil thickness.  
30
- 31           J.       Structural metal stud bracing is required at each door opening 48” or wider.  
32                   01       Provide two (2) 54 mil studs at each jamb of frame.  
33                   02       Studs shall be fastened together to form a single composite unit.  
34                   03       Studs shall extend and be secured to steel structure above.  
35                   04       Field verify conditions and requirements.  
36
- 37           K.       Horizontal Bracing: shall be minimum 54 Mil cold rolled channels with 1/2" legs.  
38                                  Provide in sizes in accordance with punched openings in studs.  
39                   01       Horizontal bracing shall be either welded in place to each stud; or fastened with  
40                                  a clip specifically designed for the purpose.  
41                   02       Provide one row of horizontal bracing at mid-span of partitions up to 12’-0”  
42                                  high; and at 5’-0” O.C. for partitions higher than 12’-0”.  
43
- 44           L.       Provide all accessories including, but not limited to, tracks, clips, web stiffeners, spacers,  
45                                  anchors, fastening devices, resilient clips, and other accessories required for a complete  
46                                  and proper installation, and as recommended by the manufacturer for the steel member  
47                                  and assembly being used.  
48
- 49           M.       Wall Furring:  
50                   01       Furring Channels: standard 1-1/2” and / or 7/8” deep x 30 mil minimum  
51                                  galvanized sheet metal ‘hat section’ furring channels.  
52                   02       Refer to Drawings for size at each application.  
53
- 54           N.       Metal to Metal Connections:  
55                   01       Framing fasteners shall be self-drilling / self-tapping screws.

- 1                   02       Framing screws shall be #10-16x5/8" hex washer head screw.  
2                   03       Welded connections shall be fillet or flare welds as recommended by the  
3                                    manufacturer for the specific connection conditions.  
4  
5

6   **2.3   WALL BOARD MATERIALS**

- 7  
8   A.    General Design: Provide Humidity Resistant Gypsum Wallboard, shall be USG 5/8",  
9        Type X, Sheetrock "Mold Tough" gypsum panels.  
10       01       Panels shall comply with ASTM D3273.  
11       02       Sizes shall be 4'-0" wide by longest practical length to minimize joints.  
12       03       Use at all walls in high humidity rooms (locker rooms, shower rooms / stalls,  
13                 food service areas / rooms, restrooms, non-air-conditioned interior spaces /  
14                 rooms) that do not receive a tile or masonry finish.  
15       04       Also provide within 24" of all sinks and lavatories.  
16  
17   B.    Gypsum Board Moisture Guard:  
18       01       Design of gypsum board moisture guard is based on products manufactured by  
19                 WaterGuard; or equal approved by the Architect.  
20       02       Continuous extruded PVC specifically designed to fasten to bottom of gypsum  
21                 board sheet to maintain consistent elevation above floor slabs.  
22       03       Standard size at non-fire-rated partitions: 1-3/4".  
23       04       Standard size at fire-rated partitions: 1/2".  
24  
25   C.    Corner Beads: No. 28 gauge galvanized steel, 1-1/4 inch legs. Use at all exterior corners.  
26  
27   D.    Joint Compound (Taping): Standard types manufactured by gypsum wallboard  
28        manufacturer for intended use. Fire rated type must be used on fireproof systems.  
29  
30   E.    Laminating Adhesives: Standard type manufactured or recommended by manufacturer  
31        of product to be laminated.  
32  
33   F.    Gypsum board reveals shall be 1/2" wide by 5/8" deep drywall reveals; extruded  
34        aluminum, painted finish.  
35       01       Provide where indicated on the Drawings.  
36       02       Acceptable manufacturers / products include:  
37           a.       Gordon 'Final Forms I' Series 500 (basis of design).  
38           b.       Fry Reglet - "DRM" Series.  
39           c.       Pittcon - "SWR" Series.  
40  
41   G.    Control Joints: Metal type with 1/4 inch open joint, perforated flanges for floating in  
42        place.  
43       01       Niles Building Products model 093 Zinc Control Joint; or equal.  
44       02       Control joints at walls shall be located vertically.  
45           a.       A maximum of 30'-0" O.C. floor to above ceiling.  
46           b.       Each side of door frames from top of jamb to above ceiling.  
47           c.       Above ceiling, cut / separate gyp board full height to top of gyp board.  
48       03       Control joints at gypsum board ceilings shall be located:  
49           a.       As indicated on the Drawings  
50           b.       Where not indicated, at a maximum of 30'-0" O.C. Coordinate with  
51                    Architect for exact locations.  
52       04       Control joints at furdawns shall be located on all sides of the furdawn at a  
53                 maximum of 30'-0" O.C. to above ceiling.  
54       05       At building expansion joints, provide control joint full height of gyp board  
55                 unless detailed or specified otherwise.

- 1  
2 H. Fasteners (screws) shall be U.S.G. type "S" drywall screws, minimum 1-1/4" length, or  
3 longer as required to penetrate metal framing components a minimum of 1/2".  
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7 **PART 3 - EXECUTION**  
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9 **3.1 METAL FRAMING INSTALLATION**  
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- 11 A. Floor Track: Attach to floor at 24 inch maximum centers with shoot-in pins or concrete  
12 nails.  
13  
14 B. All metal framing shall extend to floor or roof structure / deck above, unless shown  
15 otherwise on the Drawings.  
16 01 Fasten tracks at 24" intervals and more often where necessary.  
17 02 Where framing is perpendicular to joists, provide additional bracing as required.  
18 03 At fire rated partitions, framing shall extend full height to floor or roof deck  
19 above to allow a full, tight fit and seal of gyp board to be applied.  
20 04 Where studs are indicated to extend only above ceiling, brace to structure or  
21 other suitable framing at intervals not to exceed 32" O.C. each side and  
22 staggered. Framing used for bracing shall be minimum 33 Mil members.  
23  
24 C. Studs:  
25 01 Single lengths positioned vertically in the runners, spaced 16 inches O.C.  
26 maximum unless otherwise shown.  
27 02 Install double studs at framed opening jambs. Install stud bracing on each side  
28 of opening at frame head height between jamb studs and adjacent studs.  
29 03 Secure studs to stud track on both sides at bottom track prior to installation of  
30 gyp board.  
31 04 Where framing extends to structure or floor / roof deck, secure studs to both  
32 sides at bottom track prior to installation of gyp board. Temporarily fasten top  
33 track to stud as required to hold plumb in place. Secure / fasten gyp board to  
34 studs +/- 1" below bottom of track leg. Do not permanently fasten gyp board or  
35 stud directly to top track. Remove temporary track fastener to provide vertical  
36 movement of studs within the top track.  
37 05 Where studs are indicated to extend only above ceiling, secure studs to both  
38 sides at top and bottom track prior to installation of gyp board. Brace to structure  
39 or other suitable framing at intervals not to exceed 32" O.C. one side only.  
40 Coordinate with other trades as required to avoid conflict.  
41  
42 D. Wall Reinforcement:  
43 01 Provide horizontal bridging in all stud walls in accordance with the  
44 manufacturer's standards and recommendations.  
45 02 Provide solid, 2x (2x4 min.) treated wood blocking, spanning between wall  
46 studs, at all wall mounted fixtures, finish hardware, toilet partitions, wall  
47 cabinets, toilet accessories, specialties, built-in work and similar locations as  
48 required to provide a suitable substrate for firm attachment of other work.  
49  
50 E. Chase-Wall Bracing:  
51 01 Install cross-bracing for chase wall construction; Mil thickness of bracing to  
52 equal stud Mil thickness.  
53 02 Space braces a maximum of 36 inches vertically on every pair of studs.  
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**3.2 WALLBOARD INSTALLATION**

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- A. Select the maximum practical length to minimize end joints. All end joints shall be neatly fitted and staggered. Joints on opposite sides of partition shall be so arranged as to occur on different studs.
- B. Install metal corner bead at external corners. Where length of the corner does not exceed standard stock lengths, use a single length.
- C. Install gypsum board moisture guard on the bottom of all gypsum board sheets set at / on finish floor slabs.
- D. Install metal trim where indicated and all wall board not terminating under frames or behind bases shall be trimmed with galvanized "J" mold.
- E. Apply at least three coats of joint compound over beads, screw heads and trim, and each coat shall be feathered out onto panel faces. Refer to Para. 3.7 Workmanship Tolerances for level of finish required.
- F. Float out and sand joints to make joints invisible when painted with non-texture paint. Refer to Para. 3.6 Workmanship Tolerances for level of finish required.
- G. Caulk around pipes, ducts, structure or similar items which penetrate drywall systems.
- H. Fasten wallboard at 12 inches O.C., except at the edges/joints which shall be at 8 inches O.C.
- I. Edge-Grip Clips: Position clips on the back of the panels and drive prongs into panel edges. Space clips 16 inches O.C. Screw-attach clip to framing, furring or wall surface.
- J. At all wrap-around hollow metal frames, gyp board shall extend ½” minimum into frame throat.
- K. At all exterior metal framed walls extend gypsum wall board from floor to deck unless noted otherwise.

**3.3 WORKMANSHIP TOLERANCES and REQUIRED LEVEL OF FINISH**

- A. Wallboard:
  - 01 Visual: Correct any nicks, bumps, out-of-level or out-of-plumb areas detectable to the naked eye.
  - 02 Float solid between corner beads less than 36 inches apart. Surfaces that appear concave are not acceptable.
  - 03 Provide "J" mold and continuous 1/4 inch reveal wherever gypsum board directly abuts other material or when the end is exposed.
  - 04 Float control joints flush with the wall surface so that ceiling wall molds that are specified separately will align flat and straight with the wall surface.
- B. Required Level of Gypsum Drywall Finish (refer to Gypsum Association publications for standards):
  - 01 All gypsum wallboard shall be finished to a level 4 unless specifically scheduled or noted otherwise. All joints and interior angles shall have tape embedded in joint compound and 2 separate coats of joint compound applied over all flat joints and 1 separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with 3 separate coats of joint

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compound. All joint compounds shall be smooth and free of tool marks and ridges.

02 For all plenum areas and areas not exposed provide a level 1 finish. All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.

03 All gypsum wallboard scheduled to receive a semi-gloss or glossy finish shall be finished to a level 5 unless specifically scheduled or noted otherwise. All joints and interior angles shall have tape embedded in joint compound and 2 separate coats of joint compound applied over all flat joints and 1 separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with 3 separate coats of joint compound. A thin coat of joint compound or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges.

**3.4 COMMENCEMENT RESTRICTIONS**

A. Interior gypsum wallboard and ceiling board installation may not commence until all exterior sheathing and dampproofing is completed, the individual floor is dried in or roofing is complete, roof top equipment openings are covered and flashed, and exterior wall openings are protected.

**3.5 PROTECTION AND CLEAN UP**

A. Coordinate with painting and make sure all gypsum board is primed and the specified texture is provided.

B. Unless the Construction Manager gives notice otherwise, in advance. Each Trade contractor is responsible for removing his own trash from the Work area and for the initial cleaning of his own Work, while ongoing and when completed.

01 Garbage collections: Provide a collection can at each location on the site used as an eating area.

02 Trash removal: Clear the building and site of trash at least once a week. When rapid accumulation occurs, make more frequent removal. Remove highly combustible trash such a paper and cardboard daily.

03 Disposition of debris: Remove debris from the site and make legal disposition. Locations for disposal shall be of the Contractor's choice within the above restrictions. No debris or material may be buried or burned at the site. Take necessary precautions to prevent accidental burning of materials be avoiding large accumulations of combustible materials.

C. The Work shall be turned over to the Construction Manager/Owner in immaculate condition. Cleaning includes removal of smudges, marks, stains, fingerprints, soil, dirt, paint spots, dust, lint, discolorations and other foreign material.

D. Remove all temporary facilities.

**END OF SECTION**

**SECTION 09 61 43**  
**CONCRETE FLOOR SEALER**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
  - 01 Provide concrete sealer at all concrete building floors including Mezzanine.
- B. Related Work:
  - 01 Section 03 30 00 – Cast-In-Place Concrete.

**1.2 SUBMITTALS**

- A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.
- C. Installation Instructions: Submit manufacturer’s complete installation instructions, including fastening, for all products and / or assemblies proposed to be furnished.
  - 01 Installation details submitted for review shall be specific to the work of this contract and accurately depict interface within the assembly(s) indicated on the Drawings.
  - 02 Generic details that do not depict actual conditions shall not be acceptable.
- D. Maintenance Instructions: Submit manufacturer’s complete maintenance instructions and recommendations for all products and / or assemblies proposed to be furnished.
  - 01 Include recommended cleaning products and instructions for use.
  - 02 Where applicable, provide recommended maintenance schedules and procedures.

**1.3 REFERENCES**

- A. ASTM International
  - 01 ASTM C156 - Standard Test Method for Water Loss [from a Mortar Specimen] Through Liquid Membrane-Forming Curing Compounds for Concrete.
  - 02 ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
  - 03 ASTM C1315 - 11 Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.

**PART 2 - PRODUCT**

**2.1 MANUFACTURERS**

- A. Design is based on products manufactured by Prosoco.



- 1 B. Acceptable Manufacturers: The following manufacturers are acceptable to provide  
2 products of this section, provide all proposed products meet or exceed the specified  
3 requirements.  
4 01 Euclid Chemical.  
5 02 L.M. Scofield.  
6 03 ZEP Manufacturing.  
7

## 8 2.2 MATERIALS

9

- 10 A. Design of concrete floor sealer is based on Prosoco Consolideck LS concrete sealer,  
11 hardener & densifier.  
12  
13 B. Concrete floor sealer shall be a penetrating lithium silicate sealer specifically formulated  
14 for application on interior concrete to resist damage from water and surface abrasion.  
15 The increased surface hardness reduces dusting and simplifies maintenance, producing a  
16 cleaner, healthier environment.  
17  
18 C. Performance Test Data:  
19 01 Federal EPA VOC.  
20 02 SCS Global Services Certified Indoor Air Quality "Gold"  
21 03 Abrasion: 59 using H@@ wheel, 1000 gram load ASTM C1353  
22 04 Water Vapor Transmission (breathability): ASTM E96 100%  
23 05 Slip Resistance ASTM C1028  
24 a. Steel Troweled: Dry 0.720 Wet 0.664  
25 b. Honed (up to 100 grit): Dry 0.759 Wet 0.654  
26 c. Polished (up to 800 grit): Dry 0.865 Wet 0.645  
27  
28 D. Technical Data:  
29 01 Form: Clear, water-like liquid  
30 02 Specific gravity: 1.10  
31 03 pH: 11.0  
32 04 Weight/gallon: 9.2 pounds  
33 05 Active content: 14.5 percent  
34 06 Total solids: 14.5 percent  
35 07 VOC content: 0 grams per Liter. Complies with all known national, state and  
36 district AIM VOC regulations.  
37 08 Flash point: Not flammable  
38 09 Freeze point: 32 degrees Fahrenheit (0 degrees Celsius)  
39 10 Shelf life: 2 years in unopened, factory-sealed container  
40

## 41 PART 3 - EXECUTION

42

### 43 3.1 INSTALLATION

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- 45 A. Concrete slabs shall be smooth, dry, and free of any foreign materials.  
46  
47 B. Apply in strict accordance with manufacturer's instructions for both preparation and  
48 application. Preparation is not indicated here.  
49  
50 C. For Cured, Steel Troweled Concrete:  
51 01 Apply a single coat using a low pressure sprayer. Apply sufficient product to  
52 wet the surface without producing puddles. Use a clean microfiber pad to spread  
53 the product evenly and ensure uniform wetting. Avoid spreading once drying  
54 begins. Scrubbing is not necessary.  
55 02 If surfaces dry immediately, increase the rate of application. Surface should  
56 remain wet for 5–10 minutes. Adjust rate of application to eliminate puddles.

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- 03 Allow treated surfaces to dry.
  - 04 Remove any dried powder residue using a stiff broom, power sweeper or auto-scrubbing machine.
  - 05 Note! Allowing excess material to puddle on the floor will extend dry times and create white residues which must be removed immediately. Call 800-255-4255 for removal instructions.
- D. For Cured, Ground/Honed Concrete:
- 01 Sand, level or grind the concrete surface with a floor sander, orbital floor machine or diamond grinding equipment to achieve the desired exposure.
  - 02 Remove all dust and debris using an auto-scrubbing machine and fresh water. Allow wet surfaces to dry.
  - 03 Using a low pressure sprayer apply sufficient product to wet the surface without producing puddles. Use a clean microfiber pad to spread the product evenly and ensure uniform wetting. Avoid spreading once drying begins. Scrubbing is not necessary.
  - 04 If surfaces dry immediately, increase the rate of application. Surface should remain wet for 5–10 minutes. Adjust rate of application to minimize puddles. Allow treated surfaces to dry.
  - 05 Remove any dried powder residue using a stiff broom, power sweeper or floor scrubbing machine.
  - 06 If additional surface sheen is desired, buff or burnish the concrete surface in both directions with an orbital floor machine or burnisher equipped with an appropriate polishing pad. This is a dry buffing operation.
  - 07 Note! Allowing excess material to puddle on the floor will extend dry times and create white residues which must be removed immediately. Call 800-255-4255 for removal instructions.
- E. Install coating after all painting operations are completed.
- F. Apply any painted stripes or graphics indicated on drawings. Allow approximately 24 hours drying time between installation and additional coats.
- G. Apply an additional coat of concrete floor sealer over any areas receiving striping or graphics as specified above.

**END OF SECTION**

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**SECTION 09 90 10**

**PAINTING AND STAINING – LOW V.O.C.**

CONDITIONS OF THE CONTRACT AND DIVISION 1 APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Refer to Section 013300 Submittal Procedures for substitutions.

**1.2 SCOPE**

- A. Work Included: Work under this Section includes furnishing all labor, material, equipment and accessories necessary for completion of all painting and staining. Refer to paragraph 3.01 for list of items to receive paint.
- B. Work Not Included:
- 01 Shop coat of paint on metal, unless noted otherwise. Refer to Section 05500 - Miscellaneous Metals.
  - 02 Aluminum and copper, unless otherwise noted.
  - 03 Factory finished equipment.
  - 04 Plastic clad educational equipment.

**1.3 SUBMITTALS**

- A. Material lists: Give the supplier's name, product name, number and generic description of each proposed product and its use. Provide product data sheets if requested.
- B. Samples: Submit full range of colors, patterns, textures and finishes available for selection, including the following:
- 01 Color Chips: Provide complete duplicate sets of color chips for color selection.
  - 02 Small Applied Samples: Provide pieces of actual material on which paint will occur with minimum dry mil thickness of specified paint.
  - 03 Sheen Samples: Provide full range of varying sheens when sheens are controllable by intermixing.
  - 04 Provide two (2) stained and finished wood veneer paneling samples to represent the panels and architectural cabinets, 12"x12" size, each time for approval for color, sheen and finish quality until approved by the Architect. Subsequent submittals will be required until approval.
- C. Installed Samples: Provide large size samples for approval. Approved samples may be left in place as part of the work.
- D. One room and/or area, as selected by the Architect, shall be painted with materials specified or accepted and applied directly from container, unthinned. After acceptance by Architect, room and/or area shall be standard of quality of entire project.
- E. Certification: Furnish a letter certifying that materials submitted are truly equivalent, or better than those called out in the finish schedule.

**1.4 RESPONSIBILITY OF COORDINATION**

- A. Coordinate the work specified herein with the following work:
- 01 Provide information to preceding trades for proper preparation of substrate.

- 1           02       Inspect substrate before proceeding to verify proper preparation.  
2           03       Notify Architect of any item to receive paint which may not be covered by a  
3                scheduled finish type. Architect will furnish appropriate specification.  
4

5   **1.5     QUALITY ASSURANCE**  
6

- 7           A.       Materials shall be applied directly from containers in which material is purchased. No  
8                exceptions.  
9  
10          B.       Subcontractor shall provide to Owner and Architect a notarized certification that paint  
11                used is as specified in writing by the Architect.  
12  
13          C.       Number of coats of each of several finishes shall be in accordance with detailed  
14                specifications, which will produce first quality finish if properly applied. If number of  
15                coats specified fails to produce a finish acceptable to Architect, this Contractor shall apply  
16                additional coat(s) at his own expense until an acceptable finish is achieved.  
17  
18          D.       Provide primers and other undercoat paints produced by same manufacturer as finish  
19                coats. Use thinners recommended by paint manufacturer's printed instructions.  
20  
21          E.       For Wood Veneer finishes, provide a uniform stain and smooth clear finish with no  
22                pinholes, cloudiness, scratches, unfinished areas, bubbles, etc.  
23  
24          F.       Deliver products to jobsite in unbroken containers bearing manufacturer's labels, intact  
25                and legible at time of use.  
26

27   **1.6     PRODUCT HANDLING**  
28

- 29          A.       Store only approved materials at the jobsite, storing only in a suitable and designated area  
30                restricted to the storage of paint materials and related equipment.  
31  
32          B.       Temperature in the storage area shall be between 40°F and 110°F. Open and mix all  
33                materials in the storage area.  
34  
35          C.       Use all means necessary to protect materials before, during, and after application, and to  
36                protect the installed work and materials of all other trades.  
37  
38          D.       Apply water-base paints only when temperature of surfaces to be painted, and  
39                surrounding air temperatures are between 50°F (10°C) and 90°F (32°C), unless  
40                otherwise permitted by paint manufacturer's printed instructions.  
41  
42          E.       Apply solvent-thinned paints only when temperature of surfaces to be painted, and  
43                surrounding air temperatures are between 45°F (7°C) and 95°F (35°C), unless otherwise  
44                permitted by paint manufacturer's printed instructions.  
45  
46          F.       Do not paint in snow, rain, fog or mist, or when relative humidity exceeds 85%, or to  
47                damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed  
48                instructions. Painting may be continued during inclement weather, if areas and surfaces  
49                to be painted are enclosed and heated within temperature limits specified by paint  
50                manufacturer, during application and drying periods.  
51

52   **1.7     EXTRA STOCK**  
53

- 54          A.       Upon completion of the work of this Section, deliver to the Owner, an extra stock equaling  
55                10 percent or a minimum of 1 gallon, whichever is greater, of each color, type, and gloss

1 of paint used in the work. Make sure each container is tightly sealed, clearly labeled with  
2 contents, and location where used.

3  
4 **1.8 WARRANTY**

- 5  
6 A. The undertaking of a painting subcontract will indicate that the subcontractor will warrant  
7 the work specified herein for two years against becoming unserviceable or causing an  
8 objectionable appearance, resulting from either defective or nonconforming materials and  
9 workmanship.  
10  
11 B. Defects shall include by not be limited to the following:  
12 01 Discoloring noticeably by yellowing, streaking, blooming, changing color or  
13 darkening.  
14 02 Mildew.  
15 03 Peeling, cracking, blistering, alligatoring or releasing from the substrate.  
16 04 Chalking or dusting excessively.  
17 05 Changing sheen in irregular fashion.  
18 06 Softening or becoming tacky.  
19 07 Bubbling.  
20  
21 C. In the event of damage, immediately make all repairs and replacements necessary for  
22 approval of the Architect, and at no additional cost to the Owner.  
23

24 **PART 2 - PRODUCTS**

25  
26 **2.1 MANUFACTURERS**

- 27  
28 A. All paint materials selected for coating systems for each type of surface shall be the  
29 product of a single manufacturer and shall, as a system, have flame spread, fuel  
30 contribution, and smoke density test results less than 25.  
31  
32 B. Paint materials listed herein, unless otherwise designated in the "Painting Schedule", are  
33 the products of **The Sherwin Williams Company** and require no further approval as to  
34 manufacturer or catalogue number.  
35

36 **2.2 ALTERNATE MANUFACTURERS**

- 37  
38 A. The following manufacturers will be considered provided a similar professional first line  
39 material is submitted with all technical documentation for review prior to bidding. Each  
40 alternate paint type shall be identified and must correspond with the matching type  
41 specified herein. Alternate paint will be subject to approval by the Architect.  
42 01 Pittsburg Paints  
43 02 Tnemec  
44 03 Pratt and Lambert  
45 04 Glidden Professional  
46

47 **2.3 MATERIALS**

- 48  
49 A. The following is a specification of typical painted items and does not specifically  
50 include every item that is to receive paint. It should, however, establish type and quality  
51 of finish for all items normally included in a complete paint job.  
52  
53 B. **INTERIOR**  
54 01 **Finish Type 1 CMU**  
55 a. 1<sup>st</sup> Coat: Kem Cati Coat HS Epoxy Filler Sealer B42400, apply 7-  
56 13.5 Wet mils, 5-10 dry mil thickness.

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- b. 2<sup>nd</sup> Coat: Macropoxy 646 Fast Cure Epoxy B58W620
  - c. 3<sup>rd</sup> Coat: Same as second coat
- 02 **Finish Type 2 Exposed Steel, Metal Doors and Frames (Ferrous)**
- a. 1<sup>st</sup> Coat: Pro Cryl Universal Water Based Primer, B66W310
  - b. 2<sup>nd</sup> Coat: Pro Industrial 0 VOC Acrylic Semi-Gloss
  - c. 3<sup>rd</sup> Coat: Same
- 03 **Finish Type 3 Wood (Doors, Trim, and Woodwork to be painted)**
- a. 1<sup>st</sup> Coat: Premium Interior Wall & Wood Primer, B28W8111
  - b. 2<sup>nd</sup> Coat: Pro Industrial 0 VOC Acrylic Semi-Gloss
  - c. 3<sup>rd</sup> Coat: Same
- 04 **Finish Type 4 Gypsum Board: Schedule Walls**
- a. 1<sup>st</sup> Coat: Pro Green 200 Wall Primer, B28W600
  - b. 2<sup>nd</sup> Coat: Pro Green 200 Latex Eg-Shel, B20W651
  - c. 3<sup>rd</sup> Coat: Same
- 05 **Finish Type 5 Sealed Concrete Floor** (Sealed concrete is for those floors that are not schedule for another finish). **1<sup>st</sup> floor rooms with sealed concrete scheduled and Elevator Pit shall be sealed concrete.**
- a. 1<sup>st</sup> Coat: H&C Low VOC Clear Gloss Solvent Based Sealer with slip resitant additive “Sharps Grip”. Elevator pit does not need additive.
  - b. 2<sup>nd</sup> Coat: SAME
  - c. Apply 1<sup>st</sup> and 2<sup>nd</sup> coats when all trades are completed, floor is cleaned and structure is ready for occupancy.
  - d. Surface must be free of dust, dirt and other foreign material.
- 06 **Finish Type 6 Gypsum Board-Epoxy Type finish @ Wet Areas** (Restrooms, Custodian Rooms) and for use on Abuse Resistant (AR) gypsum board wainscot.
- a. 1<sup>st</sup> Coat: Pro Green 200 Wall Primer, B28W600
  - b. 2<sup>nd</sup> Coat: Pro Industrial Pre-Catalyzed Epoxy Semi-Gloss, K46W051
  - c. 3<sup>rd</sup> Coat: same as second coat
- 07 **Finish Type 7 Gypsum Board - Scheduled Ceilings**
- a. 1<sup>st</sup> Coat: Pro Green 200 Primer, B28W600
  - b. 2<sup>nd</sup> Coat: Pro Green 200 Flat Latex, B30W651
  - c. 3<sup>rd</sup> Coat: Same as second coat
- 08 **Finish Type 8 Galvanized Metal - Zinc Coated Metal**
- a. 1<sup>st</sup> Coat: Pro Cryl Universal Water Based Primer, B66W310
  - b. 2<sup>nd</sup> Coat: Pro Classic Waterborne Semi-Gloss
  - c. 3<sup>rd</sup> Coat: Same as second coat
- 09 **Finish Type 9 Wood Paneling, Architectural Cabinets and Wood Solids**
- a. Step 1: Sand panels with 180 grit sand paper to a smooth finish taking care not to sand through the outer layer of veneer. Sand with the grain of the veneer.
  - b. Step 2: Inspect the panel thoroughly for any natural occurring imperfections or machining marks that may be present. Make any repairs to the panel or solid at this point utilizing a Mohawk M607-004 Natural Water Base Paste Wood Filler.
  - c. Step 3: Inspect the panel thoroughly for any extreme color variations in the outer veneer layer. If sharp contrasts in veneer color or density are evident bleach the panel using Kleen Strip Parts A&B Wood Bleach.

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- d. Step 4: Stain the panel to match the control sample using Campbell Azotone Dye Pigment system or an approved equal. The stain is custom mixed to match the control sample.
- e. Step 5: Inspect the stained panel thoroughly for color uniformity. Use the Azotone Dye as a toner/sap stain to evenly finish any sap or grain streaks in the panel.
- f. Step 6: When the color of the panel is consistent spray, apply Gemini VS275-0300 Pre-Catalyzed Clear Vinyl Sealer.
- g. Step 7: Sand the sealer with 180 grit paper taking care not to sand through the sealer coat. Sand with the grain of the veneer.
- h. Step 8: Spray the first coat of Pre-Catalyzed Lacquer on the panel ensuring consistent spray pattern. Use Gemini 510-075 low VOC Pre-Catalyzed Lacquer.
- i. Step 9: Sand the dried lacquer with 250-300 grit paper until a smooth finish is obtained.
- j. Repeat steps 8 and 9 until desired finish is achieved.

C. **EXTERIOR**

- 01 **Finish Type 12 Galvanized Metal**
  - a. 1<sup>st</sup> Coat: Pro-Cryl Universal Primer B66 (gray color) - spray application
  - b. 2<sup>nd</sup> Coat: Acrolon 218 HS Acrylic Polyurethane B65 – spray application
  - c. 3<sup>rd</sup> Coat: Same as second Coat
  
- 02 **Finish Type 13 Exposed Steel and Metal Doors and Frames**
  - a. 1<sup>st</sup> Coat: Pro-Cryl Universal Water Based Primer, B66W310
  - b. 2<sup>nd</sup> Coat: Pro Industrial 0 VOC Acrylic Semi-Gloss, B66W651
  - c. 3<sup>rd</sup> Coat: Same as second coat
  
- 03 **Finish Type 14 Exposed Mechanical Equipment Cabinets**
  - a. 1<sup>st</sup> Coat: Pro-Cryl Universal Water Based Primer, B66W310
  - b. 2<sup>nd</sup> Coat: Pro Industrial 0 VOC Acrylic Semi-Gloss, B66W651
  - c. 3<sup>rd</sup> Coat: Same as second coat
  
- 04 **Finish Type 15 Pavement marking paint**
  - a. Traffic Paint – Set Fast Acrylic Traffic Paint (SJC Standard is yellow for standard parking stripes)
  - b. Red for Fire Lane curbs
  - c. Blue for Accessible parking space squares and accessible curb ramps
  
- 05 **Finish Type 16 Concrete (columns, column caps)**
  - a. 1<sup>st</sup> Coat: Loxon Masonry Primer, A24W8300
  - b. 2<sup>nd</sup> Coat: Conflex XL High Build Smooth A05-450, apply 13-16 Wet mils, 6-7 dry mil thickness. Achieve 10 or less pinholes/sq.ft.
  - c. 3<sup>rd</sup> Coat: Same as second coat
  
- 06 **Finish Type 17 Galvanized Metal-Zinc Coated**
  - a. 1<sup>st</sup> Coat: Pro-Cryl Universal Primer B66 (gray color) - spray application
  - b. 2<sup>nd</sup> Coat: Acrolon 218 HS Acrylic Polyurethane B65 – spray application
  - c. 3<sup>rd</sup> Coat: Same

1 **2.4 COLORS**

- 2  
3 A. Colors shall be as selected by Architect. Different colors may be selected for each room,  
4 and more than one color may be selected in each room. The design is based on the  
5 following colors and numbers:  
6

7 **PART 3 - EXECUTION**

8  
9 **3.1 ITEMS TO RECEIVE PAINT**

- 10  
11 A. Generally, all items that are normally painted in any typical building, including but not  
12 limited to the following list:  
13 01 All products and materials that are not prefinished or designated prefinished.  
14 02 All ferrous metal including exposed steel structure; excluding mechanical and  
15 equipment rooms.  
16 03 All exposed exterior steel; including masonry lintels, exposed steel structure,  
17 handrails and other exterior steel components.  
18 04 All exterior wood.  
19 05 All interior wood (clear finish or opaque as designated).  
20 06 All conduit, outlet boxes and electrical cabinets exposed within a user occupied  
21 rooms; excluding those located in mechanical rooms.  
22 07 All new pipe, plumbing and ductwork exposed within a user occupied rooms.  
23 08 All new metal grilles, except aluminum, unless otherwise indicated.  
24 09 All new exposed gypsum board surfaces, including all mechanical rooms.  
25 10 Miscellaneous other items which normally require painting or are scheduled to  
26 be painted.  
27 11 Consult plans, finish schedule, details and specifications for other trades as all  
28 items usually field painted or finish will be considered as part of the Contract.  
29 12 All new exposed mechanical equipment and electrical equipment.  
30 13 Mechanical Room Pipes: All pipes shall be painted if insulated or not insulated.  
31  
32 B. All work where a coat of material has been applied must be inspected and approved by  
33 the Architect, before application of succeeding specified coat, otherwise no credit for coat  
34 applied will be given. Notify Architect when a particular coat has been completed for  
35 inspection and approval. Apply coats of material in strict accordance with manufacturer's  
36 specifications, except where requirements of these specifications are in excess of  
37 manufacturer's requirements. Paint all sight exposed pipe and plumbing, only after all  
38 mechanical work and tests have been completed.  
39

40 **3.2 PREPARATION**

- 41  
42 A. General: Surface must be clean to ensure adhesion. Remove oil and grease with paint  
43 thinner. Wash off dirt with warm soapy water and rinse with clean water. Remove rust by  
44 wire brushing or sanding.  
45  
46 B. Unfinished Surfaces:  
47 01 Wood: Sand smooth and apply one coat of primer undercoat. After primer has  
48 dried overnight, putty nail holes and cracks, then spot-prime putty with primer.  
49 Again, allow the primer to dry overnight, sand lightly and topcoat.  
50 02 Masonry and Concrete: Remove efflorescence or cement dust on masonry and  
51 concrete by etching with a 10% solution of muriatic (Hydrochloric) acid. Flush  
52 off surface after etching with clean water, and paint while still damp. On surface  
53 where muriatic acid cannot be used to neutralize the efflorescence, remove the  
54 efflorescence by sanding, scraping or wire brushing, and apply a coat of masonry  
55 conditioner before painting. If efflorescence is not present, no primer is  
56 necessary on concrete and masonry surfaces. Fill voids and pores in concrete and



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haydite blocks with latex block filler and allow to dry overnight before top-coating.

03 Iron and Steel: Prime with metal primer and allow to dry overnight before top-coating.

04 Galvanized Metal: Prime with galvanized metal primer and allow to dry overnight before top-coating.

**3.3 APPLICATION**

- A. General: Surfaces to be finished must be clean, dry, free of dirt, oils, loose paint or any other contamination that would adversely affect adhesion, protective properties or appearance of the coating.
- B. Paint Thickness: Provide the manufacturer’s dry film thickness per coat at a minimum, unless noted otherwise.
  - 01. Thickness Test: Use observation gauge that measures "V" shape scratch.
- C. Allow exterior paints to dry 72 hours between coats and interior paint to dry 24 hours between coats. Allow all enamels and varnishes to dry 24 hours between coats. If enamel and varnishes are tacky after 24 hours, allow additional time until finish is dry.
- D. Leveling: Apply with proper consistency and quality so paint flows out to a level surface free of brush and roller marks, bubbles, dust, runs, sags, and holidays. Spread evenly.
- E. Appearance: Uniform color, texture and sheen.
- F. Neatness: Paint shall not be smeared, spattered or run over adjoining colors or materials. Cut-on lines shall be straight.
- G. First coat shall be white, unless otherwise specified.

**END OF SECTION**

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**SECTION 10 44 13**

**FIRE EXTINGUISHERS AND CABINETS**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
  - 01 Provide fire extinguishers with wall brackets where indicated.
- B. Related Work:
  - 01 Section 09 21 16 – Gypsum Board Assemblies
  - 02 Section 13 34 19 – Metal Building Systems

**1.2 SUBMITTALS**

- A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.
- C. Shop Drawings: Submit complete shop drawings consisting of design, fabrication and erection / installation of proposed assemblies.
  - 01 Show profiles, sizes, spacing and locations of assembled components.
  - 02 Show details of shop fabrications, connections and details.
- D. Installation Instructions: Submit manufacturer’s complete installation instructions, including fastening, for all products and / or assemblies proposed to be furnished.
  - 01 Installation details submitted for review shall be specific to the work of this contract and accurately depict interface within the assembly(s) indicated on the Drawings.
  - 02 Generic details that do not depict actual conditions shall not be acceptable.
- E. Maintenance Instructions: Submit manufacturer’s complete maintenance instructions and recommendations for all products and / or assemblies proposed to be furnished.
  - 01 Include recommended cleaning products and instructions for use.
  - 02 Where applicable, provide recommended maintenance schedules and procedures.
- F. Color / Finish Samples
  - 01 Provide two (2) samples of each finish for selection by the Architect.
  - 02 Finish samples shall be provided of / on actual material; paper or digital samples shall not be accepted.
  - 03 Minimum size shall be 3” x 3”, but must be large enough to convey attributes

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Design of fire extinguisher cabinets and fire extinguishers is based on products manufactured by JL Industries

1 B. Acceptable Manufacturers: The following manufacturers are acceptable to provide  
2 products of this section, provide all proposed products meet or exceed the specified  
3 requirements.

- 4 01 J. L. Industries
- 5 02 Uline
- 6 03 Apex
- 7 04 Potter Roemer

8  
9  
10 **2.2 MATERIALS**

11  
12 A. Wall Mount Brackets

- 13 01 Provide manufacturer's standard fire extinguisher wall bracket specifically  
14 suited for support of wall mounted fire extinguishers.

15  
16 B. Fire Extinguishers:

- 17 01 Multi-purpose dry chemical with UL 4A-60B:C and FM approved; UL 2A-  
18 10B:C for 5 and 10 lbs.
- 19 02 Capacity: 5 lb. At mechanical rooms and direct wall mounted extinguishers;  
20 and 10 lb. at fire extinguisher cabinets.
- 21 03 Extinguishers are furnished for direct wall mounting and for fire extinguisher  
22 cabinets. Refer to drawings for location and quantity.
- 23 04 Provide initial inspection tag for each extinguisher.

24  
25  
26 **PART 3 - EXECUTION**

27  
28 **3.1 PREPARATION**

- 29  
30 A. Coordinate with other trades as required for installation of rough openings / recesses in  
31 walls to receive fire extinguisher cabinets.
- 32  
33 B. Coordinate with other trades as required for installation of all blocking in walls necessary  
34 for proper installation of fire extinguisher cabinets and wall mounted brackets.

35  
36 **3.2 INSTALLATION**

- 37  
38 A. Install fire extinguisher cabinets in strict accordance with manufacturer's standards and  
39 final reviewed submittals.
- 40  
41 B. Install fire extinguishers at all cabinets and wall hung locations..
- 42  
43 C. Provide initial inspection tag for each extinguisher immediately prior to Substantial  
44 Completion.

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46  
47 **END OF SECTION**

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**SECTION 11 96 01**

**OVERHEAD TROLLEY CRANE**

CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS, DIVISION 00 AND 01  
APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
- 01 Provide a complete, operational overhead, motorized, bottom running, trolley crane system configured to the supporting structure as indicated on the Drawings.
  - 02 The assembly shall be complete, including trolley, hoist, controller and associated electrical. Trolley beam & supporting braces to be furnished by Pre-Engineered Metal Building supplier in accordance with the requirements of the Crane manufacturer.
- B. Related Work:
- 01 Section 13 34 19 – Metal Building Systems.
  - 02 Division 26 – Electrical.

**1.2 SUBMITTALS**

- A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.
- C. Shop Drawings: Submit complete shop drawings consisting of design, fabrication and erection / installation of proposed assemblies.
- 01 Show profiles, sizes, spacing and locations of assembled components.
  - 02 Show details of shop fabrications, connections and details.
  - 03 Show details of field fabrications, connections and details.
  - 04 Show details of interface with runway beam structure.
- D. Installation Instructions: Submit manufacturer’s complete installation / erection instructions, including fastening, for all products and / or assemblies proposed to be furnished.
- 01 Installation details submitted for review shall be specific to the work of this contract and accurately depict interface within the assembly(s) indicated on the Drawings.
  - 02 Generic details that do not depict actual conditions shall not be acceptable.
- E. Maintenance Instructions: Submit manufacturer’s complete maintenance instructions and recommendations for all products and / or assemblies proposed to be furnished.
- 01 Include recommended cleaning products and instructions for use.
  - 02 Where applicable, provide recommended maintenance schedules and procedures.
- F. Operations and Maintenance Manuals:
- 01 Provide complete operations and maintenance manuals to the Owner.
  - 02 Refer to section 01 78 23 – Operations and Maintenance Manuals.

03 O & M manuals must be reviewed, accepted and delivered to the Owner prior to Owner demonstration(s).

### 1.3 REFERENCES

- A. Occupational Safety and Health Act (OSHA).
- B. American Gear Manufacturers Standards (AGMA).
- C. American National Standards Institute (ANSI).
- D. American Society of Mechanical Engineers (ASME):
  - 01 ASME B30.10 – Hook Inspections.
  - 02 ASME B30.17 – Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist).
  - 03 ASME HST-4M – {Performance Standard for Overhead Electric Wire Rope Hoists.
- E. Crane Manufacturers Association of America (CMAA).
- F. Hoist Manufacturers Institute.
- G. National electric Manufacturing Association.
- H. National Electric Code (NFPA 70):
  - 01 Motors – NEMA MG-1.
  - 02 Control enclosures – NEMA Rated.
- I. American Society for Testing and Materials:
  - 01 ASTM A36 - Structural Steel.
  - 02 ASTM A307, Carbon Steel Externally and Internally Threaded Standard fasteners.
  - 03 ASTM A325, High Strength Bolts for Structural Steel.
  - 04 ASTM A500, Cold formed welded and seamless carbon sheet structural tubing in rounds and shapes.
  - 05 ASTM A992, Steel for Structural Shapes for use in Building Framing.
- J. Federal Specification: Fed. Spec. TT-P-636.
- K. American Institute for Steel Construction:
  - 01 Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings - Latest Edition.
  - 02 Code of Standard Practice - Latest Edition.
- L. American Welding Society: American Welding Society Structural Welding Code D11.1-77.

### 1.4 OPERATING CONDITIONS

- A. The equipment will be installed in a non-air conditioned pre-engineered metal building with a roof, indoors.
- B. The equipment will be operating in ambient temperatures ranging from 35 degrees F to 100 degrees F.
- C. The atmospheric conditions are classified as dry, nonhazardous.

- 1 D. Electrical Classification: Safe – nonhazardous.  
2
- 3 E. Electrical power characteristics: Power for operating the equipment will be supplied by  
4 460v, three-phase, 60hertz, delta, wye) connected circuit.  
5 01 For delta connected circuits the L2 neutral of this circuit is connected to ground  
6 at the distribution transformer.  
7 02 A variation of + 5% from the nominal voltage can be expected at the feeder  
8 terminals during normal plant operations.  
9 03 For DELTA systems the B phase is grounded and per the National Electric Code  
10 a fuse is not allowed in the B phase.  
11
- 12 F. Lifting Capacity:  
13 01 Hook: 2 tons.  
14 02 Total Lift: 20 feet - Low elevation of hook to high hook position.  
15
- 16 G. Operating Speeds: two speed capability required to provide the following ranges:  
17 01 Bridge: Two speed - 120 FPM at high speed / 40 FPM at low speed.  
18 02 Trolley: Two speed - 20 to 25 FPM at high speed / 5 to 8 FPM at low speed.  
19 03 Hoist: Two speed -20 to 25 FPM at high speed / 5 to 8 FPM at low speed.  
20
- 21 H. Type of Control:  
22 01 AC control for pendant operation from operating floor.  
23 02 Bridge: two speed with soft start / soft stop.  
24 03 Trolley: two speed with soft start / soft stop.  
25 04 Hoist: two speed with soft start / soft stop.  
26
- 27 I. Type of Service:  
28 01 Crane: CMAA Crane Service Class C.  
29 02 Hoist: HMI 100-71 Hoist Service Class H4.  
30
- 31 J. Heights:  
32 01 Operating floor to hook in high position: 20 feet.  
33 02 Operating floor to underside of building structural steel: slopes, height varies.  
34 03 Operating floor to high point of crane: 20 feet.  
35
- 36 K. Length of Runway: 35 feet.  
37
- 38 L. Runway Structure:  
39 01 Span Between Centerlines of ASCE Runway Rails: n/a  
40 02 Size of Runway Beams: Designed by pre-engineered metal building  
41 manufacturer in coordination with Crane supplier.  
42

## 43 PART 2 - PRODUCTS

### 44 2.1 MANUFACTURERS

- 45 A. Design of trolley crane is based on products manufactured by Coffing Hoist / Shupper-  
46 Brickle Equipment Company. Model EC-1 Motorized Trolley and ECMT-4008 2 Ton  
47 Double Chain (Parallel Mounted).  
48
- 49 B. Acceptable Manufacturers: The following manufacturers are acceptable to provide  
50 products of this section, provide all proposed products meet or exceed the specified  
51 requirements.  
52 01 Engineered Systems.  
53 02 Progressive Crane.  
54 03 Yale  
55  
56

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2 **2.2 MATERIALS - GENERAL**  
3

- 4 A. Structural Steel:  
5 01 Comply with ASTM A992.  
6 02 Plates, angles, and channels shall comply to ASTM A36.  
7 03 Steel Tubes shall comply with ASTM A500 - Grade B (Fy= 46 KSI).  
8  
9 B. Welding: Shall conform to the American Welding Society (AWS) standards and  
10 recommendations. D14.1.  
11  
12 C. Bolts:  
13 01 Comply with ASTM A325.  
14 02 Size: 3/4" or as shown on drawings.  
15  
16 D. Painting:  
17 01 Comply with Fed. Spec. TT-P-636.  
18 02 Preparation: Steel shall be clean, dry, and free of rust.  
19 03 All surfaces of the structural parts of the crane shall be finished in accordance  
20 with the environment and vendor's standard practice for that environment.  
21 04 All surfaces of electrical and mechanical parts shall be finished in accordance  
22 with the vendor's standard practice.  
23

24 **2.3 CRANE ASSEMBLIES**  
25

- 26 A. Crane Runways:  
27 01 The crane runway support steel, runway beams, crane rails and crane runway  
28 stops shall be furnished by the Contractor as components of the building in size  
29 and lengths as indicated on the Drawings.  
30 02 Coordinate all trades as required for proper interface.  
31  
32 B. Crane Trolley:  
33 01 The crane trolley beam shall consist of one (1) precision rolled s-beam or w-  
34 beam as designed by the crane manufacturer.  
35 02 A monorail type trolley carrier shall be furnished to support the hoisting  
36 equipment.  
37 03 Provide hardened tread wheels with antifriction bearings integrated with the  
38 crane bridge.  
39 04 The trolley carrier shall be motor driven by work gear drive or spur gear drive  
40 unit per manufacturer's design.  
41 05 An electric brake shall be furnished on each drive.  
42 06 The drives shall be shock-free on starting and stopping.  
43 07 Safety lugs shall be furnished on the trolley.  
44 08 The trolley carrier shall be welded steel construction; and designed to transmit  
45 the imposed load to the crane bridge girder without undue deflection.  
46  
47 C. Electric Wire Rope Hoist:  
48 01 A hoisting machine of proper capacity and designed specifically for hoisting  
49 duty shall be mounted on the trolley; and shall consist of a motor, gear reducer,  
50 hoist drum, sheaves, load block, hook and hoisting rope.  
51 02 An electric brake and mechanical load brake or high ratio worm drive shall be  
52 supplied on the hoist.  
53 03 The electric brake shall be of suitable size to promptly stop the motor rotation  
54 in either direction and hold the load.  
55 04 The mechanical load brake shall be a Weston friction disc type and be capable  
56 of holding and controlling the lowering speed of the load under all conditions.

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- 05 Precision cut, full depth teeth, heat treated forged steel gears shall be used in the gear reducer. These gears shall be provided with oil bath lubrication and enclosed in a drip-proof case.
  - 06 The hoist drum and sheaves shall be of large diameter to permit maximum rope life.
    - a. The drum diameter shall be at least 20 times the rope diameter and shall be grooved to provide for the entire lift without overlapping the rope.
    - b. With the hook in its lowest position, at least two turns shall remain on the drum. The drum flanges shall be guarded so that the rope cannot wedge between the drum and the hoist frame.
  - 07 A paddle or weight operated type upper final limit switch shall be provided to protect against hoisting beyond safe limits of travel. The switch system must be designed in such a manner that the switch operator mechanism cannot be over-traveled and allow the switch to become inoperative.
  - 08 A loading limit device shall be provided to prevent overstressing the system.
    - a. This device shall reenergize the hoist motor and immobilize the up-circuit when an overcapacity lift is attempted.
    - b. This switch must be set to overcome dynamic loading conditions but not exceed 125% rated capacity.
  - 09 Geared upper and lower limit switches shall be furnished to restrict motion beyond the normal operating travel. These switch contacts shall be connected in the respective motor control circuits.
  - 10 The hoisting rope shall be improved plow steel, of suitable diameter, with a factor of safety of at least five. Connection to the drum shall be made adequately and shall be easily detachable for replacement.
  - 11 The load block shall be of the enclosed type and equipped with a swivel type safety latch hook.

29 **2.4 MOTORS**

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- A. Motors shall be the standard type supplied by the hoist, trolley and crane component manufacturer.
  - B. All motors shall be rated for either hoist, trolley or bridge duty, totally enclosed, induction type, per NEMA MG-1.
    - 01 They shall be 460 volts, three-phase, and rated for 30 minute operation, Class "F" insulation under full load with a temperature rise not to exceed 80°C above an ambient temperature of 40°C.
    - 02 Service factor: 1.0.
  - C. Current Conductors: Provide retractable insulated cable for power system. Power system mounted to column.

44 **2.5 CONTROL STATION**

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- A. A pendant type pushbutton station shall be provided to control the motions of the bridge, trolley, and hoist.
    - 01 Hoist: 2 speed.
    - 02 Bridge and Trolley: Variable Frequency.
  - B. This station shall consist of buttons having the following marking:
    - 01 Bridge Forward Marked North, East.
    - 02 Bridge Reverse Marked South, West.
    - 03 Trolley Forward Marked East, North.
    - 04 Trolley Reverse Marked West, South.
    - 05 Hoist Up Marked "Up".



- 1                   06       Hoist Down   Marked “Down”.
- 2                   07       Start       Marked “Start”.
- 3                   08       Stop       Marked “Stop”.
- 4                   09       Stop Button to have red mushroom head.
- 5                   10       Where two speed control is specified, fast / slow buttons shall be incorporated
- 6                               into the above arrangement.
- 7
- 8                   C.       The pushbutton station shall be suspended on a bonded strain cable, from a festooned
- 9                               track mounted on the bridge, to a position 4”-0” above the operating floor level from the
- 10                              bottom of the station.
- 11                   01       It shall be possible to move the station along the bridge span independent of the
- 12                              trolley.
- 13
- 14                   D.       The pushbutton enclosure shall be of lightweight construction in accordance with
- 15                              Vendor’s standard.
- 16
- 17                   E.       The pushbutton station shall consist of lightweight enclosure and a cover with button
- 18                              guards.
- 19
- 20                   F.       Travel Limit Switches:
- 21                   01       Limit switches shall be provided on the bridge and trolley and wired into the
- 22                              respective control circuits to stop the driving motors at the extremes of travel.
- 23                   02       Triggers shall be provided by the crane manufacturer.
- 24

25   **2.6   CRANE CONTROL**

- 26
- 27                   A.       Speed Control shall be provided for all travel and hoisting motions as outlined in
- 28                              paragraph Operating Conditions – Type of Control above.
- 29
- 30                   B.       All single or two speed motions shall be controlled by across-the-line, reversing type
- 31                              motor starters, with an electronic bridge and trolley soft start.
- 32
- 33                   C.       Variable Speed:
- 34                   01       Variable speed motions shall be controlled by a variable frequency drive, as
- 35                              specifically provided for bridge crane systems by either Power Electronics or
- 36                              Magnetek, with programmable speeds, acceleration and deceleration. Do not
- 37                              substitute a non-crane/hoist VFD.
- 38                   02       The control circuit voltage shall not exceed 120 volts.
- 39                              a.       This voltage shall be supplied from a dry type transformer of proper
- 40                              capacity.
- 41                              b.       The primary leads of this transformer shall be connected across the
- 42                              “L1” and “L2” lines of power service.
- 43                              c.       The X2 line on the transformer secondary shall be grounded and
- 44                              adequate fuse protection supplied in the underground X1 line.
- 45                   03       Motor thermal overload protection shall be furnished by “Klix-ons” embedded
- 46                              in the motor windings.
- 47                   04       A main line disconnect switch and magnetic contactor shall be furnished. The
- 48                              latter shall be energized from the pendant pushbutton station. Momentary
- 49                              pressure on the emergency stop pushbutton shall de-energize this contactor.
- 50                   05       Branch circuit (fuse) protection shall be furnished for each motor function.
- 51

52   **2.7   ELECTRICAL WIRING**

- 53
- 54                   A.       The complete electrical installation shall be made in accordance with the National
- 55                              Electric Code requirements and the conditions outlined in Operating Conditions above.
- 56

- 1 B. All electrical equipment shall be mounted in NEMA Type 3.4.7.9 enclosures.  
2  
3 C. All wiring connections within the electrical control enclosures shall be made with 600-  
4 volt, 90 C machine tool wire.  
5 01 Wiring connections between control enclosures and other electrical devices  
6 shall be made with 600-volt conductors and run in rigid conduit.  
7 02 Flexible metal conduit may be used to devices requiring position adjustment or  
8 run less than three feet.  
9 03 All wiring connections to electrical equipment in control enclosures shall be  
10 terminated on terminal strips with lugs or spades and properly identified.  
11 04 Open trays or unguarded wire conductors with zip tied wire bundles are not  
12 permitted.  
13  
14 D. Conduits shall be terminated at all enclosures and boxes in drilled holes or knockouts.  
15 01 Conduits one inch and smaller shall be fastened to the enclosure by the use of  
16 dished type lock nuts with trailing knife edge.  
17 02 Conduits, ¼ inch and larger, shall be terminated in a threaded hub or an  
18 Appleton “HUB” fitting inserted in a drilled hole knockout.  
19 03 Insulated bushings shall be furnished on all conduit terminations.  
20 04 Threaded conduit fitting shall be used for all other connections.  
21  
22

### 23 **PART 3 - EXECUTION**

#### 24 **3.1 PREPARATION**

- 25  
26  
27 A. Crane manufacturer will be provided structural steel and electrical submittals for review  
28 and comment prior to submittals being forwarded to Architect’s review and being  
29 returned to submitter. Contractor shall address all comments furnished by the crane  
30 manufacturer.  
31  
32 B. Contractor shall coordinate all trades as required for the proper installation of the bridge  
33 crane and interface with structural and electrical work.  
34  
35 C. Crane installer shall thoroughly inspect all structural steel installation of runway beams  
36 prior to start of installation.  
37 01 Notify Contractor of any issues and / or discrepancies preventing the correct  
38 installation of the bridge crane.  
39 02 Do not proceed until all issues and discrepancies have been fully resolved.  
40  
41 D. Crane installer shall thoroughly inspect all electrical rough-in and interfacing work prior  
42 to start of installation.  
43 01 Notify Contractor of any issues and / or discrepancies preventing the correct  
44 installation of the bridge crane.  
45 02 Do not proceed until all issues and discrepancies have been fully resolved.  
46

#### 47 **3.2 ERECTION**

- 48  
49 A. Erect bridge crane in strict accordance with manufacturer’s instructions and final  
50 reviewed submittals.  
51  
52 B. Coordinate with steel erector for installation of runway rails on top of the runway beams.  
53 Firmly attached runway rails to runway beam, aligned for smooth operation.  
54  
55 C. Coordinate with electrical contractor as required for all final connections.  
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**3.3 TESTING**

- A. Upon completion of installation, thoroughly test all functions of the bridge crane as required to assure proper operation of all components.
- B. Make final adjustments as required.
- C. Touch up paint any components scratched during installation.

**3.4 TRAINING**

- A. Upon completion of installation and testing, coordinate with Owner to provide complete training on the operation and maintenance of the bridge crane.
  - 01 Allow up to three (3) hours for demonstration and training session.
  - 02 Training shall be conducted by a factory / manufacturer representative.
- B. Per spec section 01 78 23 – Operation and Maintenance Manuals, all final, reviewed, accepted O&M manuals must be in possession of the Owner prior to training.

**END OF SECTION**

**SECTION 13 31 23**  
**PRE-ENGINEERED SHADE STRUCTURES**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 – GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. The shade structure contractor shall be responsible for the design, engineering, fabrication, supply, and installation (including foundations). The intent of this specification is to have only one single contractor be responsible for all the above functions.

**1.3 REFERENCES**

- A. Shade Structures must comply with the latest revision of applicable codes and regulations including IBC 2012.
- B. American Society for Testing Materials (ASTM)
- C. American Welding Society: Structural Welding Code AWS D1.1: Symbols for Welding and Nondestructive Testing AWS 2.3.
- D. International Accreditation Services (IAS)
- E. American Institute of Steel Construction (AISC): Specifications for the design, fabrication, and erection of structural steel.

**1.4 SUBMITTALS**

- A. Provide proof of installed reference sites with six structures for similar scope of project and installation that are engineered to IBC 2012 Specifications.
- B. Provide a minimum of 13 fabric samples to demonstrate fabric color range and powder color selections.
- C. Provide proof of all quality assurance items including:
  - 01 A list of at least three reference projects of similar type structures that have been installed in the last 10 years as described below in 2.1 General, Scope.
  - 02 Proof of general liability, professional liability, and umbrella insurance as per section 1.5 D.
  - 03 Proof of a minimum of \$25,000,000 aggregate bonding capacity as per Section 1.5 E.
  - 04 Proof of IAS Certification per Section 1.5 F.
  - 05 Proof of current status as an ISNetworld Member Contractor.
  - 06 Proof of a Corporate Safety Program along with an Injury & Illness Prevention Program.
  - 07 Proof of Corporate Quality Control Manual as per Section 1.5 H

**1.5. QUALITY ASSURANCE**

Fabrication and erection are limited to firms with proven experience in design and construction of fabric shade structures and such firms shall meet the following minimum requirements. No substitutions shall be allowed for the following:

- A. A single shade contractor shall design, engineer, manufacture, and erect the fabric shade structures including the foundations.
- B. All bidders shall have at least 15 years' experience in the design, engineering, manufacturing, and installation of shade structures.
- C. All bidders shall engineer to IBC 2012 requirements with similar scope.

- 1 D. All bidders shall be able to provide proof of a minimum of \$1,000,000 general/public
- 2 liability insurance, \$3,000,000 professional liability (PL) insurance, and an additional
- 3 \$10,000,000 umbrella/excess liability insurance.
- 4 E. All bidders shall be licensed and bonded with a minimum bonding capacity of \$6,000,000
- 5 and aggregate bonding capacity of \$25,000,000.
- 6 F. Steel manufacturer shall be accredited by IAS (International Accreditation Service) for
- 7 Structural Steel Fabrication under UBC 97 & 2000 Section 1701.7 and IBC 2012 Section
- 8 1704.2.2.
- 9 G. Proof of current status as an ISNetworld Member Contractor.
- 10 H. The shade contractor shall have a Corporate Quality Control program and manual
- 11 describing their complete quality assurance program.
- 12 I. All bidders must have an in-house warranty & service department and local office to assist
- 13 in repairs and service calls.

14  
15 **1.7 WARRANTY**

- 16 A. The successful bidder shall provide a 12-month warranty on all labor and materials.
- 17 B. A supplemental warranty from the manufacturer shall be provided for a period of 10 years
- 18 (pro-rated) on fabric and 10 years on the structural integrity of the steel from the date of
- 19 substantial completion.
- 20 C. The warranty shall not deprive the Owner of other rights under the provisions of the
- 21 Contract Documents and will be in addition to and run concurrent with other warranties
- 22 made by the Contractor under requirements of the Contract Documents.

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24  
25 **PART 2 – PRODUCTS**

26  
27 **2.1 GENERAL**

- 28
- 29 A. Scope: Provide (1) one Full Cant Hip Single Model #202\_20x14\_KP that is 20' x 14' and
- 30 with a 12' entry height. Spread footings are required unless Architect approved Drilled pier
- 31 footings.
- 32
- 33 B. The structures shall be manufactured by Shade Structures, Inc.dba USA SHADE & Fabric
- 34 Structures, or approved equivalent and include the structural steel frame, fabric roof, steel
- 35 cables, all fasteners, and installation. Project management and foundations will also be
- 36 included.
- 37
- 38 Contact: Shade Structures, Inc.
- 39 Dba USA SHADE & Fabric Structures
- 40 2580 Esters Blvd, Suite 100
- 41 DFW Airport, Texas 75261
- 42 Contact Name: Kendall Purgatorio – Phone: 713-203-1729
- 43 [kpurgatorio@usa-shade.com](mailto:kpurgatorio@usa-shade.com)
- 44
- 45 C. To qualify as an approved equivalent, please submit product documentation, fabric samples
- 46 and all quality assurance criteria as per Section 1.4 at least 10 days prior to bid date.
- 47 Approved equals will be issued per addendum prior to bid date.
- 48 D. The shade structure shall conform to the current adopted version of the International Building
- 49 Code 2012 and local agency additions and amendments.
- 50 E. All shade structures are engineered and designed to meet a minimum of 140 mph wind load
- 51 for steel and 90 mph wind load for fabrics, Exposure C, live load of 5 lbs/sf<sup>2</sup> and a 5 lbs/sft<sup>2</sup>
- 52 snow load. When ASD Steel Design Method is used based on IBC 2012 Section 1605.3.1, the
- 53 Dead + 0.75 of Live + 0.75 of Wind Load cases must be combined. NO EXCEPTIONS.
- 54
- 55 F. Steel:
- 56 01 All steel members of the shade structure shall be designed in strict accordance with the
- 57 requirements of the “American Institute of Steel Construction” (AISC) Specifications and

- 1 the “American Iron and Steel Institute” (AISI) Specifications for Cold Formed Members  
2 and manufactured in a IAS (International Accreditation Service) accredited facility for  
3 Structural Steel Fabrication as per IBC 2012 Section 1704.2.2.
- 4 02 All connections shall have a maximum internal sleeving tolerance of .0625 inches using  
5 high tensile strength steel sections with a minimum sleeve length of 6 inches.
- 6 03 All non-hollow structural steel members shall comply with ASTM A-36. All hollow  
7 structural steel members shall be cold formed, high strength steel and comply with  
8 ASTM A-500, Grade C. All steel plates shall comply with ASTM A-572, Grade 50. All  
9 galvanized steel tubing shall be triple coated for rust protection using an in-line electro-  
10 plating coat process. All galvanized steel tubing shall be internally coated with zinc and  
11 organic coatings to prevent corrosion.
- 12 04 All steel and hardware which is not pre-galvanized shall be hot dipped galvanized in  
13 compliance with ASTM A123/A123M (For Iron and Steel Products) and or ASTM  
14 A153/A153M (For iron and Steel Hardware).
- 15
- 16 G. Welding:
- 17 01 All shop-welded connections of the shade structure shall be designed and performed in  
18 strict accordance with the requirements of the “American Welding Society” (AWS)  
19 Specifications. Structural welds shall be made in compliance with the requirements of the  
20 “Prequalified” welded joints where applicable and by certified welders. No onsite or field  
21 welding shall be permitted.
- 22 02 All full penetration welds shall be continuously inspected by an independent inspection  
23 agency and shall be tested to the requirement of IBC 2012 and local agency additions and  
24 amendments.
- 25 H. Powder Coating:
- 26 01 Galvanized steel tubing preparation prior to powder coating shall be executed in  
27 accordance to solvent cleaning SSPC-SP1. Solvent such as water, mineral spirits, xylol,  
28 toluol, which are to be used to remove foreign matter from the surface. A mechanical  
29 method prior to solvent cleaning prior to surface preparation shall be executed according  
30 to Power Tool Cleaning SSPC-SP3 and utilizing wire brushed abrasive wheels and needle  
31 gun, etc.
- 32 02 Carbon structural steel tubing preparation prior to powder coating shall be executed in  
33 accordance to commercial blast cleaning SSPC-SP6 or NACE #3. A commercial blast  
34 cleaned surface, when viewed without magnification, shall be free of all visible oil,  
35 grease, dirt, mill scale, rust, coating, oxides, corrosion, products and other foreign  
36 material.
- 37 03 Powder coating shall be sufficiently applied, with a minimum three mils thickness and  
38 cured at the recommended temperature to provide proper adhesion and stability to meet  
39 salt spray and adhesion tests as defined by the American Society of Testing Materials.
- 40 04 Powder used in the powder coat process shall have the following characteristics:
- 41 a. Specific Gravity: 1.77 +/- 0.05 g/cm<sup>3</sup>
- 42 b. Coverage at 1.0 mils: 109sq.ft/lb/mil
- 43 c. Storage: 80° F
- 44 d. Interpron 800 HR is a series of high durability TGIC powder coatings designed  
45 for exterior exposure. Tested against the most severe specifications, Interpron  
46 800 HR gives significantly improved gloss retention and resistance to color  
47 change.
- 48 e. Rust Protection Powder Under Coat Primer will be required on all structures in  
49 close proximity to water or chemicals. POWDURA® Epoxy Powder Coating  
50 Z.R. Primer shall be applied in accordance with the manufacturers’  
51 specifications. Primer should be fused only and then top coated with the selected  
52 powder coat to ensure proper intercoat adhesion.
- 53
- 54 I. Tension Cable: Steel cable is determined based on calculated engineering loads.
- 55 01 For light and medium loads, ¼” (nominal) galvanized 7 x 19 strand cable to be used.
- 56 02 For heavy loads, 3/8” (nominal) galvanized 7 x 19 cable to be used.
- 57

1 J. Fabric Roof Systems

2 01 UV shade fabric is made of UV stabilized Shadesure® cloth as manufactured by  
3 MultiKnit Ltd and made of a UV stabilized high-density polyethylene mesh. Mesh shall  
4 be raschel knitted with monofilament and tape yarn filler to ensure that material will not  
5 unravel if cut. Panels to be 10ft. wide.

6 02 Fabric Properties:

- 7 a. Life Expectancy: A minimum of 8 years continuous exposure to the sun  
8 b. Fading: Minimum fading after 5 years (3 years for red)  
9 c. Fabric Mass: 2.43-2.58 oz/sqft (190-200g/sm)  
10 d. Fabric Width: 9.8425 (3m)  
11 e. Roll Length: 164.04 (50m)  
12 f. Roll Dimensions: 62.99"x16.5354" (160 cm x 42 cm)  
13 g. Roll Weight: +/- 66 lbs (+/-30 kg)  
14 h. Minimum Temperature: -13°F (-25° C)  
15 i. Maximum Temperature: +176°F (80° C)

16 03 Stitching & Thread:

- 17 a. All sewing threads are to be double stitched.  
18 b. Thread shall be GORE Tenara Sewing Thread manufactured from 100% expanded  
19 PTFE (Teflon); mildew resistant exterior approved thread. Thread shall meet or  
20 exceed the following:  
21 1. Flexible temperature range  
22 2. Very low shrinkage factor  
23 3. Extremely high strength, durable in outdoor climates  
24 4. Resists flex and abrasion of fabric  
25 5. Unaffected by cleaning agents; acid rain, mildew, salt water and rot  
26 resistant, unaffected by most industrial pollutants  
27 6. Treated for prolonged exposure to the sun

28  
29 02.2 SHIPPING AND HANDLING

- 30  
31 A. All steel surfaces touched by tie down straps are to be padded before final clinching. This can  
32 be accomplished by using carpet pads or factory manufactured padding.  
33 B. All dunnage must be padded before painted products are set in place. Smaller and loose pieces  
34 must be padded and totally separate from paint padding.  
35 C. Unloading: Lift forks to be covered with padding. All dunnage must be padded vertically and  
36 horizontally to prevent damage to painted surfaces. When unloading, take care to prevent  
37 tools and other hard surface items from making contact.  
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41 **PART 3 – EXECUTION**

42  
43 03.1 INSTALLATION

- 44 A. Installation of shade structures shall be performed by manufacturer or manufacturer-approved  
45 contractor, which shall be bonded and holding a current contractor's license with the State of  
46 Texas Contractors State License Board. All installation personnel must have experience in the  
47 erection of tensioned fabric structures.  
48 B. The contractor installing the structure shall comply with manufactures instructions for  
49 assembly, installation, and erection per approved drawings.  
50 C. Concrete:  
51 1. Unless noted otherwise for footing and piers by General Contractor's Engineer, concrete  
52 specification for footings, piers, slabs, curbs and walkways shall meet a minimum 2,500  
53 psi at 28-day strength.  
54 2. Concrete work is executed in strict accordance with the latest American Concrete  
55 Institute Building Code (ACI 318-99).  
56  
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- 3. Slump 4” maximum.
- 4. Whenever daily ambient temperatures are below 80 degrees Fahrenheit, the contractor may have mix accelerators and hot water added at the batch plant.
  - a. Temperature range between 75-80 degrees, 1% accelerator High Early (non-calcium)
  - b. Temperature range between 70-75 degrees, 2% accelerator High Early (non-calcium)
  - c. Temperature range below 70 degrees, 3% accelerator High Early (non-calcium)
- 5. The contractor shall not pour any concrete when daily ambient temperature is below 55 degrees Fahrenheit.

<b>Temperature Range</b>	<b>% Accelerator</b>	<b>Type Accelerator</b>
75-80 degrees	1%	High Early (non-calcium)
70-75 degrees	2%	High Early (non-calcium)
Below 70 degrees	3%	High Early (non-calcium)

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D. Foundations:

- 1. All Anchor Bolts set in new concrete shall be ASTM F-1554 GR 55
- 2. All Anchor Bolts shall be Hot Dipped Galvanized
- 3. Pier Footings:  
Minimum footing size shall be 24” diameter x 8’ depth and placed in accordance with/ and conform to manufacturers engineered specifications and drawings.

**END OF SECTION**



1 **SECTION 13 34 16.16**

2  
3 **ALUMINUM BLEACHERS**

4  
5 CONDITIONS OF THE CONTRACT, SECTIONS DIVISION 00 AND 01 APPLY TO THIS SECTION.

6  
7 **PART 1 - GENERAL**

8  
9 **1.1 DESCRIPTION**

- 10  
11 A. Scope of Work:  
12 01 Steel framework.  
13 02 Aluminum seats, foot planks and riser planks.  
14 03 Aluminum railings, steps and accessory items.  
15  
16 B. Related Work:  
17 01 Section 32 13 13 Concrete Paving and Flatwork  
18

19 **1.2 SUBMITTALS**

- 20  
21 A. Provide all submittals in accordance with Section 01 33 00 – Submittal Procedure.  
22  
23 B. Submit manufacturer's printed specifications and shop drawings to Architect for approval  
24 within four weeks of award of contract.  
25

26 **PART 2 - PRODUCTS**

27  
28 **2.1 MANUFACTURERS**

- 29  
30 A. Southern Bleacher Co. of Graham, Texas.  
31  
32 B. Sturdisteel Co. of Waco, Texas, Type TE.  
33  
34 C. Alenco, Bryan, Texas.  
35  
36 D. Safeway Steel Products.  
37  
38 E. Miracle Recreation Equipment Co.  
39

40 **2.2 MATERIALS**

- 41  
42 A. Structural Steel: ASTM A36, hot-dip galvanized to ASTM A123.  
43  
44 B. Aluminum: Extruded aluminum 6063-T6 alloy, nominal wall thickness 0.078 inch.  
45 01 Seat Planks: Clear anodized, 204R1 finish. 2 x 10 fluted non-skid surface with  
46 2 internal legs for support, minimum wall thickness, .085".  
47 02 Floor, riser, steps and aisle extensions: Same finish as seat plank except mill  
48 finish.  
49 a. Floor planks - two 2 x 10.  
50 b. Riser plank - one 2 x 8.  
51 c. Walkway - five 2 x 10 and one 2 x 6 toe board.  
52 d. Exit steps - 2 x 12's, one required per unit.  
53 e. Aisle extensions - one 2 x 6.  
54 f. Wheelchair platform - per ADA requirements; one required per unit.  
55 03 End caps and sleeve inserts, matching clear anodized finish and caps, one-piece  
56 channel design, attached with drive rivets.

- 1  
2 C. Plank Hardware: Bolts, nuts, etc; hot-dipped galvanized steel or cadmium plated.  
3  
4 D. Hold Down Clips: 4 way adjustable, aluminum alloy 6063-T6.  
5  
6 E. Guard railing: Anodized aluminum pipe with end plugs and corner elbow.  
7 01 Provide four (4) line railing at the back and both sides (ends) and two (2) line at  
8 the front.  
9  
10 F. Mudsills: All stands shall have 2" x 6" treated mudsills at every point where steel would  
11 otherwise be in contact with concrete, drilled for field bolting.  
12

### 13 2.3 DESIGN CRITERIA

- 14  
15 A. Design Loads:  
16 01 Live Load: 100 psf gross horizontal projection.  
17 02 Lateral Sway Load: 24 lbs. lin. ft. seat plank.  
18 03 Perpendicular Sway Load: 10 lbs. lin. ft. seat plank.  
19 04 Wind Load: 143 mph (3 second gusts)  
20 05 Live load of Seat and Tread Plank: 120 lbs. lin. ft.  
21 06 Guard railings shall be capable of resisting 50 lb/lin. ft. horizontal load and 100  
22 lb./lin. ft. vertical load applied to top rail without causing permanent  
23 deformation.  
24 *NOTE:* Support frame work shall not exceed 6'-0" on centers and be connected by cross  
25 bracing.  
26

### 27 2.4 DESCRIPTION

- 28  
29 A. Bleachers:  
30 01 Provide one (1) units, five (5) rows each, portable type as manufactured by  
31 Southern Bleacher Company.  
32 02 Vertical rise per row - 8".  
33 03 Horizontal depth per row - 24".  
34 04 Height of seats above footrest - 17".  
35 05 Length of stand - 15'-0"± to provide seating for approximately 50 people per  
36 unit.  
37 06 Accessible ground level seating area meeting ADA and local codes.  
38

## 39 PART 3 - EXECUTION

### 40 3.1 INSTALLATION

- 41  
42  
43 A. Install bleacher units on concrete slab as shown.  
44  
45 B. Anchor framing to slab on 2x6 treated continuous wood mudsills and shim as required  
46 for proper rigid support.  
47  
48 C. Seat and floor plank seams will have twin sleeve inserts, 6" minimum penetration and  
49 riveted at one end only for expansion.  
50  
51 D. End caps, channel type riveted to underside of plank at all open ends.  
52  
53 E. Connect seat and foot planks to the support structure by four-way adjustable clips using  
54 5/16" diameter bolts.  
55  
56 F. Install guardrails on all sides of bleachers, front walkway and steps.

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- G. Perform work of this Section with competent mechanics skilled in bleacher work and under the direct control and supervision of bleacher manufacturer's representative.
- H. Install bleachers in strict accordance with approved shop drawings and details.
- I. Where erection is complete, the portion of site shall be cleared and bleachers and cleaned of all scrap and trash.
- J. Weld steel bolts to nuts at benches and footboard hold-down clips.

**END OF SECTION**

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**SECTION 13 34 19**

**METAL BUILDING SYSTEMS**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work: Work under this section of the specifications shall include all labor, materials, equipment and appurtenances for the installation of complete pre-engineered building(s) as indicated on the drawings and herein specified.
- 01 To include all structural components and parts of the building, including, but not limited to primary structural steel framing, purlins, girts, mezzanine framing including columns, steel decking, angle screeds, necessary bracing, struts, wall and roof openings, crane beams and connecting members.
  - 02 All main structural steel, girts, purlins, supports, etc.( all components) shall be hot dip galvanized after fabrication. Bolted connections are the preferred method once galvanized to avoid corrosion.
  - 03 To include all metal roof and wall panels, flashing curbs, gutters and downspouts, integrated wall and roof insulation, all with necessary closures and fasteners.
  - 04 Furnish and install overhead trolley crane and design structural steel components for crane rail and supplementary support members.
  - 05 Coordination of this Section of the Specifications with all other trades is mandatory, so that all phases of work will be properly coordinated and interfaced with the metal building systems.
  - 06 Interfacing work that may be provided by others includes, but is not limited to cementitious wall panels, doors and frames, sectional overhead doors, louvers, flood vents, and mechanical, electrical and plumbing work. Coordinate as required.
- B. Related Work:
- 01 Section 05 31 00 – Steel Decking
  - 02 Section 05 51 00 – Metal Stairs.
  - 03 Section 05 52 13 – Pipe and Tube Railing
  - 04 Section 07 21 00 – Thermal Insulation
  - 05 Section 07 11 13 – Bituminous Dampproofing
  - 06 Section 08 11 13 – Fiberglass Doors and Frames.
  - 07 Section 08 36 13 – Sectional Overhead Doors
  - 08 Section 08 71 00 – Door Hardware
  - 09 Section 08 90 00 – Louvers and Vents

**1.2 SUBMITTALS**

- A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.
- C. Shop Drawings: Submit complete shop drawings consisting of design, fabrication and erection / installation of proposed assemblies.
- 01 Show profiles, sizes, spacing and locations of assembled components.

- 1                   02       Show details of shop fabrications, connections and details.  
2                   03       Show details of field fabrications, connections and details.  
3                   04       Provide calculations demonstrating compliance with wind load and other  
4                               requirements.  
5                   05       Shop drawings shall be sealed and signed by a Texas registered engineer.  
6  
7           D.       Installation Instructions: Submit manufacturer’s complete installation instructions,  
8                   including fastening, for all products and / or assemblies proposed to be furnished.  
9                   01       Installation details submitted for review shall be specific to the work of this  
10                               contract and accurately depict interface within the assembly(s) indicated on the  
11                               Drawings.  
12                   02       Generic details that do not depict actual conditions shall not be acceptable.  
13  
14           E.       Maintenance Instructions: Submit manufacturer’s complete maintenance instructions  
15                   and recommendations for all products and / or assemblies proposed to be furnished.  
16                   01       Include recommended cleaning products and instructions for use.  
17                   02       Where applicable, provide recommended maintenance schedules and  
18                               procedures.  
19  
20           F.       Color / Finish Samples:  
21                   01       Provide two (2) samples of each finish for selection by the Architect.  
22                   02       Finish samples shall be provided of / on actual material; paper or digital  
23                               samples shall not be accepted.  
24                   03       Minimum size shall be 3” x 3” but must be large enough to convey attributes  
25                               of the proposed product.  
26  
27           G.       Mock-Up Panel: Mock-up panel shall be fabricated and shall be 8' long x 6' high panel  
28                   showing selected panel color range and texture, bonding, mortar color, joint shape, and  
29                   quality workmanship.  
30                   01       Panel shall be “L” shaped fastened to the actual clip system over metal siding  
31                               substrate and including girt framing to indicate the actual wall conditions.  
32                               Support of girt framing as needed.  
33                   02       See Section 07 44 63 for additional materials not by this subcontractor.  
34                   03       Once accepted by the Architect, the sample panel shall be the standard by  
35                               which installed panels shall be judged.  
36                   04       Sample wall shall remain in place until all exterior wall work is complete.  
37  
38

39   **1.3    REFERENCES**

- 40  
41           H.       ASTM International:  
42                   01       ASTM A 36 – Standard Specification for Carbon Structural Steel.  
43                   02       ASTM A 48 – Specification for Gray Iron Castings.  
44                   03       ASTM A 123 – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron  
45                               and Steel Products.  
46                   04       ASTM A 307 – Specification for Carbon Steel Bolts and Studs, 60 000 psi  
47                               Tensile Strength.  
48                   05       ASTM A 325 – Standard Specification for Structural Bolts, Steel, Heat  
49                               Treated, 120/105 KSI Minimum Tensile Strength.  
50                   06       ASTM A 354 – Standard Specification for Quenched and Tempered Alloy  
51                               Steel Bolts, Studs, and Other Externally Threaded Fasteners.  
52                   07       ASTM A 475 – Specification for Zinc-Coated Steel Wire Strand.  
53                   08       ASTM A 490 – Specification for Structural Bolts, Alloy Steel, Heat Treated,  
54                               150 KSI Minimum Tensile Strength.  
55                   09       ASTM A 500 – Specification for Cold-Formed Welded and Seamless Carbon  
56                               Steel Structural Tubing in Rounds and Shapes.

1	10	ASTM A 529 – Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
2		
3	11	ASTM A 563 – Specification for Carbon and Alloy Steel Nuts.
4	12	ASTM A 572 – Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
5		
6	13	ASTM A 653 / A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
7		
8		
9	14	ASTM A 792 / A 792M – Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
10		
11	15	ASTM A 992 – Standard Specification for Structural Steel Shapes.
12	16	ASTM A 1011 – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
13		
14		
15	17	ASTM A 1039 – Specification for Steel, Sheet, Hot Rolled, Carbon, Commercial, Structural, and High-Strength Low-Alloy, Produced by Twin-Roll Casting Process.
16		
17		
18	18	ASTM E 96 / E 96M – Standard Test Methods for Water Vapor Transmission of Materials.
19		
20	19	ASTM E 108—Spread-of Flame Testing: Class 1A Rating.
21	20	ASTM E 283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
22		
23		
24	21	ASTM E 331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
25		
26		
27	22	ASTM E 1592 – Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
28		
29	23	ASTM E 1646 – Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
30		
31	24	ASTM E 1680 – Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems.
32		
33	25	ASTM E 2140 – Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head.
34		
35	26	ASTM F 436 – Specification for Hardened Steel Washers.
36	27	ASTM F 1145 – Specification for Turnbuckles, Swaged, Welded, Forged.
37	28	ASTM F 1554 – Specification for Anchor Bolts, Steel, 36, 55, and 105-KSI Yield Strength.
38		
39		
40	I.	American Institute of Steel Construction (AISC):
41	01	AISC Specification for Structural Steel Buildings.
42	02	AISC Serviceability Design Considerations for Low-Rise Buildings.
43		
44	J.	American Iron and Steel Institute (AISI):
45	01	AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
46		
47		
48	K.	American Welding Society (AWS):
49	01	AWS D1.1 / D1.1M – Structural Welding Code – Steel.
50	02	AWS D1.3 / D1.3M – Structural Welding Code – Sheet Steel.
51		
52	L.	Association for Iron & Steel Technology (AISE):
53	01	AISE 13 – Specifications for Design and Construction of Mill Buildings.
54		
55	M.	Metal Building Manufacturers Association (MBMA):
56	01	MBMA Metal Building Systems Manual.

1  
2 **1.4 DESIGN - GENERAL**  
3

- 4 A. The building design incorporates the general design parameters of the metal building as  
5 it relates to the building architecture. These parameters include:  
6 01 Centerline of rigid frames.  
7 02 Locations of endwall columns.  
8 03 Eave height(s).  
9 04 Cantilever and supported overhangs.  
10 05 Wind bracing.  
11 06 Opening types, sizes and locations.  
12  
13 B. Reasonable considerations have been incorporated in the building design to allow for  
14 the design of the metal building by the manufacturer to conform to, adapt to and fit  
15 within the building architecture as indicated on the Drawings.  
16  
17 C. Special areas of consideration include wind frames / bents, bridging, angle bracing and  
18 rod bracing.  
19  
20 D. Deviations in the architecture of the building, as shown, in order to accommodate the  
21 metal building system design shall not be considered.  
22 01 The manufacturer shall design the building as required to conform to, adapt to  
23 and fit within the building architecture as indicated on the Drawings.  
24  
25 E. The general building design as indicated on the Drawings is based on use of 8 inch roof  
26 purlins, eave struts and wall girts.  
27 01 The metal building design shall incorporate 8 inch members, increasing the  
28 gauge of the member(s) where required to meet design loads.  
29  
30 F. The metal building design shall accommodate collateral loads that are suspended from  
31 the roof structure. The minimum collateral loads shall be based on 3 PSF; however,  
32 review the Drawings as required to account for actual collateral loads imposed by other  
33 trades.  
34

35 **1.5 BUILDING NOMENCLATURE**  
36

- 37 A. Metal Building System: A building system that will employ the following as indicated  
38 on the Drawings:  
39 01 Either continuous or simple-span 'Z' or 'C'-shaped cold-formed purlins or  
40 open-web steel joists for support of the roof cladding.  
41 02 Simple-span 'Z' or 'C'-shaped cold-formed purlins or open-web steel joists for  
42 support of the steel wall cladding.  
43 03 Three-plate, built-up rigid space frames and/or cold-formed 'C' or hot-rolled I-  
44 shaped post-and-beam framing to support the roof and wall secondary  
45 members.  
46 04 All systems (cladding, roof and wall secondary, lateral primary framing, and  
47 longitudinal bracing) work together to provide resistance to vertical and lateral  
48 loading demands.  
49  
50 B. Gable Symmetrical: A continuous frame building with the ridge in the center of the  
51 building, consisting of tapered or straight columns and tapered or straight rafters.  
52 01 The sidewall girts may be continuous (by-passing the columns) or simple span  
53 (inset in the column line).  
54 02 The rafters may or may not have interior columns.  
55

- 1 C. Gable Asymmetrical: A continuous frame building with an off-center ridge, consisting  
2 of tapered or straight columns and tapered or straight rafters.  
3 01 The eave height and roof slope may differ on each side of the ridge.  
4 02 The sidewall girts may be continuous (by-passing the columns) or simple span  
5 (flush in the column line). The rafters may or may not have interior columns.  
6  
7 D. Single-Slope: A continuous frame building which does not contain a ridge but consists  
8 of one continuous slope from side to side.  
9 01 The building consists of straight or tapered columns and tapered or straight  
10 rafters.  
11 02 The sidewall girts may be continuous (by-passing the columns) or simple span  
12 (flush in the column line).  
13 03 The rafters may or may not have interior columns.  
14  
15 E. Lean-To (LTO): A building extension, which does not contain a ridge, but consists of  
16 one continuous slope from side to side. These units usually have the same roof slope  
17 and girt design as the building to which they are attached and supported by.  
18  
19 F. Roof Slope: Pitch expressed as inches of rise for each 12" of horizontal run.  
20  
21 G. Building Width: Measured from outside to outside of sidewall secondary structural  
22 member (girt).  
23  
24 H. Building Eave Height: A nominal dimension measured from the finished floor to top  
25 flange of eave strut.  
26  
27 I. Building Length: Measured from outside to outside of endwall secondary structural  
28 member.  
29  
30 J. Auxiliary Loads: Dynamic loads induced by cranes, conveyors, or other material  
31 handling systems.  
32  
33 K. Collateral Loads: The weight of any non-moving equipment or material, such as  
34 ceilings, electrical or mechanical equipment, sprinkler systems, plumbing, or ceilings.  
35  
36 L. Dead Load: The actual weight of the building system (as provided by the metal building  
37 supplier) supported by a given member.  
38  
39 M. Floor Live Loads: Loads induced on a floor system by occupants of a building and their  
40 furniture, equipment, etc.  
41  
42 N. Roof Live Loads: Loads produced by maintenance activities, rain, erection activities,  
43 and other movable or moving loads but not including wind, snow, seismic, crane, or  
44 dead loads.  
45  
46 O. Roof Snow Loads: Gravity load induced by the weight of snow or ice on the roof,  
47 assumed to act on the horizontal projection of the roof.  
48  
49 P. Seismic Loads: Loads acting in any direction on a structural system due to the action of  
50 an earthquake.  
51  
52 Q. Wind Loads: The loads on a structure induced by the forces of wind blowing from any  
53 horizontal direction acting on all vertical, horizontal and sloped surfaces of the  
54 building.  
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56 **1.6 DESIGN REQUIREMENTS**



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- A. General
  - 01 The building manufacturer will use standards, specifications, recommendations, findings and/or interpretations of professionally-recognized groups such as AISC, AISI, AWS, ASTM, CSA, CWB, MBMA, Federal Specifications, and unpublished research by MBMA as the basis for establishing design, drafting, fabrication, and quality criteria, practices, and tolerances.
  - 02 The Manufacturer's design, drafting, fabrication and quality criteria, practices, and tolerances shall govern, unless specifically countermanded by the contract documents.
  - 03 Design structural mill sections and built-up plate sections in accordance with code-appropriate edition of AISC's "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", ANSI/AISC 360 ASD method.
  - 04 Cold-Formed steel structural members and panels will generally be designed in accordance with "Specifications for the Design of Cold-Formed Steel Structural Members", 2007 Edition, ANSI/AISI S-100-07.
  - 05 Design weldments per the following:
    - a. Structural Welding: Design per AWS D1.1, "Structural Welding Code – Steel", Latest Edition.
    - b. Cold-Formed Welding: Design per AWS D1.3, "Structural Welding Code – Sheet Steel", Latest Edition.
- B. Design Code: Structural design for the building structural system shall be provided by the metal building system manufacturer for the following design criteria:
  - 01 International Building Code (IBC) 2018.
  - 02 Building Occupancy Category: Low Hazard Storage, Group S-2.
  - 03 The greater of the two applicable wind requirements of IBC 2018 and the Texas Windstorm Adopted Wind Speeds shall govern.
- C. Design Loads:
  - 01 Dead Load – Weight of the building system as determined by manufacturer. See structural drawings for weights.
  - 02 Mezzanine Floor Load.
    - a. Live Load – 125 PSF.
    - b. Dead Load (Weight of Material as determined by the PEMB manufacturer.
    - c. Collateral Load – 4 PSF
  - 03 Roof Live Load – 20 PSF.
  - 04 Collateral Load – 4 PSF.
  - 05 Wind Load:
    - a. Wind Speed – 152 mph
    - b. Wind Exposure – C
    - c. Risk Category - III
  - 06 Wind Load: Metal building design shall comply with all requirements of Texas Department of Insurance; and where required, Texas Windstorm Insurance Association as follows:
    - a. TWIA Inland I Zone
  - 07 Seismic Load: NA
  - 08 Auxiliary Loads: Auxiliary loads shall include dynamic loads, such as cranes and material handling systems, and will be defined in the Contract Documents.
  - 09 Crane Loads:
    - a. Crane loads shall be a function of the Service Class as defined by the governing code and Crane Manufacturers Association of America (CMAA) and the rated tonnage, A- Standby or Infrequent Service.
    - b. Crane capacity: 2 ton Refer to Section

- 1 c. Crane loads will be obtained from the crane manufacturer and
- 2 supplied by the Architect to the metal building system manufacturer
- 3 at the time of bid.
- 4 d. Building structure shall be designed for the crane loads in accordance
- 5 with the governing code.
- 6
- 7 D. Roof canopies and roof extensions shall be designed for an uplift wind load of twice the
- 8 basic wind pressure required for the building.
- 9
- 10 E. In the design of the wall components, including girts and wall panels, the design wind
- 11 pressure acting inward shall be 30 PSF minimum. Outward design wind pressures shall
- 12 be 1.0 / 1.3 of these values.
- 13
- 14 F. Design Load Combinations - DL + LL, DL + WL.
- 15

16 **PART 2 - PRODUCTS**

17

18 **2.1 PRE-ENGINEERED BUILDING MANUFACTURERS**

- 19
- 20 A. Design of metal building systems is based on Whirlwind Steel Buildings.
- 21
- 22 B. Acceptable Manufacturers: The following manufacturers are acceptable to provide
- 23 products of this section, provide all proposed products meet or exceed the specified
- 24 requirements.
- 25 01 Whirlwind Steel Buildings (basis of design)
- 26 02 Mid-West Steel Building Company
- 27 03 United Structures of America, Inc.
- 28 04 American Steel Building.
- 29 05 Alliance Steel Buildings
- 30 06 Butler Manufacturing Company
- 31 07 Kirby Building Systems
- 32 08 Metallic Building Company
- 33 09 Red Dot Building Systems
- 34

35 **2.2 MATERIALS – GENERAL**

- 36
- 37 A. General:
- 38 01 All framing members shall be shop-fabricated for bolted field assembly.
- 39 02 Primary structural framing shall include the sloping rafters and columns (rigid
- 40 frames), endwall columns, and wind bracing.
- 41 03 Secondary structural framing shall include the purlins, girts, eave struts, flange
- 42 bracing, sill support, slips, and other miscellaneous structural parts.
- 43 04 Unless otherwise specified, the minimum thickness of framing members shall
- 44 be as follows:
- 45 a. Cold-formed secondary framing members 16 gauge
- 46 b. Webs of welded built-up members 1/4"
- 47 c. Flanges of welded built-up members 1/4"
- 48 d. Bracing rods 1/2" diameter
- 49 05 Cold-formed sections shall be manufactured by precision roll or brake
- 50 forming. All dimensions shall be true, and the formed member shall be free of
- 51 fluting, buckling or waviness.
- 52 06 All shop connections shall be by welding in accordance with the AWS
- 53 Structural Welding Code D1.1-72. Welders and welding operators shall have
- 54 been previously qualified as provided in the code. All flange to web welds
- 55 shall be continuous submerged or the shielded arc process. Butt welds in
- 56 flange and web plates shall be full penetration.

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- 07 All field connections shall be field bolted with ASTM A325 (.0003 Bronze Zinc Plated) as shown on the Drawings. A325 bolts shall be tightened / torque as stipulated by the registered engineer responsible for the design.
- 08 Where required, connections in secondary members shall be made with special 1/2" oval head, with hex nuts. The faying surfaces of all bolted connections shall be smooth and free from burrs or distortions.
- 09 All framing members shall carry an easily visible identifying mark, either stamped, stenciled or painted.

B. Primary Framing Steel:

- 01 Steel for hot rolled shapes must conform to the requirements of ASTM Specifications A-36, A-572 or A-992, with minimum yield of 36 or 50 KSI, respectively.
- 02 Steel for built-up sections must conform to the requirements of ASTM A-1011, A-1018, A-529, A-572 or A-36 as applicable, with minimum yield of 42, 46, 50, or 55 KSI as indicated by the design requirements.
- 03 Round Tube must conform to the requirements of ASTM A-500 Grade B with minimum yield strength of 42 KSI.
- 04 Square and Rectangular Tube must conform to the requirements of ASTM A-500 Grade B with a minimum yield strength of 46 KSI.
- 05 Steel for Cold-Formed Endwall "C" sections must conform to the requirements of ASTM A-1011 or A-1039 Grade 55, or ASTM A-653 Grade 55 with minimum yield strength of 55 KSI.
- 06 X-bracing will conform to ASTM A-36 or ASTM A-529 for rod and angle bracing or ASTM A-475 for cable bracing.

C. Secondary Framing Steel:

- 01 Steel used to form purlins, girts and eave struts must meet the requirements of ASTM A-653 Grade 55 for galvanized material with a minimum yield of 55 KSI.
- 02 Design Thicknesses – Gauge to be determined by design to meet specified loading conditions.

D. All primary and secondary steel framing is to be hot-dipped galvanized after fabrication.

E. Panels:

- 01 Pre-painted Galvalume® and G60 Interior-Side.
- 02 Standing Seam Panels must have 50 percent minimum aluminum-zinc alloy-coating and conform to ASTM A-792 or ASTM A-653 with a minimum yield of 50 KSI.
- 03 Through-fastened panels must have 50 percent minimum aluminum-zinc alloy coating and conform to ASTM A-792 or ASTM A-653 with a minimum yield of 50 KSI.
- 04 Panel Finish:
  - a. PVDF Finish: 70% PVDF paint system with a 35-year finish warranty.

F. Panel Fasteners:

- 01 For Galvalume® and Painted finished roof panels: Long Life Cast Zinc head.
- 02 For wall panels: Coated carbon steel.
- 03 Color of exposed fastener heads to match the wall and roof panel finish.
- 04 Concealed Fasteners: Self-drilling type, of size required.
- 05 Fasteners shall have a Lifetime warranty against rust and discoloration.

G. Flashing and Trim: Match material, finish, and color of adjacent components.

- 1                   01       Provide trim at rakes, including peak and corner assemblies, high and low  
2 eaves with box gutters, corners, bases, framed openings and as required or  
3 specified to provide weathertightness and a finished appearance.  
4  
5           H.       Roof Clips:  
6           01       All clips must have factory-applied mastic and designed so that movement  
7                   between the panel and the clip does not occur.  
8           02       Short or Tall Fixed clips; shall be either 3-1/2 or 4-1/2" in height. Used for  
9                   applications where only a moderate amount of thermal expansion and  
10                  contraction in the roof panel is expected.  
11           03       Short or Tall Sliding clips: shall be either 3-1/2 or 4-1/2" in height and provide  
12                   either 1-7/8" or 3 7/8" of travel for panel thermal expansion and contraction,  
13                   depending on clip choice.  
14  
15           I.       Sealant and Closures:  
16           01       Sidelaps: Factory applied non-skinning Butyl mastic.  
17           02       Endlaps, Eave, Ridge Assembly, and Gable Flashings: Field applied 100%  
18                   solids butyl-based elastomeric tape sealant, furnished in pre-cut lengths.  
19           03       Outside Closures: Closed-cell, plastic or metal.  
20           04       Inside Closures: Closed-cell, plastic or metal.

21  
22 **2.3       PRIMARY FRAMING**

- 23  
24           A.       Rigid Frames: Fabricated as welded built-up "I" sections or hot-rolled sections.  
25                   01       Frame Design: Gable Unsymmetrical.  
26                   02       Frame Design: Single Slope.  
27                   03       Frame Type: Clear-Span.  
28  
29           B.       Rigid Frame Columns:  
30                   01       Tapered  
31  
32           C.       Rigid Frame Rafters:  
33                   01       Tapered.  
34  
35           D.       Endwall Frames / Roof Beams:  
36                   01       Fabricate endwall columns of cold-formed "C" sections, mill-rolled sections,  
37                           or built-up "I" sections depending on design requirements.  
38                   02       Depth or endwall columns shall be 8".  
39                   03       Wall girt framing at endwalls shall be flush framed at endwall columns.  
40  
41           E.       Finish:  
42                   01       Hot-dipped galvanized after fabrication.  
43  
44           F.       Field Bolted Connections: All field bolted connections shall be designed and detailed  
45                   utilizing ASTM A-325 or A-490 depending on design requirement.  
46

47 **2.4       SECONDARY FRAMING**

- 48  
49           A.       Purlins and Girts: Purlins and girts shall be cold-formed "Z" sections with stiffened  
50                   flanges.  
51                   01       Flange stiffeners shall be sized to comply with the requirements of the latest  
52                           edition of AISI and LGSI.  
53                   02       They shall be pre-punched at the factory to provide for field bolting to the  
54                           rigid frames.  
55                   03       They shall be simple or continuous span as required by design. Connection  
56                           bolts will install through the purlin/girt webs, not purlin/girt flanges.

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- B. Purlins (Excluding Open Web Joists): Horizontal structural members which support roof coverings.
  - 01 Depth: To be determined by design: 8", 10" or 12".
  - 02 Maximum Length: To be determined by design.
  - 03 Finish at Interior Members: Red oxide or gray Primer.
  - 04 Finish at Exterior Members: Pre-Coated Galvanized.
  
- C. Girts: Horizontal structural members that support vertical panels.
  - 01 Depth: To be determined by design: 8", 10" or 12".
  - 02 Maximum Length: To be determined by design.
  - 03 Finish at Interior Members: Red oxide or gray Primer.
  - 04 Finish at Exterior Members: Pre-Coated Galvanized.
  
- D. Eave Struts: Unequal flange, cold-formed "C" sections or "Z" purlins.
  - 01 Depth: To be determined by design: 8", 10" or 12".
  - 02 Maximum Length: To be determined by design.
  - 03 Finish at Interior Members: Pre-Coated Galvanized.
  - 04 Finish at Exterior Members: Pre-Coated Galvanized.
  
- E. Base Framing: Base members to which the base of the wall covering may be attached to the perimeter of the slab; secured to the concrete slab with mechanical anchors.
  - 01 Base angle with flashing.
  - 02 Finish at Interior Members: Red oxide or gray Primer.
  - 03 Finish at Exterior Members: Pre-Coated Galvanized.
  
- F. Interior Mezzanine System
  - 01 Open web, parallel chord, simple span load carrying members suitable for the direct support of the mezzanine floor systems utilizing material sizes and yield strengths as required.
  - 02 Open web members shall be fabricated of material that conforms to the material specifications designated by the Steel Joist Institute as acceptable for this product.
  - 03 Structural steel rolled shapes shall conform to ASTM A992 and all angles, bars, channels and plates to conform to ASTM A36.
  - 04 Columns for mezzanine to be square or rectangular tube sections (HSS) conforming to ASTM A500, Grade B, Fy = 46KSI.
  - 05 Bridging with welded connections.
  - 06 Joist attachment: Welded.
  - 07 Decking to be a 3½" composite deck consisting of normal weight concrete, 3000psi minimum and galvanized corrugated composite steel decking complying with ASTM 653, Fy = 40KSI with a Section Modulus as determined by the engineer of the PEMB manufacturer. Headed anchors (Studs) are manufactured from cold drawn wire conforming with ASTM A108, GR 50 with fluxed ends.
  
- G. Wind Bracing:
  - 01 When the wind load is applied in a direction such that it is not resisted by the transverse rigid frames, provision shall be made to adequately transmit all wind forces on the building to the foundation.
  - 02 Provide diagonal roof rods, struts, wind columns, wind beams, etc., such that the forces are carried by truss action.
  - 03 It will be noted that diagonal rod bracing in the walls is not acceptable.
  - 04 Design of the building shall coordinate wind bracing to avoid conflict with doors and other openings through the exterior wall.

1 H. Flange Bracing: The inside flange of all rigid frames shall be braced laterally by angles  
2 connected to the flange and web of the frame and to the web of the purlin or girt so that  
3 the allowable compressive stress is adequate for any combination of loading.  
4

## 5 2.5 ROOF AND WALLS PANELS

6  
7 A. General:

8 01 Typical exterior wall panels shall be fabricated from 26 gauge high-strength  
9 Galvalume conforming to ASTM A792/A792M-AZ50.

10 02 Typical roof panels shall be fabricated from 24 gauge high-strength Galvalume  
11 conforming to ASTM A792/A792M-AZ50.  
12

13 B. Exterior Exposed Fastener Wall Panels (main body of building)

14 01 Design is based on Whirlwind Type "Super Span" exposed fastener wall panel.  
15 02 Nominal 36" coverage.

16 03 Depth: 1-1/4".

17 04 Major ribs at 12" O.C.

18 05 Wall panels shall be continuous from the building eave / rake to the bottom of the  
19 panel.

20 06 Trim: Match material, thickness and finish of metal panels

21 07 Finish: Whirlwind "Ceram-A-Star", Modified Silicone-Polyester Two-Coat System:  
22 0.20 – 0.25 mil primer with 0.7 – 0.8 mil color coat.  
23

24 C. Roof Panels

25 01 Design is based on Whirlwind Type "Weather Lok-16" standing seam roof  
26 panel.

27 02 Nominal 16" coverage.

28 03 Depth: 2".

29 04 Concealed fastener system supported on clips attached to the purlins.

30 a. Panel clips shall be two-piece floating type: ASTM C 645, with  
31 ASTM A 653/A 653M, G90 hot-dip galvanized zinc coating,  
32 configured for concealment in panel joints, and identical to clips  
33 utilized in tests demonstrating compliance with performance  
34 requirements.

35 05 Field mechanically seamed with full 360 degree seaming.

36 06 Panels shall include a field applied sealant within the seamed joint.

37 07 Roof panels that are field-formed shall be continuous from ridge to eave.

38 08 Prefabricated roof panels shall be continuous from ridge to eave for lengths 40'  
39 or less. Where end-laps are required they shall be a minimum of 6" long and  
40 shall occur at a roof purlin or eave strut.

41 09 Finish: 70% PVDF Fluoropolymer two-coat system, 0.2-0.3 primer with 0.7-0.8  
42 mil color coat, complying with AAMA 62.. Colors to be standard manufacturer  
43 colors selected by the Architect.  
44

45 D. Panel Fasteners:

46 01 All self-tapping sheet metal screws shall conform to A.S.A. Standard B 18.6 and  
47 shall have Type "A" or Type "AB" threads. Screws shall be equipped with metal  
48 and EPDM or neoprene washers.

49 02 Optional self-drilling fasteners shall be No. 12-14 Type B self-drilling screw  
50 with non-walking point and two step thread to insure maximum strip-out torque  
51 in panel to panel usage.

52 03 Screws and washers shall be carbon steel plated with .0005" thick zinc plating.  
53 Any exposed fasteners shall "Extended Life" heads with a 300 series stainless  
54 steel cap. Fastener head shall be painted with one prime coat and two finish  
55 coats of baked silicone polyester to match panel and/or trim.  
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- E. Sealer:
  - 01 Sealer for side-laps, end-laps and flashing shall be non-asphaltic, non-shrinking, non-drying, and non-toxic and shall have superior adhesion to metals, plastics, and painted surfaces at temperatures from -30° to -160° F. The material shall have a flashpoint of at least 300°F. and shall not flow at 200°F.
  - 02 Equal in performance to Gov. Spec. No. MIL-C-18969, Type II, Class B.
  - 03 Minimum size: 1/2" wide x 3/32" thick
  
- F. Flashing, Closures and Trim:
  - 01 Flashing and/or trim shall be furnished at the rake, corners, and eaves; at reamed openings, and whenever necessary to provide weather tightness and a finished appearance.
  - 02 24 gauge Galvalume, conforming to ASTM A792/A792M-AZ50, for flashing, metal closures, trim and other miscellaneous uses.
  - 03 A formed panel matching the slope and profile of adjoining panels shall be provided along the building ridge.
  - 04 Solid or closed cell, performed Ethylene-Propylene Diene-Monomer (EPDM) or Ethylene Propylene Terpolymer (EPT) color gray, matching the profile of the panel shall be installed along the rake and/or eave where required for weather tightness.
  
- G. Eave gutters shall be 24 gauge Galvalume. Snap-on gutter straps shall be provided for ease in erection at a maximum spacing of 5'. Design of the gutter will permit rapid installation or removal after roof and wall sheets are in place. Gutter shall screen from view the eave ends of roof sheets. No portion of the gutter will protrude under the roof panels. Finish coating shall be 70% Kynar 500 and shall be on both sides of the sheet metal.
  
- H. Downspouts shall be 24 gauge Galvalume rectangular shaped. Downspouts shall be sized to connect properly with cast iron downspout boots and shall be supported by attachment to the wall covering at 10' maximum spacing. Finish coating shall be 70% Kynar 500 and shall be on both sides of the sheet metal.
  
- I. The metal building system shall be designed and fabricated to accommodate the proper interface and installation of specified roof and wall panels.
  
- J. Metal Building Insulation: Provide and install metal building insulation as specified in **Section 07 21 00 – Thermal Insulation.**

**2.6 ACCESSORIES**

- A. Canopies: Overhanging or projecting roof structures off the sidewall or endwall with the extreme end usually unsupported. For aesthetic application or to cover entrance or walkway. Provide and install necessary structural steel components within girt space, to support canopy.
  
- B. Purlin Extensions: Overhanging or projecting roof structure at the end of a building.
  
- C. Framed Openings:
  - 01 Used to frame out doors, windows, louvers, and any other openings.
  - 02 Framing shall be "C" section type framing as required to provide the rough opening required for installation of hollow metal frames, window frames, louvers and vents, and other similar through-wall and / or work to be provided by others.
  - 03 Coordinate as required to provide proper opening sizes.





- 1                   02     Bolt Holes and Related Machining: Shop fabricate base plates, splices and  
2 flanges to include bolt connection holes. Shop fabricated webs to include  
3 bracing holes.  
4                   03     Secondary structural connections (purlins and girts) to be ordinary bolted  
5 connections, which may include welded clips.  
6                   04     Manufacturer is responsible for all welding inspection in accordance with the  
7 manufacturer's IAS Accreditation or CAN/CSA A660 Certification.  
8                   05     Non-Destructive Testing (NDT) - NDT shall be performed and documented as  
9 required by the governing building code for this project.  
10  
11        C.     Zee Purlins:  
12            01     Fabricate purlins from cold-formed "Z" sections with stiffened flanges.  
13            02     Size flange stiffeners to comply with the requirements of the latest edition of  
14                    AISI. Connection bolts will install through the webs, not the flanges.  
15  
16        D.     Girts  
17            01     Girts must be simple or continuous span as required by design.  
18            02     Connection bolts will install through the webs, not the flanges.  
19  
20        E.     Column Base Plates:  
21            01     Heights of columns shall be designed to allow for a nominal 1/2" shim space  
22                    below all primary framing base plates.  
23  
24        F.     Diagonal Bracing:  
25            01     Wind bracing in the roof and/or walls need not be furnished where it can be  
26                    shown that the diaphragm strength of the roof and/or wall covering is adequate  
27                    to resist the applied wind or seismic forces.  
28            02     Diagonal bracing in the roof and sidewalls may be used to resist longitudinal  
29                    loads (wind, crane, etc.) in the structure if diaphragm action cannot be used.  
30            03     Do not locate diagonal bracing at locations that interfere with openings in  
31                    exterior walls.  
32            04     Diagonal bracing will be furnished to length and equipped with hillside  
33                    washers and nuts at each end. It may consist of rods threaded each end or  
34                    galvanized cable with suitable threaded end anchors. If load requirements so  
35                    dictate, bracing may be of structural angle and/or pipe, bolted in place.  
36  
37        G.     Special Bracing:  
38            01     When diagonal bracing is not permitted in the sidewall, a rigid frame type  
39                    portal or fixed base column will be used.  
40            02     Shear walls can also be used where adequate to resist the applied wind or  
41                    seismic forces.  
42  
43        H.     Flange Braces:  
44            01     The compression flange of all primary framing must be braced laterally with  
45                    angles connecting to the bottoms chords of purlins or to the webs of girts so  
46                    that the flange compressive stress is within allowable limits for any  
47                    combination of loading.  
48

49     **PART 3 - EXECUTION**

50  
51     **3.1     EXAMINATION**

- 52  
53        A.     The erector shall examine substrates, areas, and conditions for compliance with  
54                requirements for installation tolerances and other conditions affecting performance of  
55                work.  
56

1 B. Before erection proceeds, the erector survey elevations and locations of concrete and  
2 masonry bearing surfaces and locations of anchor rods, bearing plates and other  
3 embedment's to receive structural framing for compliance with requirements and metal  
4 building system manufacturer's tolerances.

5  
6 C. Proceed with erection only after unsatisfactory conditions have been corrected.

7  
8 **3.2 PREPARATION**

- 9  
10 A. Clean surfaces thoroughly prior to installation.  
11  
12 B. Provide temporary shores, guys, braces, and other supports during erection to keep  
13 structural framing secure, plumb, and in alignment against temporary construction loads  
14 equal in intensity to design loads. Remove temporary supports when permanent  
15 structural framing connections and bracing are in place, unless otherwise indicated.

16  
17 **3.3 ERECTION - FRAMING**

- 18  
19 A. Erect framing in accordance with MBMA Low Rise Building Systems Manual,  
20 Common Industry Practices.  
21  
22 B. The erector shall furnish temporary guys and bracing where needed for squaring,  
23 plumbing, and securing the structural framing against loads, such as wind loads acting  
24 on the exposed framing and seismic forces, as well as loads due to erection equipment  
25 and erection operation.  
26 01 Temporary guys, braces, etc. shall not be anchored directly to the building  
27 slab.  
28 02 All temporary guys, braces, false-works and cribbing shall be removed  
29 immediately upon completion of erection.  
30  
31 C. Do not field cut or alter structural members without approval of the metal building  
32 manufacturer's registered structural engineer.  
33  
34 D. After erection of all shop primed members, prime welds, abrasions, and marred  
35 surfaces resulting from erection / installation.  
36  
37 E. After erection of galvanized members, touch up all welds and abrasions with a zinc-rich  
38 / cold galvanizing paint

39  
40 **3.4 ERECTION - WALL AND ROOFING SYSTEMS**

- 41  
42 A. Install in accordance with reviewed shop drawings and manufacturer's standards and  
43 instructions.  
44  
45 B. Exercise care when cutting prefinished material to ensure cuttings do not remain on  
46 finish surface.  
47  
48 C. Provide continuous sealant / sealant tape at all panel joints.  
49  
50 D. Fasten cladding system to structural supports, aligned level and plumb.

51  
52 **3.5 ERECTION - GUTTER AND DOWNSPOUT**

- 53  
54 A. Install in accordance with reviewed shop drawings and manufacturer's standards and  
55 instructions.  
56

- 1 B. Connect downspouts to storm sewer system or provide precast concrete splash-blocks  
2 as indicated on the Drawings.  
3  
4 C. Provide strap anchors at 10'-0" maximum at all downspouts; minimum three (3) per  
5 downspout.  
6

7 **3.6 ERECTION - TRANSLUCENT PANELS**  
8

- 9 A. Install in accordance with reviewed shop drawings and manufacturer's standards and  
10 instructions.  
11  
12 B. Coordinate with installation of roofing system and related flashings.  
13  
14 C. Provide weather-tight installation.  
15

16 **3.7 INSTALLATION - ACCESSORIES**  
17

- 18 A. Refer to other sections and coordinate with other trades as required for the proper  
19 installation and interface of work not included in this section. Work includes, but is not  
20 limited to:  
21 01 Hollow metal doors and frames.  
22 02 Overhead doors.  
23 03 Aluminum windows.  
24 04 Louvers.  
25  
26 B. Seal all accessories weather-tight.  
27

28 **3.8 TOLERANCES**  
29

- 30 A. All work shall be performed in a workmanlike manner.  
31  
32 B. Install Framing in accordance with MBMA Low Rise Building Systems Manual,  
33 Common Industry Practices.  
34

35 **3.9 PROTECTION AND CLEAN-UP**  
36

- 37 A. Upon completion of the work, remove all debris related to the work of this section.  
38  
39 B. Particular attention shall be made in removing metal shavings, screws, and other debris  
40 from roof panels.  
41  
42 C. Use all means necessary to protect installed work and finishes prior to Substantial  
43 Completion and acceptance by the Owner.  
44  
45  
46  
47

**END OF SECTION**

## **SECTION 22 00 00**

### **GENERAL PLUMBING**

#### **1.1 RELATED DOCUMENTS**

- A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

#### **1.2 INTENT OF DRAWINGS AND SPECIFICATIONS**

- A. Drawings and Specifications are intended to be complimentary. Any work exhibited in either of them whether in the other or not, is to be executed according to true intent and meaning thereof, the same as if set forth in all. Should any work required by the drawings and specifications be in violation of any Federal, State, County or City laws, ordinance or regulation, those laws and regulations shall prevail, and shall be complied with by the Contractor as a part of this work with no extra compensation.
- B. The drawings are schematic in nature but show the various components of the system approximately to scale and indicate how they are to be integrated with other parts of the building. Determine exact locations by close coordination with the Owner's Representative, job measurements, determining the requirements of other trades and reviewing all contract documents. The Drawings indicated general routing of the various parts of the systems, but do not indicated all fittings, offsets and runouts which are required. The Contract includes these items as required to fit the system into spaces allotted for them.
- C. Equipment that is scheduled is the basis of the design, and have been coordinated for space, installation and electrical requirements. Space, installation and electrical requirements for other equipment and models from acceptable manufacturers have not been verified or coordinated. Contractor shall verify these requirements prior to using other equipment in his bid and include any additional costs for installation of the equipment. This includes general construction and MEP costs.

#### **1.3 PERMITS AND FEES**

The contractor shall obtain and pay for all permits and licenses, file all notices, pay all legal fees and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work specified or shown on the drawings. This applies to Federal, State and Local Codes and Requirements. Approval to the various insuring and inspection authorities shall also be obtained. Refer to Architectural sections for additional information.

#### **1.4 GUARANTEE**

All materials, apparatus and equipment furnished and installed under this Section of these Specifications shall be new and free from any defects when accepted by the Owner and shall be guaranteed in writing for a period of one year from the date of acceptance by the Owner unless noted to have extended warranties.

## 1.5 COOPERATION

The Contractor shall cooperate with other trades on the job and make installations in the proper sequence during the construction of the buildings, and he shall notify the Architect well in advance of construction of all interference of his work with that of other trades and of building construction. This notification shall not relieve the contractor of his responsibilities.

## 1.6 VISITING THE SITE

The Contractor shall be familiar with the Drawings and Specifications and shall have examined the premises and understand the conditions under which he will be obligated to operate in performing the contract. No allowance shall be made consequently for any error through negligence in this regard.

## 1.7 WORKMANSHIP

All work shall be performed in a neat workmanlike manner and in the best practice of the trade. Only workmen skilled in the trades shall be employed to perform the work included in these specifications.

## 1.8 MATERIALS

- A. Materials, when not otherwise definitely specified, shall conform to applicable National Specifications and Standards. All materials shall be certified to not contain any asbestos or other material banned by the Environmental Protection Agency. Lead shall not be used in any material, pipe or solder in contact with the domestic water system.
- B. The names of manufacturers and model numbers have been used in the Contract Documents to establish type of equipment and standard of quality. Where only one name is mentioned for a particular item of material, then that manufacturer is the only one acceptable. Where several names are mentioned, any one of those listed may be furnished provided submittal contains sufficient information to show complete compliance with contract Documents. No attempt has been made to determine if each manufacturer listed will produce material that will comply with all requirements of this project or will fit the allotted space; if they do, then it will be acceptable.
- C. Requests for substitution during the bidding period, in accordance with the requirements of the Special Conditions, must be accompanied by a complete product submittal with all features, accessories and capacities noted. Large equipment must include a 1/4" scale drawing showing how the equipment and required access space are compatible with the available space. Acceptance for bidding does not waive the post bidding requirement for formal submittal and approval.

## 1.9 REMOVAL OF RUBBISH AND CLEAN-UP

Keep area of operations free from accumulation of waste material or rubbish at all times. At the completion of the work, remove all rubbish, tools, scaffolding and surplus materials from the area of operations. The exposed parts of the Mechanical installation which are to be painted shall be thoroughly cleaned of cement, plaster, grease, oil spots and other materials in preparation for painting. All piping shall be cleaned of cement, plaster and other construction debris prior to being concealed above accessible ceilings or being insulated. Clean exposed piping prior to final inspection. All construction areas shall be left "broom" clean on a daily basis. Prior to final acceptance, vacuum clean all mechanical rooms including equipment.

#### 1.10 LUBRICATION

After the installation is completed, lubricate all moving parts of all equipment furnished under this Division of the Specifications requiring same. Leave with the Owner a brief but complete set of lubrication instructions, showing the recommended frequency of lubrication and the type of lubricant recommended for each piece of equipment.

#### 1.11 NOISE AND VIBRATIONS

The Contractor shall guarantee that the entire system and its component items of equipment, as installed by him, shall operate without objectionable vibration or noises, as determined by the Architect. If, in the opinion of the Architect, objectionable vibration or transmission thereof to the building occurs, the Contractor shall execute such remedial measures as are necessary to eliminate such unsatisfactory operating conditions and the material and labor thereby required shall be performed at the Contractor's expense.

#### 1.12 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. ELECTRICAL: Power wiring is specified in the Electrical Section. Interlock and control wiring (any voltage) is specified under this Section. Controllers and starters, unless part of a motor control center, are specified under this Section.
- B. PAINTING OF EQUIPMENT, PIPING AND ACCESSORIES: Painting Section. However, all items furnished under this Section shall be kept clean and free from corrosion.
- C. OPENINGS: Various Sections. However, the locations of all inserts and openings shall be determined under this Section and coordinated with other Sections in ample time to avoid cutting new construction.
- D. CUTTING, PATCHING AND FURRING: Various Sections. However, the locations of all inserts and openings shall be determined and coordinated with other sections.
- E. EQUIPMENT AND PIPING SUPPORTS: Refer to structural drawings, details and notes for specific support and pipe hanging requirements. Specific loading and attachment methods shall be followed to assure that individual structural members are not overloaded.

#### 1.13 GENERAL EQUIPMENT REQUIREMENTS

Manufacturer's printed directions shall be followed for preparing, assembling, installing, erecting and cleaning manufactured materials or equipment, unless otherwise directed.

#### 1.14 SHOP DRAWINGS

- A. Submit seven complete sets of shop drawings checked and certified by the contractor as being checked and lists of materials furnished under this Division. Shop drawings shall be approved before installation of the material under consideration.

B. Shop Drawings shall consist of published ratings of capacity data, detailed construction drawings, wiring and control diagrams, performance curves, installation instructions, manufacturer's installation drawings and other pertinent data. Where the literature is submitted covering a group or series of similar items, the item under consideration shall be clearly indicated. Shop drawing shall list VOC of materials. Materials with VOC levels higher than LEED and code requirements will be rejected. Drawings shall be submitted showing revisions to equipment layouts due to use of alternate or substitute equipment. The front sheet of each copy of the submittal shall have the following typed information:

1. Job name and location.
2. General Contractor's name, address, Project Manager's name and telephone number.
3. Submitting Sub-contractor's name, address, Project Manager's name and telephone number.
4. Suppliers company name, address, salesman's name and telephone number.
5. Signature of an officer or attorney-in-fact of the Sub-contractor with date and title and a statement that the submittal materials and equipment comply with the Contract Documents.

Any submittal without all of the above information will be rejected without review.

C. Equipment that has regional representation shall only be supplied by the regional representative that serves the area where the project is located. The regional representative's name and signature shall be included with the shop drawing.

D. Shop Drawings are required for but are not limited to the following items:

Plumbing Carriers, Drains & Cleanouts	Water Softening System
Fire Sprinkler System Piping/Equipment	Water Heaters
Piping Insulation	Plumbing Fixtures & Equipment
Pipe Markers and Valve Tags	Plumbing Pipe, Valves & Fittings
Coordination Drawings	Fire Sprinkler Drawings and Calculations

E. Approval of these submittals shall not be construed as releasing the contractor from compliance with the contract Documents. They are a means of coordinating the work and aiding in the proper selection and installation of equipment. Do not release items such as fire dampers and starters until associated equipment or ductwork drawings are approved. All materials and equipment shall be subject to final acceptance by the Engineer at the completion of construction and adjustments of the system.

F. If a submittal is returned to the Contractor marked "Rejected" or "Revise and Resubmit", only one (1) additional submittal will be permitted without the Contractor incurring charges for the additional re-submittals. Lee Truong & Yu Engineers (LTY) shall be reimbursed by the Contractor for any expense in connection with any necessary submission in addition to the two (2) submissions allowed. Contractor shall pay LTY \$500 for review of EACH additional submission beyond the two (2) submissions allowed. For shop drawing submittals beyond the two (2) submissions allowed, a \$500 cashier's check shall be included with such submittals or LTY will not review the submittal. For fire sprinkler shop drawings, see Section 21 13 13 for more stringent requirements.

#### 1.15 PROTECTION OF EQUIPMENT

- A. Do not deliver equipment to jobsite until progress of construction has reached the stage where equipment is actually needed, or until building is closed in enough to protect equipment from the weather. Equipment allowed to stand in weather will be rejected, and Contractor is obligated to furnish new equipment at no cost to Owner.
- B. Adequately protect equipment (including all Owner-furnished items) from damage after delivery to job. Cover with heavy cloth as required to protect from damage.
- C. Equipment which has been damaged by construction activities will be rejected. Contractor shall furnish new equipment at no cost to Owner.

#### 1.16 CUTTING AND PATCHING

Coordinate the work with other trades to arrange for all holes, chases, and other spaces necessary for the installation of all components of the mechanical systems. Inform the other trades in ample time for these to be provided. Failure to comply with this requirement may necessitate cutting and patching work. If such work becomes necessary, it will be done under this Section of the specifications and shall conform to all applicable requirements of other Sections of the Specifications.

#### 1.17 STRUCTURAL STEEL

All structural steel used for the purpose of fabricating pipe supports, pipe guides, pipe anchors, equipment supports, and framing for large ducts and plenums, shall conform to ASTM Designation A-36. All steel used for these purposes shall be new, clean, straight and galvanized.

#### 1.18 CONCRETE PADS

All equipment mounted on the floor shall have a concrete house keeping pad. Concrete pads shall be sized for the equipment to be supplied. Pad shall exceed base dimensions by approximately 4" all around. Reinforce pads rebar including #4 bar around perimeter. Tool pad to form chamfered edge. Nominal thickness shall be 4". Refer to details for outdoor equipment.

#### 1.19 SPARE PARTS LISTS, OPERATING INSTRUCTIONS

At completion of job, furnish three copies of spare parts lists and operating instructions for all equipment furnished under this Division. These lists and instructions shall be published by the manufacturer of the equipment and shall be in good condition. Bind in 3-ring binder with project name.

#### 1.20 TOOLS AND SPARE PARTS

Upon completion of the installation, deliver to the Owner all tools and spare parts that are furnished by the Equipment Manufacturer for use with the equipment furnished under this Contract.



## 1.21 RECORD DRAWINGS

- A. Maintain at the job site a separate set of white prints (blue line or black line) of the contract drawings for the sole purpose of recording the "as-built" changes and diagrams of those portions of work in which actual construction is at variance with the contract drawings. Mark the drawings with a colored pencil. Prepare, as the work progresses and upon completion of work, reproducible drawings clearly indicating locations of various lines, valves, ductwork, traps, equipment, and other pertinent items, as installed. Include flowline elevation of sewer lines. Record existing and new underground and under slab piping with dimensioned locations and elevations of such piping.
- B. At the conclusion of project, obtain without cost to the Owner, erasable mylars of the original drawings and transfer as-built changes to these. Prior to transmittal of corrected drawings, obtain 3 sets of blueline prints of each drawing, regardless of whether corrections were necessary and include in the transmittal (2 sets are for the Owner's use and one set is for the Architect/Engineer's records). Delivery of these as-built prints and reproducibles is a condition of final acceptance. Provide record drawings on one set each (reproducible Dayrex mylar film positives) and AutoCad 2000 files on disk (CD Rom).
- C. As-Built drawings should indicate the following information as a minimum:
  - 1. Indicate all addendum changes to documents.
  - 2. Remove Engineer's seal, name, address and logo from drawings.
  - 3. Mark documents RECORD DRAWINGS.
  - 4. Clearly indicate: DOCUMENT PRODUCED BY
  - 5. Indicate all changes to construction during construction. Indicate actual routing of all piping, ductwork, etc. that were deviated from construction drawings.
  - 6. Indicate exact location of all underground plumbing and flow line elevation.
  - 7. Indicate exact location of all underground plumbing piping and elevation.
  - 8. Indicate exact location of all underground electrical raceways and elevations.
  - 9. Revise schedules to reflect (actual) equipment furnished and manufacturer.
  - 10. During the execution of work, maintain a complete set of drawings and specifications upon which all locations of equipment, ductwork, piping, devices, and all deviations and changes from the construction documents in the work shall be recorded.
  - 11. Location and size of all ductwork and mechanical piping above ceiling including exact location of plumbing isolation valves.
  - 12. Exact location of all electrical equipment in and outside of the building.
  - 13. Fire Protection System documents revised to indicate exact location of all sprinkler heads and zone valves.
  - 14. Exact location of all roof mounted equipment, wall, roof and floor penetrations.
  - 15. Cloud all changes.

## 1.22 OWNER'S INSTRUCTIONS

Provide four hours of instruction to the Owner's designated personnel upon completion of the system's installation.

## 1.23 ALTERNATES

- A. Determine the scope of each specified alternate proposal by carefully reading all Divisions of the Documents. The Bid Form contains information explaining the extent of the construction to be performed under a specific alternate. Alternate proposals, which are not predominantly mechanical in scope, are described in other Divisions of these Documents. Pay particular note to re-roofing items that may necessitate adjustments to existing piping.

- B. Alternative Equipment: Certain types of equipment as listed below require the specified brand and model to be included in the base bid. At the contractor's option, he may propose equivalent equipment from one of the listed alternate manufacturers for one or more of these types of equipment. The contractor shall list in this alternate bid the name of the item, manufacturer's name, model number and the amount to be deducted from his base bid.

#### 1.24 MEP INSPECTIONS

- A. Contractor shall formally request inspections from LTY to review any and all MEP installations. Inspections shall include but not be limited to: pipe tests, underground installations prior to backfill, rough-in installations, wall cover inspections, above ceiling inspections, final inspection. Owner and City shall also be included in inspection requests; however, approval of installation by Owner or City does NOT absolve the Contractor of the required inspection and approval of all Plumbing installations by LTY nor take the place of the required inspection and approval of all Plumbing installations by LTY.
- B. Information required from Contractor on each and every request for inspection is as follows:
  - 1. Specific type of test (i.e. hydrostatic test, etc.).
  - 2. Exact location of test (i.e. area of building with room numbers, riser number for sanitary waste / vent plumbing tests, etc.).
  - 3. Description of test (i.e. partial inspection, walls only, chase walls, wall cover, ceiling cover, etc.)
  - 4. Exact time test started (required test time per Project Manual will need to have elapsed prior to LTY inspection). Estimated time test will start will not be acceptable.
  - 5. Pressure reading on gauge at time of request for all pipe tests (provide picture of gauge with request).
  - 6. Verification from General Contractor with name of person that verified, that specific test has been verified by the Contractor and all sub-contractors to meet all requirements of the Specifications and Codes (prior to inspection request).
- C. Contractor shall provide a MINIMUM of 48 hour notice prior to requested inspection time, no exceptions.
- D. INSPECTION REPORTS: After each inspection, LTY will generate an inspection report and distribute promptly. The Contractor will then be given 7 working days from date of report to address all deficiencies listed on the report. The GENERAL CONTRACTOR shall verify that all items on each inspection report have been addressed by their subcontractors in this time period. Once verified the GENERAL CONTRACTOR shall sign-off on each deficiency listed on the report and return the signed-off copy of the inspection report to LTY via e-mail. After the signed-off report is returned to LTY, the GENERAL CONTRACTOR shall request a re-inspection by LTY to close the report. If after 7 working days no re-inspection is requested by the GENERAL CONTRACTOR to close a report, LTY reserves the right to re-inspect whenever our schedule allows, with these re-inspections still being subject to Paragraph E below.

- E. TEST REJECTIONS AND RE-INSPECTIONS: If a test is rejected or a re-inspection of an issued LTY Inspection Report is found to NOT be completely addressed, only ONE (1) additional inspection will be permitted without the Contractor incurring charges for each additional inspection required. LTY shall be reimbursed \$500 by the GENERAL CONTRACTOR for expenses in connection with EACH inspection in addition to the two (2) inspections allowed. For inspections beyond the two (2) allowed inspections, a \$500 cashier's check shall be provided at the time of each additional inspection or LTY will not perform the inspection.

#### 1.25 DEMOLITION AND REMODELING

- A. In areas of demolition, contractor shall remove all plumbing equipment, fixtures, drains, piping and devices not to be reused. Any material that has salvage value shall be offered to the Owner, and if accepted, delivered to his warehouse. If not accepted it shall be properly disposed of with the other construction debris.
- B. Where existing systems serve other areas as well, they shall remain active in those areas. Cap, patch and relocate piping, etc. to keep systems operable.
- C. Remove and replace ceilings, walls, floors and other finishes as necessary to install or modify plumbing systems.
- D. Where ceilings are to be removed or replaced, remove and reinstall existing plumbing items where necessary.
- E. Relocate piping as necessary to allow new or modified construction. Repair existing plumbing systems damaged by construction activities.
- F. Where large equipment is to be replaced (water heaters, storage tanks, water softeners, etc.), ensure that equipment that is an acceptable manufacturer but not the scheduled brand will fit the available space and can be installed through existing doors, louvers or windows, prior to using this equipment in the bid.
- H. Where new cold or hot water piping connects to the existing system, system may require partial or complete draining of water. Include the costs of shutdown, drainage, cleaning, refilling and chlorination of the system.
- I. Where existing equipment is modified or replaced and interfaces with the Energy Management System, disconnect and reconnect EMS wiring, and replace end devices and sensors as necessary.

#### 1.26 CONSTRUCTION PHASING

- A. Phasing of construction shall be the sole responsibility of the General Contractor. Construction phasing shall accommodate all needs and schedules required by the Owner. All costs for construction shall be included in the price submitted by the Contractor on the bid date. No additional money will be approved for the Contractor or their sub-contractors to accommodate costs (including labor) associated with construction phasing.

END OF SECTION

## SECTION 22 05 53

### IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

#### PART 2 - MATERIALS AND METHODS

##### 2.1 PIPE MARKING

- A. Identify all new system piping. Use Opti-Code Brady pressure sensitive adhesive pipe markers consisting of pipe marker and direction of flow arrow tape. Background colors of markers, arrows and tape of each type of pipe system shall be of appropriate legend and background color to meet all ANSI/OSHA/ASME standards, complete with direction arrow. Select appropriate size for O.D. of piping including insulation. Clean pipe PRIOR to installation of pipe markers. Markers or arrows not wrapping the full circumference of the pipe shall be tie wrapped in place, otherwise taped at each end around full circumference of pipe. Provide minimum 2-1/4" letters through 4" pipe and 4" letters for piping larger than 4". For exterior piping or piping inside mechanical rooms, provide Snap-Around pipe markers up to 4" pipe and Strap-Around pipe markers for piping larger than 4". Manufacturer shall be Brady or approved equal.
- B. Apply markers as follows:
1. At input and output of each piece of equipment inside building.
  2. At each valve not in a mechanical room.
  3. At every point a pipe enters or exits a wall or floor (both sides of wall or floor).
  4. At intervals not exceeding 20 feet.
  5. Any location where view is obstructed.
- C. These markers shall conform to OSHA and ANSI A 13.1 Codes. Arrow markers must have same ANSI background colors as their companion pipe markers and wrap completely around pipe with 3" overlap.
- D. Pipe markers and arrow markers shall be provided as follows:
1. Domestic Cold Water
  2. Domestic Hot Water (including tempered water)
  3. Domestic Hot Water Return (including tempered water return)
  4. Sanitary Waste
  5. Sanitary Vent
  6. Fire Sprinkler System
  7. Natural Gas
  8. Roof Drain Leader
- E. MANUFACTURER PIPE LABELING: All piping shall be labeled by manufacturer along entire length of pipes. Labeling shall indicate SIZE, CLASS, MATERIAL SPECIFICATION, NAME OF MANUFACTURER and COUNTRY OF ORIGIN. Piping not properly labeled by manufacturer with the information listed above will be removed from site and replaced at no cost to Owner.

## 2.2 EQUIPMENT MARKING

- A. GENERAL: Each piece of plumbing equipment shall be suitably marked with the name as listed on the plans. Name shall be prominently displayed so it may be easily located and read after equipment installation. Pumps may be marked on adjacent piping.
- B. The following equipment shall be marked with lamacoid nameplate, 2" high letters:
  - 1. Water Heaters
  - 2. Water Softening System
- C. The following equipment shall be marked with laminated engraved plastic nameplate with 1.25" high letters, fastened with epoxy or screws:
  - 1. Circulator Pumps

## 2.3 VALVE MARKING

- A. Each valve, except those located adjacent to the equipment they serve, shall have a tag of heavy-gauge 1½" diameter brass, stamped and engraved in black with the valve number and service symbol. Attach tag to the valve handle with a chain of similar gauge and material.
- B. On the "As Built" Drawings, mark the symbol and number of all valves, exactly as the valves are tagged.
- C. Furnish a valve schedule properly identifying the valve number and service with the exact location, the material within the pipe and the room numbers or area that the valve serves. This schedule shall be furnished on reproducible film suitable for reproduction on an ozlid machine.
- D. Provide one valve schedule, as above, installed in aluminum frame with lexan shield, and mount on wall of main equipment room.

## 2.4 PAINTING

- A. GENERAL: All piping or insulation on piping exposed to view shall be painted color directed by Architect. Insulated pipe with required metal jacket shall not be painted unless directed by Architect. Reference Architectural Contract Documents. All above grade gas piping shall be painted.
- B. PAINT TYPE: Industrial grade, high gloss enamel over suitable primer. Provide two finish coats.
- C. COLOR CODING: (Verify with Architect prior to painting)
  - 1. Gas Piping                      Yellow
  - 2. Fire Sprinkler System        Red

END OF SECTION

## SECTION 22 07 19

### PLUMBING PIPING INSULATION

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

##### 1.2 GENERAL REQUIREMENTS

- A. Install all insulation in conformance with manufacturer's recommendations and these specifications.
- B. All interior adhesives and sealants must meet VOC limit requirements of South Coast Air Quality Management District (SCAQMD) Rule #1168. Must comply with the TIPS requirements.
- C. All interior paints and coatings must meet VOC limit requirements of South Coast Air Quality Management District (SCAQMD) Rule #1113 and Green Seal GS-11 and GS-03. Must comply with the TIPS requirements.
- D. Insulation materials manufactured by the following list of companies will be acceptable provided their materials conform to these specifications (see Paragraph on Substitution): Armstrong, CertainTeed, Childers, Foster, Knauf, Koolphen, Manville, Owens-Corning and Pittsburgh-Corning.
- E. Flame Spread and Smoke Requirements:
  - 1. All jackets, adhesives, coatings, insulating materials and vapor barrier mastics for piping and equipment shall have a flame spread not higher than 25 and smoke developed rating not higher than 50.
  - 2. All materials containers shall have a U. L. Label.
- F. At each pipe support point, provide formed 16 gauge galvanized sheet metal saddle, with length three times pipe size, 8" minimum. Sheet metal saddle shall be secured to pipe insulation using aluminum band at both ends of saddle. For piping 1½" and larger, install a hard section of Koolphen K phenolic foam pipe insulation, with length three times pipe size, minimum 8" length, on lower 180° of piping, 360° if clamps are used on top of pipe, same thickness as adjacent insulation, to prevent compression at support bearing area. Seal and finish to match adjoining insulation.
- G. Install .020" thick aluminum jacket with minimum 2" overlap joint on all insulated piping exposed outside building. Install factory made aluminum covers on all elbows. Cut aluminum neatly to fit all tees, such that all insulation is covered by aluminum. Use waterproofing aluminum colored Foster 95-44 or Childers CP-76-1 sealer to seal all joints. Provide .020x3/4" aluminum bands not more than 12" on center for all jacketing. Install aluminum covers on insulated pipe inside that is exposed to view in finished areas including inside gymnasiums, shop areas, areas and any areas with partial or no ceilings. Cover is not required in mechanical or AHU rooms. Jacketing in contact with soil shall be .010" stainless steel.

## PART 2 - MATERIALS AND METHODS

### 2.1 DOMESTIC COLD WATER PIPING

- A. Insulate all water piping outside and above grade, in exterior walls, within eight (8) feet of exterior walls, inside concrete block walls (not including 6" or deeper chase walls), central mechanical and boiler room piping, piping inside the building but outside the building insulation (i.e. above insulation on ceiling), in basements and all unconditioned spaces and all piping subject to condensation with 1" thick factory molded fiberglass pipe covering, density not less than 3 pounds per cubic foot, conductivity (k) not higher than .25 at 100° mean temperature difference with factory attached fire retardant, vapor barrier jacket. Piping exposed to view in finished areas, including inside gymnasiums, shall have aluminum jacketing per specification.
- B. For piping outside including pipe entry to building at grade and backflow preventers, provide 1" thick Molded Koolphen K phenolic foam pipe insulation. Install .010" stainless steel protective jacket from building wall to 6" below grade. Insulation and jacketing for backflow preventers shall be installed with easily removable sections to allow periodic servicing, testing and inspection of backflow preventer without damaging insulation installation or integrity. All water piping above grade and inside pressbox building shall be insulated with 1" thick Koolphen with aluminum jacketing installed.
- C. Install insulation over pipe and carefully connect self sealing laps. Provide 3" butt strips at each joint between sections, sealed with Foster 85-75 or Childers CP-82 adhesive. Coat all vapor retarder film (ASJ) longitudinal and butt joints with anti-fungal Foster 30-80AF vapor barrier coating to prevent moisture ingress. Coating permeance shall be 0.013 perms or less at 43 mil dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils. Apply Foster 95-50 or Childers CP-76 insulation joint sealant in phenolic insulation longitudinal and butt joints to prevent moisture ingress.
- D. Insulate fittings with pre-molded cover of same materials and thickness as pipe covering. Field fabricated, mitred fittings will not be accepted. Coat all fittings and elbows with anti-fungal Foster 30-80AF vapor barrier coating and reinforcing mesh. Coating permeance shall be 0.013 perms or less at 43 mil dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Finish all joints and seams smooth and even. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils.

### 2.2 DOMESTIC HOT WATER AND TEMPERED WATER PIPING

- A. Insulate all hot water supply and return piping, including tempered water and booster heater piping, with factory molded pipe covering made from glass fibers; 1" thick with density not less than 3 pounds per cubic foot; conductivity (k) not higher than .25 at 100° mean temperature difference; with factory attached fire retardant jacket. Piping exposed to view in finished areas, including inside gymnasiums, shall have aluminum jacketing per specification.
- B. Install insulation over pipe and carefully connect self sealing laps. Provide 3" butt strips at each joint between sections, sealed with Foster 85-75 or Childers CP-82 adhesive. Coat all vapor retarder film (ASJ) longitudinal and butt joints with anti-fungal Foster 30-80AF vapor barrier coating to prevent moisture ingress. Coating permeance shall be 0.013 perms or less at 43 mil dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils. Apply Foster 95-50 or Childers CP-76 insulation joint sealant in phenolic insulation longitudinal and butt joints to prevent moisture ingress.

- C. Insulate fittings with pre-molded cover of same materials and thickness as pipe covering. Field fabricated, mitred fittings will not be accepted. Coat all fittings and elbows with anti-fungal Foster 30-80AF vapor barrier coating and reinforcing mesh. Coating permeance shall be 0.013 perms or less at 43 mil dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Finish all joints and seams smooth and even. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils..

### 2.3 STORM DRAINAGE PIPING ABOVE SLAB

- A. GENERAL: Insulate horizontal and vertical piping including roof drain bodies. Overflow drains and piping are included in this specification. All piping above grade shall be insulated.
- B. MATERIALS: 1½" thick flexible fiberglass blanket with vapor barrier or 1" thick fiberglass pipe insulation with vapor barrier.
- C. EXECUTION: Seal vapor retarder laps with white Foster 85-75 or Childers CP-82 and staple at 4" on center. Vapor seal staples with Foster 30-80AF. Provide 3" butt strips at each joint between sections and seal as above. Install vapor stop every 15'-0" using Foster 30-80AF. Coating permeance shall be 0.013 perms or less at 43 mil dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Finish all joints and seams smooth and even. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils. Piping exposed to view in finished areas, including inside gymnasiums, shall have aluminum jacketing per specification.

### 2.4 SANITARY DRAIN PIPING ABOVE GRADE

- A. GENERAL: Insulate horizontal piping, floor drain bodies, elbow at drain, first elbow that turns down and all piping in ceiling plenums of sanitary system serving floor and hub drains receiving condensate from air conditioning and refrigeration equipment.
- B. MATERIALS: 1½" thick flexible fiberglass blanket with vapor barrier or 1/2" thick pipe insulation with vapor barrier. Insulated piping exposed to view in finished areas, including inside gymnasiums, shall have aluminum jacketing per specification.
- C. EXECUTION: Seal vapor retarder laps with white Foster 85-75 or Childers CP-82 and staple at 4" on center. Vapor seal staples with Foster 30-80AF. Provide 3" butt strips at each joint between sections and seal as above. Install vapor stop every 15'-0" using Foster 30-80AF. Coating permeance shall be 0.013 perms or less at 43 mil dry thickness as tested by ASTM E96 and meet ASTM D5590 with 0 growth rating. Finish all joints and seams smooth and even. Reinforcing mesh shall be 10x10 Childers Chil Glas #10 or Foster Mast a Fab. This application shall provide a minimum dry film thickness of 37 mils. Piping exposed to view in finished areas, including inside gymnasiums, shall have aluminum jacketing per specification.

### 2.5 DRINKING FOUNTAIN DRAIN LINES

Insulate from connections to fountains to connection to next larger size drain, or, if drain runs into floor, from fountain to floor, with 1/2" thick pipe covering the same as for Domestic Cold Water Piping.



## 2.6 LAP AND JOINT ATTACHMENT

Self-sealing type jackets will be acceptable provided the laps are sealed per the manufacturers recommendations and the installation is 100% visually inspected by the insulation contractor's foreman.

END OF SECTION

## SECTION 22 11 11

### NATURAL GAS PIPING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

##### 1.2 GENERAL REQUIREMENTS

- A. Piping shall be installed in a neat and orderly manner parallel to building coordinates with vertical drops. Piping shown underground shall be buried a minimum of 12 inches to top of pipe. Piping in the vicinity of equipment shall be arranged to not interfere with access panels and maintenance space. Provide unions, flanges and shutoff valves to allow removal of the equipment and its subassemblies.
- B. Piping shall be concealed in wall, chases and above ceilings except in the vicinity of equipment. All materials shall conform with the requirements of the local code authority.
- C. All below grade non-metallic, non-conducting pipe not under building slab shall have a tracer wire installed parallel to pipe. Tracer wire shall be a 14 gage, solid copper wire with PVC jacket with all joints and splices sealed water-tight. Carry end of wire up through slab and terminate in an accessible location. Provide identification label attached to wire.
- D. All piping, fittings and valves shall be manufactured in the United States of America. Acceptable pipe manufacturers are Bull moose Tube and Wheatland. Other domestic manufacturers will be considered for approval.
- E. Provide pipe markers, pipe painting and valve tags per the Specifications, Section 22 05 53.

#### PART 2 - METHODS

##### 2.1 EXCAVATION AND BACKFILLING

- A. GENERAL: Provide all excavation and backfilling required for the proper installation of all underground piping and other components installed below grade.
- B. EXCAVATION: Trench with ladder type trenching machine. Make trenches 6" wider than outside diameter of pipe. Excavate, backfill and grade trench bottom.
- C. BACKFILLING:
  - 1. Backfill for pipe in City Property must comply with City requirements.
  - 2. For non-drainage lines backfill with approved backfill material to 95% standard proctor, by hand compaction.

## 2.2 PIPE SUPPORTS

A. GENERAL: Provide pipe supports and guides of size and type to support pipe as well as limit movement. Minimum size hanger rod shall be 3/8". Piping connected to a piece of equipment shall have a support located near enough to the equipment that there will be no pipe weight supported by the equipment. In no case shall the nearest support be more than two feet horizontally from the connection point. Pipe support material shall be selected to be compatible with the pipe material to prevent galvanic corrosion.

### B. HORIZONTAL PIPING:

1. SUPPORT SPACING: As recommended by support manufacturer, but spaced not more than below:

<u>Pipe Size</u>	<u>Steel Pipe</u>
1" & Smaller	6 Feet
1¼" & 1½"	8 Feet
2"	8 Feet
2½" to 4"	8 Feet
6" and Larger	8 Feet

2. SUPPORT FROM ABOVE: Support piping near roof or upper floor from structure if sufficient strength exists. Use a method suitable for type of construction and of sufficient strength. Use threaded steel hanger rods of diameter required to safely support loads. Minimum size hanger rod shall be 3/8". Install rods through holes drilled in beam flanges, 1½" x 1½" x 8" angles welded to structural members or top cord slot at joist panel points and secure with large washers and nuts. Refer to structural drawing details for additional information. Do not use perforated strap. Do not use concrete anchors.

3. HANGERS: Manufactured by Anvil, Grinnell or Tolco.

- a. SINGLE RUNS OF PIPE, NO EXPANSION PROBLEM: Adjustable clevis type Grinnell Figure 260.
- b. BEAM CLAMPS: Grinnell Figure 92 for smaller pipe

4. SUPPORT FROM BELOW: All piping near the floor, or where ceiling structure does not have sufficient strength, or where there is no ceiling shall be supported from below. Support members shall be steel pipe with base plates, or welded steel structure suitably braced.

5. SUPPORT MATERIAL FINISH: Galvanized or cadmium plated steel. Provide hot dipped copper clad supports for copper piping.

## 2.3 VALVE INSTALLATION

Ball valves shall be installed such that handle for valve is positioned on the side of the pipe and is pulled down to close the valve.

## 2.4 TESTING GAS PIPING SYSTEMS

A. GENERAL: All new and existing gas piping shall be tested and repaired as required for safe operation and the passing of the Texas Railroad Commission requirements.

## B. GAS PIPING TESTING

1. Preliminary gas test as required by Code, but a minimum test pressure of 50 PSIG held for not less than eight hours without noticeable drop.
2. Test joints with a soap solution while lines are under pressure. Repair any leaks that are detected.
3. Final gas test shall be with a 24 inch column of mercury or a diaphragm gauge with a minimum dial size of 3.5 inches with a set hand and a pressure range not to exceed 20 PSIG with 2/10 pound increments. The minimum test pressure shall be not less than 10 PSIG and the maximum pressure shall not exceed 12 PSIG. The test shall be observed by the Owner's Representative AND LTY for a minimum of 30 minutes with no drop in pressure.
4. Perform gas piping test as required by the Texas Railroad Commission and submit completed Texas Pipeline Safety Form PS-86B.
5. Provide a copy of the gas pressure test reports in the Operations & Maintenance Manual provided at closeout.

- C. FINAL TEST: Subject each piping system to its normal operating pressure and temperature for not less than twenty-four hours. The piping systems must remain absolutely tight during this period. The satisfactory completion of any test or series of tests will not relieve the contractor of responsibility for ultimate proper and satisfactory operation of piping systems and their accessories.

## 2.5 SLEEVES

Provide sleeves for all piping passing through walls, floors not on grade and roof slabs. Make sleeves of galvanized pipe and sized to provide clearance of 1/4" around piping or pipe insulation if pipe is insulated. Set end of sleeve flush with the surrounding surface of wall or ceiling in which sleeve is installed. Floor slab sleeves shall extend 3" above floor level. Provide vented sleeves for all gas piping below floor slabs or paved areas. Pipes through grade beams shall be sleeved per structural engineer's drawings. As a minimum pipe shall be wrapped with 1" thick closed cell pipe insulation.

## 2.6 PLATES

Provide chromium plated wall and ceiling plates for all exposed piping, at point piping passes through walls or ceilings. Plates shall be large enough to completely cover pipe sleeves. On insulated piping, inside diameter of plates shall just exceed outside diameter of pipe covering. Plates may be omitted for pipe sizes larger than 6".

## 2.7 VALVE AND FITTING SIZES

All hand valves, fittings and other piping accessories shall be size of the line in which installed unless specifically indicated otherwise on the Drawings.

## 2.8 DIELECTRIC UNIONS

Provide dielectric insulating unions at all connections between dissimilar metals, except at final fixture connections, such as galvanized pipe connection to brass water faucet.

## 2.9 FITTINGS

- A. SCREWED: Conform to ANSI Specification B16.3.

## 2.10 VALVES AND DEVICES

- A. GENERAL: All pressures shown below are minimum working pressures.
- B. GAS VALVES:
  - 1. GAS VALVES: Ball type ANSI B16.33-1981, ANSI B16.38-1978 or UL 842-1980 approved and rated at the gas pressure of application. Nibco T-580-70-UL
  - 2. SMALL GAS COCKS: Nibco T-585-70-UL
  - 3. UNIONS: Brass insert, ground joint
  - 4. SPECIAL VALVES: As indicated on the Drawings.
- C. ACCEPTABLE MANUFACTURERS: Milwaukee, Hammond and Nibco

## PART 3 - MATERIALS

### 3.1 NATURAL GAS, OUTSIDE BUILDING

- A. GENERAL: Gas utility company will provide and install metering equipment for 5 psi service pressure. Extend piping from meter to building and install pressure reducing valve at building. Provide grounding per NFPA 70.
- B. MATERIALS:
  - 1. ABOVE GROUND: Schedule 40 black steel, ASTM ERW A-53, Grade B or ASTM A106, with malleable iron screw type fittings. Welded joints shall be used for piping 2½" and larger.
  - 2. BELOW GRADE: Polyethylene gas piping conforming to ASTM D2513, installed per manufacturer's requirements. Install minimum #14 copper wire in trench with pipe for locating purposes. Install X-Truecoat type schedule 40 steel pipe for the last five feet before exiting ground. Install dielectric union after piping exits the ground. Piping shall have socket heat fusion joints and fittings. For pipe sizes 1.5-2", piping shall be SDR-11. For pipe sizes 3-4", piping shall be SDR-11.5. Piping shall be manufactured by JM Eagle.
- C. TESTING: As required by Code but minimum test pressure of 50 PSI held for not less than 24 hours without noticeable drop. Test all joints with a soap solution while lines are under pressure. Provide test tee in pipe at meter and downstream of building pressure reducing station. Reference Paragraph 2.4 – Testing Gas Piping Systems. Testing requirements shall meet requirements listed in Paragraph 2.4.
- D. SLEEVES: Install pipe in vented sleeves when passing under roads, driveways, parking lots and similar areas. Sleeves shall be Schedule 40 PVC below grade and Schedule 40 galvanized steel otherwise. Install vent in a manner to prevent entry of rainwater, insects or foreign objects.

- E. PAINTING: All gas piping outside shall be painted with two coats of industrial grade, yellow epoxy paint.

### 3.2 NATURAL GAS, INSIDE BUILDING

- A. GENERAL: Extend gas to all fixtures, appliances and equipment as required.
- B. MATERIALS ABOVE GRADE: Schedule 40 black steel, ASTM ERW A-53, Grade B or ASTM A106 with malleable iron screw type fittings. Welded joints shall be used for piping 2½" and larger and for piping in inaccessible locations (i.e. inside walls or above inaccessible ceilings). All bolts, nuts and all thread used in the piping system and components shall be cadmium plated to resist rust. Final connections at low pressure appliances shall be corrugated flexible brass connections with epoxy coating, complying with ANSI ANS-Z21-24-1981, minimum pressure rating of 1/2 PSI. Science lab gas cocks shall be "hard-piped" with Schedule 40 black steel. Flex connections will not be acceptable at science lab gas cocks.
- C. MATERIALS BELOW GRADE: Do not install piping below grade.
- D. INSTALLATION:
  - 1. Do not install any gas piping in unventilated spaces including inside walls, unless totally encased with airtight sleeving. Sleeving shall be all metallic construction, welded or screwed black steel, Schedule 10 or heavier. Sleeves shall be vented as shown on the Drawings. Gas piping installed inside casework chases shall be sleeved. Sleeve shall extend outside casework chase into normal casework for venting purposes.
  - 2. Provide an all brass lever handle gas cock in an accessible location branch line at each individual piece of gas consuming equipment.
  - 3. Branch connections to gas consuming equipment shall be size indicated on the Drawings up to points immediately adjacent to equipment. Do not reduce to size of equipment until immediately adjacent to equipment.
- E. TESTING: As required by Code but minimum test pressure of 50 PSI held for not less than 24 hours without noticeable drop. Test all joints with a soap solution while lines are under pressure. Reference Paragraph 2.4 – Testing Gas Piping Systems. Testing requirements shall meet requirements listed in Paragraph 2.4.
- F. PAINTING: All gas piping shall be painted with two coats of industrial grade, yellow epoxy paint.

3.3 GAS PRESSURE REGULATORS:

- A. Size for full connected load, with stop valves on both inlet and outlet connections.
- B. Equip with internal relief valve to vent full capacity if regulator fails wide open. Extend full size vent without reduction to the outside.
- C. Provide weather and bug proof screening on vent.
- D. Select orifices for inlet pressures established by gas company serving the building, and for outlet pressures as required to serve the proper pressure at the items of equipment being supplied.
- E. Outlet pressure shall be field adjustable.
- F. Capacities as indicated in Schedule plus 10%.
- G. Unit shall conform to latest published ANSI Code.
- H. ACCEPTABLE MANUFACTURERS: Invensys, Rockwell or Sensus.

END OF SECTION

## SECTION 22 11 16

### DOMESTIC WATER PIPING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

##### 1.2 GENERAL REQUIREMENTS

- A. Piping shall be installed in a neat and orderly manner parallel to building coordinates with vertical drops. Piping shown underground shall be buried a minimum of 12 inches to top of pipe. Piping in the vicinity of equipment shall be arranged to not interfere with access panels and maintenance space. Provide unions, flanges and shutoff valves to allow removal of the equipment and its subassemblies without having to remove excessive amounts of building piping or drain water systems.
- B. Piping shall be concealed in wall, chases and above ceilings except in the vicinity of equipment such as water heaters. Hot water shall be piped to left hand side of plumbing fixtures as user faces fixture. All materials shall conform with the City Building Code.
- C. All piping, fittings and valves shall be manufactured in the United States of America.
- D. Provide pipe markers and valve tags per Section 22 05 53 Identification of Plumbing Piping and Equipment.

#### PART 2 - METHODS

##### 2.1 EXCAVATION AND BACKFILLING

- A. GENERAL: Provide all excavation and backfilling required for the proper installation of all underground piping and other components installed below grade.
- B. EXCAVATION: Trench with ladder type trenching machine. Make trenches 12" to 18" wider than outside diameter of pipe. Excavate, backfill and grade trench bottom.
- C. BACKFILLING:
  - 1. Backfill for pipe in City Property must comply with City requirements.
  - 2. For non-drainage lines backfill with approved backfill material to 95% standard proctor, by hand compaction.
- D. SAFETY SYSTEMS: Refer to Architectural Sections for additional requirements.



## 2.2 PIPE SUPPORTS

A. GENERAL: Provide pipe supports and guides of size and type to support pipe as well as limit movement. Minimum size hanger rod shall be 3/8". Piping connected to a piece of equipment shall have a support located near enough to the equipment that there will be no pipe weight supported by the equipment. In no case shall the nearest support be more than two feet horizontally from the connection point. Pipe support material shall be selected to be compatible with the pipe material to prevent galvanic corrosion. Un-insulated copper piping shall be wrapped with gas wrap tape at each hanger (minimum 2" beyond hanger). Vertical copper piping shall have a minimum on one intermediate support if over five feet.

### B. HORIZONTAL PIPING:

1. SUPPORT SPACING: As recommended by support manufacturer, but spaced not more than below:

<u>Pipe Size</u>	<u>Steel Pipe</u>	<u>Other Pipe</u>
1" & Smaller	6 Feet	4 Feet
1¼" & 1½"	8 Feet	5 Feet
2"	8 Feet	5 Feet
2½" to 4"	8 Feet	6 Feet
6" and Larger	8 Feet	6 Feet

2. SUPPORT FROM ABOVE: Support piping near roof or upper floor from structure if sufficient strength exists. Use a method suitable for type of construction and of sufficient strength. Use threaded steel hanger rods of diameter required to safely support loads. Minimum size hanger rod shall be 3/8". Install rods through holes drilled in beam flanges, 1½" x 1½" x 8" angles welded to structural members or top cord slot at joist panel points and secure with large washers and nuts. Refer to structural drawing details for additional information. Do not use perforated strap. Do not use concrete anchors.

3. HANGERS: Manufactured by Anvil, Grinnell or Tolco.

- SINGLE RUNS OF PIPE, NO EXPANSION PROBLEM: Adjustable clevis type Grinnell Figure 260.
- MULTIPLE RUNS: Trapeze hangers.
- BEAM CLAMPS: Grinnell Figure 92 for smaller pipe
- BEAM CLAMPS: Grinnell Figure 228 (storm or sanitary 8" and larger)

4. SUPPORT FROM BELOW: All piping near the floor, or where ceiling structure does not have sufficient strength, or where there is no ceiling shall be supported from below. Support members shall be steel pipe with base plates, or welded steel structure suitably braced.

5. SUPPORT MATERIAL FINISH: Galvanized or cadmium plated steel.

6. PIPE SADDLES: Install 18 gauge, formed galvanized sheets at each support point for insulated pipe, shaped to fit pipe, and covering bottom half of pipe. Length at saddle shall be not less than twice the insulation outside diameter, 16" minimum length. Provide compressible gasketing between non-insulated plastic pipe and hangers. Provide insulating material between dissimilar metal.

C. PLUMBING CHASE PIPING: Plumbing piping located in chases and at individual fixtures not located at chases shall be rigidly supported and aligned using the Sumner Pipe Support and Alignment System, Hubbard Holdrite System or Unistrut with U-bolts and pipe clips.

## 2.3 VALVE INSTALLATION

Ball and butterfly valves shall be installed such that handle for valve is positioned on the side of the pipe and is pulled down to close the valve. Provide access panels of adequate size for concealed valves. All valves above a ceiling shall be installed within 24" of the ceiling. All valves shall be located such that there is NO OBSTRUCTION for accessing or operating valve.

## 2.4 CLEANING DOMESTIC WATER PIPING

Flush thoroughly, sterilize with chlorine solution for minimum 24 hours, then flush clean. Strength of chlorine solution, minimum dosage 50 ppm, and methods must comply with local Code and Health Authorities. At completion, there must be no discernible odor. System shall be flushed afterwards until remaining chlorine content is less than 0.2 ppm. Post warnings until sterilization is complete.

## 2.5 TESTING PIPING SYSTEMS

- A. GENERAL: Test all piping systems to assure that they are absolutely leak free. Pipe to be insulated shall be proved leak free before pipe is concealed. LTY to witness and approve all testing. If piping is concealed prior to LTY witnessing and approving testing, contractor shall expose entire piping system and re-test piping for LTY to witness and approve.
- B. PRESSURE TEST METHOD: Hydraulically test (no air testing allowed) domestic water piping with a minimum test pressure of 150 psig. Maintain pressure for 8 hours. During this test period, inspect all pipe fittings and accessories in the piping and eliminate all leaks.
- C. FINAL TEST: Subject each piping system to its normal operating pressure and temperature for not less than twenty-four hours. The piping systems must remain absolutely tight during this period. The satisfactory completion of any test or series of tests will not relieve the contractor of responsibility for ultimate proper and satisfactory operation of piping systems and their accessories.

## 2.6 SLEEVES

Provide sleeves for all piping passing through walls, floors not on grade and roof slabs. Make sleeves of galvanized pipe and sized to provide clearance of 1/4" around piping or pipe insulation if pipe is insulated. Set end of sleeve flush with the surrounding surface of wall or ceiling in which sleeve is installed. Floor slab sleeves shall extend 3" above floor level. Provide vented sleeves for all gas piping below floor slabs or paved areas. Pipes through grade beams shall be sleeved per structural engineer's drawings. As a minimum pipe shall be wrapped with 1" thick closed cell pipe insulation.

## 2.7 PLATES

Provide chromium plated wall and ceiling plates for all exposed piping, at point piping passes through walls or ceilings. Plates shall be large enough to completely cover pipe sleeves. On insulated piping, inside diameter of plates shall just exceed outside diameter of pipe covering. Plates may be omitted for pipe sizes larger than 6".

## 2.8 VALVE AND FITTING SIZES

All hand valves, fittings and other piping accessories shall be size of the line in which installed unless specifically indicated otherwise on the Drawings.

## 2.9 DIELECTRIC UNIONS

Provide dielectric insulating unions at all connections between dissimilar metals, except at final fixture connections, such as galvanized pipe connection to brass water faucet.

## 2.10 FITTINGS

COPPER: Conform to ANSI Specification B16.22.

## 2.11 VALVES, STRAINERS AND DEVICES

- A. GENERAL: All pressures shown below are minimum working pressures. Provide memory stops for valves used for throttling service.
- B. GATE VALVE FOR PLUMBING SYSTEMS: Provide for copper pipe 2½" and larger only: Low lead, 150# bronze, threaded connection, union bonnet, solid wedge and rising stem. Nibco T-134 or F-617-0. Gate valves shall be certified and U.L. listed for lead free domestic water use.
- C. BUTTERFLY: 2½" and larger only, 200# full lug ductile iron type body, EPDM stem seals and seat liner, aluminum bronze disc, 416 stainless steel stem, extended neck for insulated lines, notched top plate with handle for throttling. All valves certified suitable for dead end service with no downstream flange. Nibco LD-2000.
- C. BALL VALVE FOR PLUMBING SYSTEMS: Provide for 2" and smaller pipe: Bronze body, threaded connection, full port, Teflon seat, stainless steel trim, extension stem for insulation. Nibco T-585-66-LF-EL.
- D. CHECK: 2" and under, 125# bronze body, bronze swing check with Teflon seat; 2½" and over 125# iron body, flanged, bronze trim. Nibco T-413-Y-LF or W-920-W-LF.
- E. INSULATION PROVISIONS: Valves on insulated lines shall have stems extending through insulation.
- F. INSTALLATION: Ball and butterfly valves shall be installed such that handle for valve is positioned on the side of the pipe and is pulled down to close the valve. All valves above a ceiling shall be installed within 24" of the ceiling.
- G. BACKFLOW PREVENTER: Provide Watts Series U-909-SQT preventer at makeup water connection to building chilled and heating water systems. Provide 909AG air gap drain funnel with drain line extension. No other brand or model is acceptable. For sizes 2-1/2" and larger, provide stainless steel body RPZ backflow preventer, Watts model 957 with 957AG air gap drain funnel with drain line extension.
- H. ACCEPTABLE MANUFACTURERS: Hammond, Milwaukee and Nibco

## 2.12 MISCELLANEOUS PIPING

- A. GENERAL: Provide all required piping not specifically shown on the drawings but necessary for the proper operation of the systems. Piping materials, methods of installation, fittings, valves, etc., shall conform, in general, to that specified for similar piping systems.
- B. TRAP PRIMER PIPING: Use Type K copper. Piping in contact with concrete shall be protected with Benjamin Foster 60-25 mastic, be PVC coated or installed in protective sleeve.
- C. MISCELLANEOUS DRAINS: Provide drain line to floor drain from backflow preventers, relief valves and other plumbing equipment with automatic drains.

## 2.13 ROUGH-INS AND CONNECTIONS

- A. SPECIAL FIXTURES AND TRIM: Provide rough-ins and connections to cabinet sinks and all trim where shown on the Drawings. Fixtures and trim requiring rough-ins and connections will be furnished loose under the special equipment section of those specifications, installation shall be under this Section. Refer to Architectural Specifications for information on prefab cabinets. Provide stops, risers and P-traps under this Section for prefab cabinets and kitchen equipment provided under the Architectural Specifications.
- B. COORDINATION: The piping and connections for these areas have been indicated approximately. The exact arrangements and locations of various piping and connections shall be determined by shop drawings provided under other sections of these Specifications.

## PART 3 - MATERIALS

### 3.1 EXTERIOR DOMESTIC WATER

- A. GENERAL: This paragraph relates to all water piping below grade, all piping above grade outside of building and piping in contact with concrete.
- B. MATERIALS:
  - 1. PIPING: Type "K" copper rigid water tubing per ASTM B-42 and ASTM B-88, with solder type ASME B 16.18 cast bronze, or ASTM B 16.22 wrought copper alloy fittings, made up with lead-free solder. Solder shall be 95.5% tin, 4% copper, 0.5% silver (lead free, antimony free, zinc-free). Silvabrite 100 by Engelhard Corporation or approved equal. Piping in contact with concrete shall be protected with Benjamin Foster 60-25 mastic or be PVC coated. Victaulic grooved copper piping connection system or equal by Anvil or Grinnell may be used for sizes 3" and larger. Where Victaulic grooved piping is used, Victaulic Style 606/607 couplings shall be used – flaring of rube and fitting ends to IPS dimensions is strictly prohibited and will not be accepted. Viega ProPress copper press joining system/pipe/fittings may be used in lieu of solder or grooved copper systems.
  - 2. MISCELLANEOUS REQUIREMENTS: Connections at water meter shall be as specified by the water district or water department. The 30 feet of piping ahead of the building service shutoff valve shall be Type "K" copper rigid water tubing with sweat fittings and lead-free solder. Install 2" diameter by 6" long capped tee above grade ahead of shutoff valve for electrical grounding use. Install concrete anchors below grade as recommended by the piping manufacturer.

C. COPPER JOINTS:

1. Clean inside and outside of all tubing and fittings.
2. Make up joints with lead-free solder. Solder shall be 95.5% tin, 4% copper, 0.5% silver (lead free, antimony free, zinc-free). Silvabrite 100 by Engelhard Corporation or approved equal. Viega ProPress copper press joining system/pipe/fittings may be used in lieu of solder.

D. TESTING: Test in accordance with recommendations of AWWA.

3.2 INTERIOR DOMESTIC WATER

A. GENERAL: This paragraph relates to all piping inside of building.

B. MATERIALS ABOVE SLAB:

1. All piping shall be hard drawn, copper water tube, Type "L" per ASTM B-88, with solder type ASME B 16.18 cast bronze, or ASTM B 16.22 wrought copper alloy fittings, made up with lead-free solder. Victaulic grooved copper piping connection system or equal by Anvil or Grinnell may be used for sizes 3" and larger. Where Victaulic grooved piping is used, Victaulic Style 606/607 couplings shall be used – flaring of tube and fitting ends to IPS dimensions is strictly prohibited and will not be accepted. Viega ProPress copper press joining system/pipe/fittings may be used in lieu of solder or grooved copper systems.
2. All individual branches serving fixtures, from surface of walls to connections to fixtures or equipment, shall be chrome plated.
3. Solder shall be 95.5% tin, 4% copper, 0.5% silver (lead free, antimony free, zinc-free). Silvabrite 100 by Engelhard Corporation or approved equal. Viega ProPress copper press joining system/pipe/fittings may be used in lieu of solder.

C. MATERIALS BELOW SLAB

1. PEX-a (Engel-Method Crosslinked Polyethylene) Piping: ASTM F 876 and F877 (CAN/CSA-B137.5) by Uponor only – no substitutions.
2. PEX-a Fittings: elbows, adapters, couplings, plugs, tees and multi-port tees (1/2 inch through 3 inch nominal pipe size): ASTM F1960 cold-expansion fitting manufactured from the following material types:
  - a. UNS No. C69300 Lead-free (LF) Brass.
  - b. 20% glass-filled polysulfone as specified in ASTM D 6394.
  - c. Unreinforced polysulfone (group 01, class 1, grade 2) as specified in ASTM D 6394.
  - d. Polyphenylsulfone (group 03, class 1, grade 2) as specified in ASTM D 6394.
  - e. Blend of polyphenylsulfone (55-80%) and unreinforced polysulfone (rem.) as specified in ASTM D 6394.
  - f. Reinforcing cold-expansion rings shall be manufactured from the same source as PEX-a piping manufacturer and marked "F1960".
3. Multi-Port Tees: Multiple-outlet fitting complying with ASTM F 877 (CAN/CSA B137.5); with ASTM F 1960 inlets and outlets.

- a. Engineered polymer branch multi-port tee.
  - b. Engineered polymer flow-through multi-port tee.
  - c. Engineered polymer commercial branch multi-port tee.
  - d. Engineered polymer commercial branch multi-port elbow.
  - e. Engineered polymer commercial flow-through multi-port tee.
4. Manifolds: Multiple-outlet assembly complying with ASTM F 877 (CAN/CSA B137.5); with ASTM F 1960 outlets.
- a. Engineered polymer valved manifold.
  - b. Engineered polymer valveless manifold.
  - c. Lead - free copper branch manifold.
  - d. Lead-free copper valved manifold.
5. PEX-to-Metal Transition Fittings:
- a. Manufacturers: Provide fittings from the same manufacturer of the piping.
  - b. Threaded Brass to PEX-a Transition: one-piece brass fitting with male or female threaded adapter and ASTM F 1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring.
  - c. Brass Sweat to PEX-a Transition: one-piece brass fitting with sweat adapter and ASTM F 1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring.
  - d. PEX-a to Flange Transition: two-piece brass fitting with lead-free ProPEX adapter and steel flange conforming to ASME B 16.5.
6. PEX-to-PEX, Lead Free (LF) Brass Ball Valves (1/2 inch (16 mm) through 2 inch (50 mm) nominal pipe size)
- a. Manufacturers: Provide ball valve(s) from the same manufacturer as the piping system.
  - b. Full-port ball valve: two-piece, ASTM F1960 cold-expansion ends, with PEX-a reinforcing cold-expansion ring.
  - c. LF brass valve with a positive stop shoulder manufactured from C69300 brass.
  - d. In compliance with: 250 CWP, ANSI/NSF 359, ANSI/NSF 14/61, cNSF-us-pw\_G lead free 0.25% Lead max., ASTM F1960, ASTM F 877 (CAN/CSA B137.5).
  - e. Stainless steel ball and trim.
- D. AIR CHAMBERS:
- 1. Install in each water branch, at each fixture and each piece of water supplied equipment.
  - 2. Locate in chases or walls as close to fixture or equipment as possible. Minimum 24" high Type L copper chamber for air, one size larger than branch pipe size.
- E. WATER HAMMER ARRESTERS: Provide on both hot and cold water branches in addition to air chambers. Arresters to be Precision Plumbing Products, Inc. or Sioux Chief, size and location to be based on pipe size, fixture unit count and manufacturer's recommendation. Install according to the Plumbing Riser Diagrams. Sizes shown on Riser Diagrams are PDI sizes. Units shall have 3-year warranty.
- F. VALVING:

1. Provide valve in branch line to each piece of water consuming equipment or fixture.
2. Generally, stop valves serving fixtures are specified in Plumbing Fixtures Section 22 42 00.
3. Valves not specified under Plumbing Fixtures, but to be located exposed to view, shall be chrome plated.

END OF SECTION

## SECTION 22 11 19

### DOMESTIC WATER PIPING SPECIALTIES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

##### 1.2 GENERAL REQUIREMENTS

- A. Provide all accessories and specialties indicated on the Contract Drawings, as specified, and as required under Section General Plumbing.

#### PART 2 - MATERIALS AND METHODS

##### 2.1 SPECIALTIES

- A. HYDRANTS: See Schedule on Drawings.
- B. VACUUM BREAKERS: Provide where required by Plumbing Code or shown on Plans, female inlet and outlet, polished chrome plated vacuum breakers, full size of line.
- C. WATER HAMMER ARRESTERS: Provide on both hot and cold water branches in addition to air chambers. Arresters to be Precision Plumbing Products, Inc. or Sioux Chief, size and location to be based on pipe size, fixture unit count and manufacturer's recommendation. Install according to the Plumbing Riser Diagrams. Sizes shown on Riser Diagrams are PDI sizes. Units shall have 3-year warranty.
- D. VACUUM RELIEF VALVES:
  - 1. GENERAL: Provide on each water heater in cold water inlet connection.
  - 2. RATING: AGA certified, 3/4", 21.5 CFM opens at less than 1/2" vacuum, 200 pounds and 250° F.
  - 3. MODEL: Watts No. 36A.
  - 4. ACCEPTABLE MANUFACTURERS: Cash, McDonnell-Miller and Watts

END OF SECTION



## SECTION 23 00 00 - GENERAL HVAC

### 1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

### 1.2 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. Drawings and Specifications are intended to be complimentary. Any work exhibited in either of them whether in the other or not, is to be executed according to true intent and meaning thereof, the same as if set forth in all. Should any work required by the drawings and specifications be in violation of any Federal, State, County or City laws, ordinance or regulation, those laws and regulations shall prevail, and shall be complied with by the Contractor as a part of this work with no extra compensation.
- B. The drawings are schematic in nature, but show the various components of the system approximately to scale and indicate how they are to be integrated with other parts of the building. Determine exact locations by close coordination with the Owner's Representative, job measurements, determining the requirements of other trades and reviewing all contract documents. The Drawings indicated general routing of the various parts of the systems, but do not indicated all fittings, offsets and runouts which are required. The Contract includes these items as required to fit the system into spaces allotted for them.
- C. Equipment that is scheduled is the basis of the design, and have been coordinated for space, installation and electrical requirements. Space, installation and electrical requirements for other equipment and models from acceptable manufacturers have not been verified or coordinated. Contractor shall verify these requirements prior to using other equipment in his bid and include any additional costs for installation of the equipment. This includes general construction and MEP costs.

### 1.3 PERMITS AND FEES

The contractor shall obtain and pay for all permits and licenses, file all notices, pay all legal fees and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work specified or shown on the drawings. This applies to Federal, State and Local Codes and Requirements. Approval to the various insuring and inspection authorities shall also be obtained. Refer to Architectural sections for additional information.

### 1.4 GUARANTEE

All materials, apparatus and equipment furnished and installed under this Section of these Specifications shall be new and free from any defects when accepted by the Owner and shall be guaranteed in writing for a period of one year from the date of acceptance by the Owner unless noted to have extended warranties.

### 1.5 COOPERATION

The Contractor shall cooperate with other trades on the job and make installations in the proper sequence during the construction of the buildings, and he shall notify the Architect well in advance of construction of all interference of his work with that of other trades and of building construction. This notification shall not relieve the contractor of his responsibilities.

## 1.6 VISITING THE SITE

The Contractor shall be familiar with the Drawings and Specifications and shall have examined the premises and understand the conditions under which he will be obligated to operate in performing the contract. No allowance shall be made consequently for any error through negligence in this regard.

## 1.7 WORKMANSHIP

All work shall be performed in a neat workmanlike manner and in the best practice of the trade. Only workmen skilled in the trades shall be employed to perform the work included in these specifications.

## 1.8 MATERIALS

- A. Materials, when not otherwise definitely specified, shall conform to applicable National Specifications and Standards. All materials shall be certified to not contain any asbestos or other material banned by the Environmental Protection Agency. Lead shall not be used in any material, pipe or solder in contact with the domestic water system.
- B. The names of manufacturers and model numbers have been used in the Contract Documents to establish type of equipment and standard of quality. Where only one name is mentioned for a particular item of material, then that manufacturer is the only one acceptable. Where several names are mentioned, any one of those listed may be furnished provided submittal contains sufficient information to show complete compliance with contract Documents. No attempt has been made to determine if each manufacturer listed will produce material that will comply with all requirements of this project or will fit the allotted space; if they do, then it will be acceptable.
- C. Requests for substitution during the bidding period, in accordance with the requirements of the Special Conditions, must be accompanied by a complete product submittal with all features, accessories and capacities noted. Large equipment must include a 1/4" scale drawing showing how the equipment and required access space are compatible with the available space. Acceptance for bidding does not waive the post bidding requirement for formal submittal and approval.

## 1.9 REMOVAL OF RUBBISH AND CLEAN-UP

Keep area of operations free from accumulation of waste material or rubbish at all times. At the completion of the work, remove all rubbish, tools, scaffolding and surplus materials from the area of operations. The exposed parts of the Mechanical installation which are to be painted shall be thoroughly cleaned of cement, plaster, grease, oil spots and other materials in preparation for painting. All piping shall be cleaned of cement, plaster and other construction debris prior to being concealed above accessible ceilings or being insulated. Clean exposed piping prior to final inspection. All construction areas shall be left "broom" clean on a daily basis. Prior to final acceptance, vacuum clean all mechanical rooms including equipment.

## 1.10 OPERATION TESTS AND ADJUSTMENTS

After completion of the work and before final acceptance thereof, the Contractor shall notify the Architect when he is ready for the balancing of air and hydronic systems which will be performed by a professional test and balance firm selected by the Owner as described in Section 15960.

#### 1.11 LUBRICATION

After the installation is completed, lubricate all moving parts of all equipment furnished under this Division of the Specifications requiring same. Leave with the Owner a brief but complete set of lubrication instructions, showing the recommended frequency of lubrication and the type of lubricant recommended for each piece of equipment.

#### 1.12 NOISE AND VIBRATIONS

The Contractor shall guarantee that the entire system and its component items of equipment, as installed by him, shall operate without objectionable vibration or noises, as determined by the Architect. If, in the opinion of the Architect, objectionable vibration or transmission thereof to the building occurs, the Contractor shall execute such remedial measures as are necessary to eliminate such unsatisfactory operating conditions and the material and labor thereby required shall be performed at the Contractor's expense.

#### 1.13 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. ELECTRICAL: Power wiring is specified in the Electrical Section. Interlock and control wiring (any voltage) is specified under this Section. Controllers and starters, unless part of a motor control center, are specified under this Section.
- B. PAINTING OF EQUIPMENT, PIPING AND ACCESSORIES: Painting Section. However, all items furnished under this Section shall be kept clean and free from corrosion.
- C. OPENINGS: Various Sections. However, the locations of all inserts and openings shall be determined under this Section and coordinated with other Sections in ample time to avoid cutting new construction.
- D. CUTTING, PATCHING AND FURRING: Various Sections. However, the locations of all inserts and openings shall be determined and coordinated with other sections.
- E. EQUIPMENT AND PIPING SUPPORTS: Refer to structural drawings, details and notes for specific support and pipe hanging requirements. Specific loading and attachment methods shall be followed to assure that individual structural members are not overloaded.
- F. COMMISSIONING: A separate Commissioning Agent is a part of this project. Contractor shall work with the Commissioning Agent to ensure that he is available to view the various tests and construction milestones.

#### 1.14 GENERAL EQUIPMENT REQUIREMENTS

Manufacturer's printed directions shall be followed for preparing, assembling, installing, erecting and cleaning manufactured materials or equipment, unless otherwise directed.

#### 1.15 SHOP DRAWINGS

- A. Submit seven complete sets of shop drawings checked and certified by the contractor as being checked, and lists of materials furnished under this Division. Shop drawings shall be approved before installation of the material under consideration.

- B. Shop Drawings shall consist of published ratings of capacity data, detailed construction drawings, wiring and control diagrams, performance curves, installation instructions, manufacturer's installation drawings and other pertinent data. Where the literature is submitted covering a group or series of similar items, the item under consideration shall be clearly indicated. Shop drawing shall list VOC of materials. Contractor shall provide complete scaled drawings of all systems including piping layouts, equipment locations and connections, and coordination with plumbing and electrical conduit and fixtures to ensure no conflicts exist. The front sheet of each copy of the submittal shall have the following typed information:
1. Job name and location.
  2. General Contractor's name, address, Project Manager's name and telephone number.
  3. Submitting Sub-contractor's name, address, Project Manager's name and telephone number.
  4. Suppliers company name, address, salesman's name and telephone number.
  5. Signature of an officer or attorney-in-fact of the Sub-contractor with date and title and a statement that the submittal materials and equipment complies with the Contract Documents.

Any submittal without all of the above information will be rejected without review.

- C. Equipment that has regional representation shall only be supplied by the regional representative that serves the area where the project is located. The regional representative's name and signature shall be included with the shop drawing.
- D. Shop Drawings are required for but are not limited to the following items:

Fan Coil Units	Air-cooled Condensing Units	Ductwork
Fans	Insulation	Air Devices
Controls	Vibration Isolation	Piping Materials

- E. Approval of these submittals shall not be construed as releasing the contractor from compliance with the contract Documents. They are a means of coordinating the work and aiding in the proper selection and installation of equipment. Do not release items such as fire dampers and starters until associated equipment or ductwork drawings are approved. All materials and equipment shall be subject to final acceptance by the Engineer at the completion of construction and adjustments of the system.
- F. If a submittal is returned to the Contractor marked "Rejected" or "Revise and Resubmit", only one (1) additional submittal will be permitted without the Contractor incurring charges for the additional re-submittals. LTY shall be reimbursed by the Contractor for any expense in connection with any necessary submission in addition to the two (2) submissions allowed. Contractor will be billed by LTY at a rate of \$125/hr for these occurrences.

1.16 PROTECTION OF EQUIPMENT

- A. Do not deliver equipment to jobsite until progress of construction has reached the stage where equipment is actually needed, or until building is closed in enough to protect equipment from the weather. Equipment allowed to stand in weather will be rejected, and Contractor is obligated to furnish new equipment at no cost to Owner.
- B. Adequately protect equipment (including all Owner-furnished items) from damage after delivery to job. Cover with heavy cloth as required to protect from damage.
- C. Equipment which has been damaged by construction activities will be rejected. Contractor shall furnish new equipment at no cost to Owner.

1.17 CUTTING AND PATCHING

Coordinate the work with other trades to arrange for all holes, chases, and other spaces necessary for the installation of all components of the mechanical systems. Inform the other trades in ample time for these to be provided. Failure to comply with this requirement may necessitate cutting and patching work. If such work becomes necessary, it will be done under this Section of the specifications, and shall conform to all applicable requirements of other Sections of the Specifications.

1.18 STRUCTURAL STEEL

All structural steel used for the purpose of fabricating pipe supports, pipe guides, pipe anchors, equipment supports, and framing for large ducts and plenums, shall conform to ASTM Designation A-36. All steel used for these purposes shall be new, clean, straight and galvanized.

1.19 SPARE PARTS LISTS, OPERATING INSTRUCTIONS

At completion of job, furnish three copies of spare parts lists and operating instructions for all equipment furnished under this Division. These lists and instructions shall be published by the manufacturer of the equipment and shall be in good condition. Bind in 3-ring binder with project name.

1.20 TOOLS AND SPARE PARTS

Upon completion of the installation, deliver to the Owner all tools and spare parts that are furnished by the Equipment Manufacturer for use with the equipment furnished under this Contract.

1.21 REFRIGERANT AND OIL

Furnish and install full refrigerant and oil charge in the air conditioning refrigeration systems and maintain it for full term of the guarantee.

## 1.22 RECORD DRAWINGS

Obtain a set of project drawings and keep these at jobsite during construction. During the course of construction, mark on these prints any changes which are made, noting particularly locations for those items which will need to be located for servicing. At completion of job, mark each sheet "Record Drawings", date and deliver to Architect.

## 1.23 OWNER'S INSTRUCTIONS

Provide the following periods of instruction to the Owner's designated personnel upon completion of the system's installation:

HVAC System - 4 Hours

Temperature Controls Systems - 4 Hours

## 1.24 ALTERNATES

- A. Determine the scope of each specified alternate proposal by carefully reading all Divisions of the Documents. The Bid Form contains information explaining the extent of the construction to be performed under a specific alternate. Alternate proposals, which are not predominantly mechanical in scope, are described in other Divisions of these Documents. Pay particular note to re-roofing items that may necessitate adjustments to existing piping.

## 1.25 FOUNDATIONS AND EQUIPMENT SUPPORTS

- A. GENERAL: Provide all foundations, supports and vibration isolation equipment.
- B. CONCRETE HOUSEKEEPING PADS: To be provided under Division 3, with pad heights for equipment, as follows:

Condensing Units: 6"

Concrete pads shall be sized for the equipment to be supplied. Pad shall exceed base dimensions by approximately 4" all around. Reinforce pads rebar including #4 bar around perimeter. Tool pad to form chamfered edge.

## 1.26 MECHANICAL INSPECTIONS

- A. Contractor shall formally request inspections from LTY to review any and all MEP installations. Inspections shall include but not be limited to: pipe tests, underground installations prior to backfill, rough-in installations, wall cover inspections, above ceiling inspections, final inspection.
- B. Information required from Contractor on each and every request for inspection is as follows:
  - 1. Specific type of test (i.e. hydrostatic test, head pressure test, medium pressure duct test, etc.).
  - 2. Exact location of test (i.e. area of building with wing or room numbers).
  - 3. Description of test (i.e. partial inspection, walls only, chase walls, wall cover, ceiling cover, etc.)

4. Exact time test started (required test time per Project Manual will need to have elapsed prior to LTY inspection). Estimated time test will start will not be acceptable.
  5. Pressure reading on gauge at time of request for all pipe tests (provide picture of gauge with request).
  6. Verification from General Contractor with name of person that verified, that specific test has been verified by the Contractor and all sub-contractors to meet all requirements of the Specifications and Codes (prior to inspection request).
- C. Contractor shall provide a MINIMUM of 48 hour notice prior to requested inspection time, no exceptions.
- D. INSPECTION REPORTS: After each inspection, LTY will generate an inspection report and distribute promptly. The Contractor will then be given 7 working days from date of report to address all deficiencies listed on the report. The GENERAL CONTRACTOR shall verify that all items on each inspection report have been addressed by their subcontractors in this time period. Once verified the GENERAL CONTRACTOR shall sign-off on each deficiency listed on the report and return the signed-off copy of the inspection report to LTY via e-mail. After the signed-off report is returned to LTY, the GENERAL CONTRACTOR shall request a re-inspection by LTY to close the report. If after 7 working days no re-inspection is requested by the GENERAL CONTRACTOR to close a report, LTY reserves the right to re-inspect whenever our schedule allows, with these re-inspections still being subject to Paragraph E below.
- E. TEST REJECTIONS AND RE-INSPECTIONS: If a test is rejected or a re-inspection of an issued LTY Inspection Report is found to NOT be completely addressed, only ONE (1) additional inspection will be permitted without the Contractor incurring charges for each additional inspection required. LTY shall be reimbursed \$500 by the GENERAL CONTRACTOR for expenses in connection with EACH inspection in addition to the two (2) inspections allowed.

#### 1.27 TESTING

All testing shall be witnessed by the Owner's Representative and the A/E Representative. Notify/coordinate with these personnel for all testing scheduled.

END OF SECTION

## SECTION 23 05 48 – HVAC VIBRATION ISOLATIONS

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

#### 1.02 GENERAL REQUIREMENTS

Provide the miscellaneous HVAC and Plumbing Equipment materials and services as shown on the Drawings and specified herein.

### PART 2 - MATERIALS

#### 2.01 VIBRATION ISOLATION

- A. GENERAL: All vibration isolation devices shall be designed and furnished by a single manufacturer, or supplier, who will be responsible for adequate coordination of all phases of this work. Submittal data shall show type, size and deflection of each isolator proposed.
- B. CORROSION PROTECTION:
  - 1. All vibration isolators shall be designed or treated for resistance to corrosion.
  - 2. Steel components shall be PVC coated, or phosphated and painted with industrial grade enamel. All nuts, bolts and washers shall be zinc electroplated. Structural steel bases shall be thoroughly cleaned of welding slag and primed with zinc chromate or metal etching primer. A finish coat of industrial enamel shall be applied over the primer.
- C. SELECTION: Spring deflections listed are static deflection and are minimum requirements. Isolation efficiencies listed are minimum. The springs shall be capable of 30% over-travel before becoming solid (minimum 1/2" clearance at final inspection). All isolators supporting a given piece of equipment shall be selected for approximately equal deflection.
- D. FCU & FAN:
  - 1. GENERAL: This Section refers to in-line fans and other structure hung fans.
  - 2. FANS LARGER THAN .5 HORSEPOWER: Provide a spring hanger consisting of a rectangular steel box, coil spring, spring cups, neoprene impregnated fabric washer and steel washer. The hanger box shall be capable of supporting a load of 200% of rated load without noticeable deformation or failure. Size for 1½" deflection, 95% efficient.



3. SMALL HORSEPOWER, STRUCTURE MOUNTED FANS INCLUDING CVT BOXES: Provide an elastomeric hanger, consisting of a rectangular steel box and an elastomeric isolation element, which shall be of Neoprene or high quality synthetic rubber with anti-ozone additive. The elements shall be designed for approximately 1/4" deflection and loaded so that deflection does not exceed 15% of the free height of the element. The design shall be such as to prevent metal-to-metal contact between the hanger rod and the steel box.
- E. ACCEPTABLE MANUFACTURERS: Amber/Booth, Kinetics, Korfund, Mason, Peabody, Vibra-Sonics, Vibration Mountings and Southeastern Hose.

### **PART 3 - EXECUTION**

- 3.1 Installation shall comply with manufacturer's requirements and installation details on the Drawings.

END OF SECTION

## **SECTION 23 05 53 – IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

### **PART 2 - MATERIALS AND METHODS**

#### **2.1 EQUIPMENT MARKING**

- A. **GENERAL:** Each piece of mechanical equipment shall be suitably marked with the name as listed on the plans. Name shall be prominently displayed so it may be easily located and read after equipment installation. Pumps may be marked on adjacent piping.
- B. The following equipment shall be marked with decal or stencil painted, 3" high letters:
  - 1. FCU's
  - 2. ACCU's
- C. The following equipment shall be marked with decal or stencil painted, 2" high letters:
  - 1. Fans
- D. Install factory made arrow marker on piping in Mechanical Rooms.

END OF SECTION

**SECTION 23 05 93 – HVAC TESTING AND BALANCING**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

1.2 GENERAL REQUIREMENTS

- A. Do all work required for preparation for HVAC Systems Testing and Balancing to be accomplished by others.
- B. The Testing, Adjusting and Balancing will be contracted and paid for directly by the Owner and will be coordinated with all requirements of Division 23.
- C. The general contractor and appropriate sub-contractors shall turn over the completed job to the TAB contractor before testing begins. The general contractor shall ensure the system is fully operational, has been cleaned and new airfilters installed in all air-handling units prior to requesting the TAB contractor to perform his work.
- D. It shall be the responsibility of the general contractor and appropriate Sub-contractors to cooperate with the Owner’s TAB contractor in furnishing personnel during the tab to make such adjustments and corrections specified by the Tab, including but not limited to sheave changes.
- E. Provide all instruments and equipment required to accomplish necessary testing and adjusting, and as required by the Architect to verify performance. All instruments shall be in accurate calibration, and shall be calibrated in ranges that will be expected.
- F. The general contractor to furnish two sets of reproducible test and balance reports and shop drawings.

1.3 DESIGN CONDITIONS

The air conditioning systems have been designed and the equipment selected to perform as follows:

Summer Conditions

Indoor Temperatures	74° F DB	55% RH
Outdoor Temperatures	97° F DB	77° F WB

Winter Conditions

Indoor Temperatures	70° F DB
Outdoor Temperatures	27° F DB

## **PART 2 - METHODS**

### **2.1 GENERAL**

- A. The HVAC contractor shall clean and adjust all systems as described in paragraph 2.2.
- B. The testing, adjusting and balancing (TAB) of the air conditioning systems and related ancillary equipment for the Owner will be performed by an impartial, technical TAB firm selected and employed by the Owner as described in paragraph 2.4.

### **2.2 HVAC**

#### **A. HVAC CONTRACTOR'S SCOPE OF WORK**

1. As a part of this contract, the HVAC Contractor shall make any changes in the sheaves, belts, dampers, valves, pump impellers, etc. required for correct balance as required by the TAB firm, at no additional cost to the Owner.
2. The HVAC Contractor shall provide and coordinate services of qualified, responsible subcontractors, suppliers and personnel as required to correct, repair or replace any and all deficient items or conditions found during the testing, adjusting and balancing period.
3. In order that all systems may be properly tested, balanced and adjusted as required by these Specifications, the contractor shall operate the systems at his expense for the length of time necessary to properly verify their completion including final adjustments, balancing and readiness for Owner's TAB firm. This length of time shall be acceptable to the Inspector. Contractor shall provide all devices to verify correctness of operation.
4. Contract completion schedules shall provide sufficient time to permit the completion of TAB firm's services prior to Owner occupancy.
5. The Drawings and Specifications have indicated valves, dampers and miscellaneous adjusting devices for the purpose of adjustment to obtain optimum operating conditions, and it shall be the responsibility of the contractor to install these devices in a manner that will leave them adjusted, accessible and readily adjustable. Should any such device not be readily accessible, the contractor shall provide access as requested by the TAB firm. Any malfunction encountered by TAB personnel and reported to the contractor or to the inspector shall be corrected by the contractor immediately so the balancing work can proceed.
6. The scope of the TAB work as defined herein is indicated in order that the contractor will be appraised of the coordination, adjustment and system modification which will be required under the project work in order to complete the Owner's requirements for final TAB. The TAB firm will not have a contractual relationship with this contractor but will be responsible to the Inspector and Owner for the satisfactory execution of the TAB work. The contractor shall allow sufficient funds in the project cost estimate and bid proposal to provide all work which may be required in the TAB phases as defined herein and as may be necessary for the completion of the TAB work as defined by the TAB firm.

B. RELATED WORK

1. The contractor shall have the building and air conditioning systems in complete operational readiness and shall perform all other items as described herein to assist the TAB company in performing the balancing, testing and adjusting of the HVAC systems.
2. For the air distribution systems the contractor shall complete and verify the following:
  - a. Verify installation for conformity to design. All supply, return and exhaust ducts terminated.
  - b. All volume, splitter, extractor and fire dampers properly located and functional. Dampers shall provide tight closure and full opening, smooth and free operation.
  - c. All supply, return, exhaust, transfer grilles, registers, diffusers and terminal units installed, leak tested and operational.
  - d. Air handling systems, units and associated apparatus, such as heating and cooling coils, filter sections, access doors, etc., shall be blanked and/or sealed to eliminate excessive by-pass or leakage of air.
  - e. All fans (supply, return, relief and exhaust) operating and verified for freedom from vibration, proper fan rotation and belt tension; overload heater elements to be of proper size and rating; and clean filters installed.
3. For the automatic controls system the contractor shall complete the following:
  - a. Verify that all control components are installed in accordance with project requirements, a point-to-point check of all DDC and computer controls has been completed and that all controls are functional, including all electrical interlocks, damper sequence, air and water resets, fire and freezestats.
  - b. All controlling instruments calibrated and set for design conditions.
4. The contractor and the suppliers of the equipment installed shall all cooperate with the TAB firm to provide all necessary data on the design and proper application of the system components and shall furnish all labor and material required to eliminate any deficiencies or mal-performance. Furnish a list of all motors with nameplate data and size of overload heater installed with motor amperage during operation.
5. During the balancing the temperature regulation shall be adjusted for proper relationship between controlling instruments and calibrated by the Control Manufacturer using data submitted by the TAB firm. The correctness of the final setting shall be proved by taking hourly readings for a period of three successive eight hour days, in a typical room on each separately controlled zone. The total variation shall not exceed 2° F from the preset medium temperature during the entire temperature survey period.
6. In all fan systems, the air quantities shown on the plans may be varied as required to secure a maximum temperature variation of 2° F within each separately controlled space, but the total air quantity indicated for each zone must be obtained. It shall be the obligation of the contractor to furnish or revise fan drives and/or motors if necessary, without additional cost to the Owner, to attain the specified air volumes.
7. The contractor shall assist the TAB firm in performing three inspections approximately 30 days apart within 90 days after occupancy of the building to insure that satisfactory conditions are being maintained throughout and to correct any unusual condition.
8. The contractor shall assist the TAB firm in performing inspections in the building during the opposite season from that in which the initial adjustments required to produce optimum operation of the system components, to produce the proper conditions in each conditioned space.

C. STORAGE

The contractor shall provide the TAB firm a secure area of ample size, conveniently located for storage of tools, equipment and other items as required.

D. NOTIFICATION

1. Systems shall be complete and in operational readiness prior to notifying the Owner that the project is ready for the services of the TAB firm and the contractor shall so certify in writing to the Owner that such a condition exists.
2. Should the Owner be so notified and the TAB work commence and the systems are found to not be in readiness or a dispute occurs as to the readiness of the systems, the contractor shall request an inspection be made by the Owner. This inspection shall establish to the satisfaction of the represented parties whether or not the systems meet the basic requirements for TAB services. Should the inspection reveal the notification to have been premature, all costs of the inspection and work previously accomplished by the TAB firm shall be paid for by the contractor. Furthermore, such items as are not ready for TAB services shall again be re-tested. Complete, operational readiness, prior to commencement of TAB services, shall include the work described in RELATED WORK above.

2.3 HVAC TESTING, ADJUSTING AND BALANCING

- A. The testing, adjusting and balancing of the air conditioning systems will be performed by an impartial technical firm whose operations are limited only to the field of professional TAB. The TAB work shall be done under the direct supervision of a qualified engineer employed by the TAB company. Work shall be in accordance with procedures and techniques as outlined in the ASHRAE Systems Handbook on TAB and procedural standards for TAB, National Environmental Balancing Bureau.
- B. The TAB firm shall be responsible for inspecting, adjusting, balancing and tabulating the data on the performance of fans, all dampers in the duct systems, all air distribution devices and the flow of water through all coils. The Mechanical Subcontractor, the various subcontractors involved and the suppliers of the equipment installed shall all cooperate with the TAB firm to provide all necessary data on the design and proper application of the system components and shall furnish all labor and material required to eliminate any deficiencies or mal-performance.
- C. Professional firms desiring to submit proposals for the performance of professional services for testing and balancing of HVAC systems for projects shall submit the necessary brochures, history of the firm, qualifications of personnel and other pertinent information to Harris County.
- D. Professional firms submitting such information on its qualifications and personnel shall keep the information current by submittal of supplemental data a minimum of once every six months or when professional or technical personnel who shall perform the work may change. The Owner shall review the qualified professional firms, with current qualifications submitted, which may be available to perform this work and request proposals, from time to time, for new projects.
- E. Each professional firm warrants by the submittal of its personnel qualifications, that such personnel shall be used in the performance of the work. In the event of personnel change, the professional firm submitting a proposal shall submit the complete qualifications and experience record of new personnel. The Owner, upon acceptance of the proposal, expects the work to be performed by the personnel whose experience is so described.

F. QUALIFICATIONS OF THE FIRM

1. The firm shall be one which is licensed to do professional services of this specified type in the State of Texas and as a minimum, have one professional engineer licensed in the State of Texas, with current registration, to perform such professional services.
2. The firm shall have a minimum of one year operation under its current firm name.
3. The firm shall be capable of performing the services specified at the location of the facility described within the time specified, preparing and submitting the detailed report of the actual field work performed and following up the basic work as may be required.

G. DOCUMENTS

1. The Owner will provide plans, specifications and change orders to the TAB firm.
2. The Owner will provide approved submittal data on equipment installed.
3. The Owner will transmit one copy of the following "Records for Owner" to the TAB firm for review and comment:
  - a. "As-Installed" Drawings
  - b. Approved Fixture Brochures, Wiring Diagrams and Control Diagrams
  - c. Shop Drawings
  - d. Instructions
  - e. Valve Charts

H. RESPONSIBILITY OF THE TAB FIRM

1. The TAB personnel shall check, adjust and balance the components of the air conditioning system which will result in optimum noise, temperature and air flow conditions in the conditioned spaces of the building while the equipment for the system is operating economically. This is intended to be accomplished after the system components are installed and operating as provided for in the contract documents, which is the responsibility of the project contractor.
2. The tests shall demonstrate the specified capacities and operation of all equipment and materials comprising the systems. Such tests shall be made as are deemed necessary by the Architect to indicate the fulfillment of the contract. The TAB firm shall then make available to the Engineer such instruments and technicians as are required for spot checks of the systems.
3. The TAB firm will not instruct or direct the contractor in any of the work. Any proposed changes or revisions in the work shall be submitted to the Architect in writing. The Architect will process the proposal as appropriate.

I. BALANCING SERVICES

1. The TAB firm, Architect and Owner will inspect the installation of heating and cooling pipe systems, sheet metal work, temperature controls and other component parts of the heating, air conditioning and ventilating systems. The inspection of the work will cover that part relating to proper arrangement and adequate provisions for the testing and balancing. The inspections shall be performed periodically as the work progresses.
2. Upon formal notification of completion of the installation and start-up of the mechanical equipment by the contractor, TAB firm will balance, test and adjust the system components to obtain optimum condition in each conditioned space in the building.
3. The TAB firm shall be responsible for inspecting, balancing, adjusting, testing and compiling the data on the performance of fans, all dampers in the duct systems, all air distribution devices or heat exchangers, and the water flow through all coils.
4. The TAB firm will, fourteen days prior to Final Inspection, as requested by the Owner prepare seven copies of the completed Test and Balance Report. The report shall be complete with logs, data and records as required herein and all logs, data and records shall be typed, produced on white bond paper and spiral bound. The report shall be certified accurate and complete by a principle engineer of the TAB firm. Transmit one copy directly to the Owner's Representative and the remaining six copies to the Architect. The Architect will review and approve the report. Upon approval, two copies will be submitted to the Owner's Representative and two copies transmitted to the Contractor.
5. Time of testing shall be coordinated with the Commissioning Agent who shall be present to observe and assist in the testing.

J. REPORT: After balancing is complete and before calling for final observation, record and submit for record, the following data:

1. Each CCU & FCU:
  - a. Total supply CFM in full cooling.
  - b. CFM of each outlet served by ducted unit.
  - c. Entering and leaving air temperature.
2. For each supply and exhaust fan:
  - a. Suction and discharge static pressure, total static pressure and total CFM.
  - b. Fan RPM measured by tachometer. Verify rotation.
  - c. Motor nameplate F.L.A., actual amps and voltage.
  - d. CFM of each outlet served by fan.
8. Each rooftop unit:
  - a. Fan data as for fans above.
  - b. Entering and leaving air temperature for cooling and heating.
  - c. Suction and discharge pressures and temperatures.
  - d. Verification that dry eye sight glass shows full charge of dry refrigerant.
  - e. Settings of all operating and safety controls.
9. Each data value that cannot be balanced to meet scheduled design value:
  - a. List the cause of the discrepancy between the actual data and the design value.
  - b. List corrective action that must be taken to meet design value.



- c. Note that “Not Operating” is not an acceptable entry into the Testing and Balancing report. If a piece of equipment is not operating during the testing and balancing process, TAB firm will contact Mechanical Contractor. Mechanical Contractor will repair system as required. TAB firm will then test and balance the system as specified.

K. REPORT APPROVAL

After report is submitted and reviewed by Engineer, Test and Balance Contractor shall meet Engineer at the site to review balancing problems and perform a random check of data values listed in report. Contractor shall bring all necessary testing and balancing equipment to site necessary to measure values.

L. AFTER OWNER OCCUPANCY:

1. After Owner has occupied and is using the building, make three additional inspections of the system during the one-year warranty period (at times directed by Owner) to:
  - a. Correct any Owner observed temperature imbalances.
  - b. Check correct operation of equipment and verify by letter to the Architect for each trip. List in the letter corrections made.
2. At the season opposite that of start up, inspect and verify correct operation of all systems. Make adjustments as required.

END OF SECTION

## SECTION 23 07 19 – HVAC PIPE INSULATION

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

#### 1.02 GENERAL REQUIREMENTS

- A. Install all insulation in conformance with manufacturer's recommendations and these specifications.
- B. Insulation materials manufactured by the following list of companies will be acceptable provided their materials conform to these specifications (see Paragraph on Substitution): Armstrong, CertainTeed, Childers, Foster, Insulphen, Knauf, Polyguard, Manville, Owens-Corning, Pabco, Pittsburg-Corning and SPI.
- C. Flame Spread and Smoke Requirements:
  - 1. All jackets, adhesives, coatings, insulating materials and vapor barrier mastics for air distribution systems shall meet the requirements of NFPA Bulletin 90-A with a flame spread of 25 or less and smoke developed rating not higher than 50.
  - 2. All jackets, adhesives, coatings, insulating materials and vapor barrier mastics for piping and equipment shall have a flame spread not higher than 25 and smoke developed rating not higher than 50.
  - 3. All materials containers shall have a U. L. Label.

### PART 2 - MATERIALS AND METHODS

#### 2.1 CONDENSATE DRAINS

Insulate all condensate drain lines with 1/2" thick AP/Armaflex SS self-seal tube insulation.

#### 2.2 REFRIGERANT PIPING

- A. GENERAL: Insulate all refrigerant suction piping.
- B. MATERIAL: 3/4" thick, closed cell foam insulation with a thermal conductivity (C value) of .27 at 75° F. Insulation shall have a maximum flame spread rating of 25 and a maximum smoke density rating of 50. Chemical composition of material shall not cause or accelerate corrosion or other deterioration of piping. Provide 1" thick insulation if pipe is 2½" or larger.

- C. **INSTALLATION:** Install insulation in accordance with the manufacturer's recommendations using pre-glued slits and butt joints. Visually inspect joints and touchup as necessary with the manufacturer's recommended adhesive. Insulation without pre-glued factory slits shall be installed over piping during fabrication then glued together. Provide UV protective coating for insulation installed outside and cover with aluminum jacketing.
- D. **MANUFACTURER:** Armacell, Rubatex or ImcoLock by IMCOA

END OF SECTION

## SECTION 23 20 00 – HVAC PIPING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

#### 1.2 GENERAL REQUIREMENTS

- A. Construct all piping systems in accordance with applicable ASME Codes. Provide a vent valve at the topmost part and a drain valve at the lowest part of all water piping systems.
- B. Piping shall be installed in a neat and orderly manner parallel to building coordinates with vertical drops. Piping in the vicinity of equipment shall be arranged to not interfere with access panels and maintenance space. Provide unions, flanges and shutoff valves to allow removal of the equipment and its subassemblies without having to remove excessive amounts of building piping or drain water systems. Bull head Tee arrangement is not acceptable.
- C. Provide pipe markers per Section 23 05 53.

### PART 2 - METHODS

#### 2.1 PIPE SUPPORTS

- A. GENERAL: Provide supports of adequate strength for all piping. Piping connected to a piece of equipment shall have a support located near enough to the equipment that there will be no pipe weight supported by the equipment. In no case shall the nearest support be more than 12” horizontally from the connection point. Pipe support material shall be selected to be compatible with the pipe material to prevent galvanic corrosion. The minimum size hanger rod shall be 3/8”.
- B. HORIZONTAL PIPING:
  - 1. SUPPORT SPACING: As recommended by support manufacturer, but spaced not more than below:

<u>Pipe Size</u>	<u>Steel Pipe</u>	<u>Other Pipe</u>
1" & Smaller	6 Feet	4 Feet
1¼" & 1½"	8 Feet	5 Feet
2"	8 Feet	5 Feet
2½" to 4"	8 Feet	6 Feet
6" and Larger	8 Feet	6 Feet

Multiple parallel runs of piping shall be supported from every joist and beam the piping crosses. Where piping runs parallel to structure support from three adjacent joists or beams.

2. **SUPPORT FROM ABOVE:** Support piping near roof or upper floor from structure if sufficient strength exists. Use a method suitable for type of construction and of sufficient strength. Use threaded steel hanger rods of diameter required to safely support loads. Install rods through holes drilled in beam flanges, 1½" x 1½" x 8" angles welded to structural members or bottom cord slot at joist panel points and secure with large washers and nuts. Refer to structural drawing details for additional requirement. Do not use perforated strap.
3. **HANGERS:** Manufactured by Grinnell or Tolco.
  - a. **SINGLE RUNS OF PIPE, NO EXPANSION PROBLEM:** Adjustable clevis type Grinnell Figure 260.
  - b. **MULTIPLE RUNS:** Trapeze hangers.
  - c. **BEAM CLAMPS:** Grinnell Figure 92 except use Figure 228 for pipes 6" and larger.
4. **SUPPORT FROM BELOW:** All piping near the floor, or where ceiling structure does not have sufficient strength, or where there is no ceiling shall be supported from below. Support members shall be steel pipe with base plates, or welded steel structure suitably braced.
5. **SUPPORT MATERIAL FINISH:** Galvanized or cadmium plated steel. Provide solid copper supports for copper piping, or install gas wrap insulating tape on pipe at support point.
6. **PIPE SADDLES:** Install 18 gauge, formed galvanized sheets at each support point for insulated pipe, shaped to fit pipe, and covering bottom half of pipe. Length at saddle shall be not less than twice the insulation outside diameter, 16" minimum length. Provide compressible gasketing between non-insulated plastic pipe and hangers. Provide insulating material between dissimilar metal.
7. **TRAPEZE SUPPORTS:** Shall consist of unistrut or channel with 3/8" thick or heavier all thread rods attached to structure. Provide double nuts and cut all tread so no more than 1" extends beyond nut.

## 2.2 TESTING PIPING SYSTEMS

- A. **GENERAL:** Test all piping systems to assure that they are absolutely leak free. Pipe to be insulated shall be proved leak free before pipe is concealed. Architect shall be notified when testing is performed so that the Engineer and Owner may observe and certify the results.
- B. **PRESSURE TEST METHOD:** Use method suitable for type of piping system being tested. For pressure pipe, use a test pressure approximately 150% of maximum system working pressure but at a minimum pressure of 60 psig. The minimum test pressure for chilled water and heating water shall be 125 psig. Maintain pressure for 8 hours. During this test period, inspect all pipe fittings and accessories in the piping and eliminate all leaks.
- C. **FINAL TEST:** Subject each piping system to its normal operating pressure and temperature for not less than twenty-four hours. The piping systems must remain absolutely tight during this period. The satisfactory completion of any test or series of tests will not relieve the contractor of responsibility for ultimate proper and satisfactory operation of piping systems and their accessories. Pipes that will contain water shall be leak tested with water.

## 2.3 SLEEVES

Provide sleeves for all piping passing through walls, floors not on grade and roof slabs. Make sleeves of galvanized pipe and sized to provide clearance of 1/4" around piping or pipe insulation if pipe is insulated. Set end of sleeve flush with the surrounding surface of wall or ceiling in which sleeve is installed. Floor slab sleeves shall extend 3" above floor level. Provide vented sleeves for all gas piping below floor slabs or paved areas.

## 2.4 PLATES

Provide chromium plated wall and ceiling plates for all exposed piping, at point piping passes through walls or ceilings. Plates shall be large enough to completely cover pipe sleeves. On insulated piping, inside diameter of plates shall just exceed outside diameter of pipe covering. Plates may be omitted for pipe sizes larger than 6".

## 2.6 DIELECTRIC UNIONS

Provide dielectric insulating unions at all connections between dissimilar metals.

## 2.7 FITTINGS

- A. SCREWED: Conform to ANSI Specification B16.3.
- B. COPPER: Conform to ANSI Specification B16.22.
- C. WELDED: Install elbow, transition, branch and weld-o-let lateral fittings in welded systems. Mitered or field fabricated fittings are not acceptable. Flanges shall be weld neck type for sizes 6" and larger pipe.
- D. SPECIAL: Use long radius ells on all pumped lines.

## 2.8 MISCELLANEOUS PIPING

- A. GENERAL: Provide all required piping not specifically shown on the drawings but necessary for the proper operation of the systems. Piping materials, methods of installation, fittings, valves, etc., shall conform, in general, to that specified for similar piping systems.
- B. CONDENSATE DRAINS: From each air conditioning unit drain pan to drain indicated, or to a suitable drain point if not indicated. All lines graded down in direction of flow. Provide trap of height required for air seal. Provide screw plug cleanout at change of direction to allow rodding.
- C. MISCELLANEOUS DRAINS: Provide copper drain line to floor drain from air compressors, air dryers, automatic air vents, backflow preventers, relief valves and other equipment with automatic drains.

## PART 3 - PRODUCTS

### 3.1 REFRIGERANT PIPING

- A. GENERAL: Provide for the systems as shown. Submit shop drawing of piping system showing all traps, pipe sizes, and accessories; drawing to be marked "Approved", and signed by an employee of the Application Engineering Department of the unit manufacturer. Do not install piping until this drawing is submitted and approved.
- B. MATERIALS:
  - 1. PIPE: Type "L" copper ACR tubing.
  - 2. FITTINGS: Wrought copper streamlined, long radius sweat fitting.

3. SOLDER: Sil-Fos, except on valves use solder recommended by valve Manufacturer. Make joints while pipe is under nitrogen purge to prevent formation of oxides inside piping.
- C. ACCESSORIES: Replaceable core type liquid line dryer-strainer sized for system capacity at 2 PSI pressure drop per ARI Standard 710-64, sight glass-moisture indicator, expansion valves, solenoid valves and charging fittings.
- 3.2 CONDENSATE DRAIN PIPING
- A. Material: Type "L" copper.
  - B. Installation:
    - a. Use threaded plugged tee at each change of direction to allow cleaning.
    - b. Install a cleanout every 50 feet of straight run piping.
    - c. Provide positive slope on all piping.

#### **PART 4 - EXECUTION**

- 4.1 EVACUATION: Completely evacuated of all moisture by applying vacuum pump for a minimum of 24 hours. Moisture indicator must indicate a completely moisture-free condition at a time of final inspection. Vacuum must be maintained at 50 microns to completely dry system and remove non-condensables.
- 4.2 DIELECTRIC: Insulate copper pipe from all dissimilar metals, hangers, pipe, etc., with 4 pound/square foot lead shields 6" long wrapped completely around the pipe and placed between hangers and pipe, or elastomeric snubbers of similar design. B-line B1999 vibra cushion and B2000 two piece clamp.

END OF SECTION

## SECTION 23 31 13 – METAL HVAC DUCTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

### PART 2 - MATERIALS AND METHODS

#### 2.1 DUCTWORK

- A. Furnish and install all supply, return, exhaust, outside air and other ductwork shown, together with splitters, extractors, dampers, etc. All ductwork, supports, bracing, etc. shall be constructed of new grade, lock forming quality, G-60 or better galvanized steel sheets.
- B. Dimensions of duct work shown on Drawings are inside air stream dimensions. Allowances have not been made for duct insulation.
- C. Provide adjustable extractors with quadrant lock mechanism equal to Titus AG-45 at all supply outlet taps into trunk duct. Provide conical tap with damper and raised quadrant lock for flexible duct taps, reference detail on the Drawings. Provide adjustable round elbows (0-90°) at ceiling devices connected with flex ducts (not required if Flexmaster self supporting flex is installed).
- D. Ductwork shall conform with current edition of SMACNA "Duct Manual and Sheet Metal Construction for Ventilating and Air Conditioning System" and the National Board of Fire Underwriters Pamphlet 90A, plus more stringent requirements of these Specifications. Adjust location of standing seams to clear structural members.
- E. Duct connections to air handling units and fans shall match the outlet/inlet size, or as recommended by the equipment manufacture, including straight lengths of duct before transitions, to minimize system effect losses. Where duct adapters or damper trays are provided with roof fans, duct connections shall match size for a minimum of 36" before elbow or transition.
- F. All duct transitions shall be gradual with a 15° maximum angle as measured from centerline of duct. This includes angled offset, mitered offset, eccentric transition and concentric transition (2 x 15°).
- G. Ductwork shall be constructed to operate at the pressure as specified under "external static pressure" of the associated air handling unit and fan schedule. Ductwork downstream of VAV boxes and fan coil unit shall be 1" static class ductwork. Ductwork operating at .75 to 2.0" shall be 2.0" pressure rated. Primary ductwork from a variable air volume air handling unit shall be constructed in accordance with Section 2.2 Medium Pressure Ductwork.
- H. Square turns shall be equipped with airfoil turning vanes built to SMACNA Standards. Provide radius turns for elbows less than 90°.
- I. Support ductwork with 1" wide x 20 gage galvanized steel straps; 6'-0" maximum centers but not more than allowed by SMACNA. Connect strap to duct with two sheet metal screws on each side of duct and one on bottom. Exposed ducts shall be supported in a manner to provide a finished appearance.



- J. Install duct braces in duct openings to hold shape of duct until grilles, registers and/or diffusers are installed. Then remove duct brace.
- K. Seal all duct joints, adjustable elbows and spin-in taps with Design Polymerics DP1010 or Hardcast IG601 Iron Grip installed full strength (no dilution). Ductwork subject to moisture and not required to be welded, shall be sealed with Benjamin Foster 3214. DP1020 may be used.
- L. In areas noted to have round double wall ductwork, provide United McGill Acousti-K27. Outer duct shall be constructed of paintable, 18 gauge galvanized steel. Inner duct shall be perforated galvanized steel. Between the inner and outer ducts install 2" thick fiberglass insulation coated to inhibit growth of micro-biological organisms and to eliminate erosion of fibers.
- M. The minimum distance between the air terminal box and the first tap shall be 54". The minimum distance between taps on the same side of the duct shall be 54".
- N. Provide equivalent sized duct of different aspect ratio to accommodate ceiling cavity conditions.
- O. Sheet metal contractor shall install control system and fire alarm system devices that are attached to ductwork. This includes control dampers, sensors and duct smoke detectors.

## 2.2 DUCTWORK FOR OUTSIDE AIR HOODS AND FANS

Where hoods or fans are shown open to mechanical room, shop, etc., provide short length of duct to allow installation of OBD and/or motorized control damper. Duct dimension shall be roof curb opening size or larger if required by damper size.

## 2.3 PLENUMS AND BLANK-OFF PLATES

- A. Provide plenums at louvers, air handling units, fan coil units and other equipment where return air or outside air ducts are shown to connect. Provide plenums for the mounting fans to louvers. Provide full or partial blank-off plates on return air openings as necessary for properly balancing of system supply air, outside air and return air flows or to cover openings where air transfer is not desired.
- B. Construct plenums with galvanized steel framing members and galvanized sheet steel, cross braced or rigidly braced with galvanized angles. Gages and bracing shall conform to SMACNA recommendations for ductwork of like size. Openings for fans, access doors, etc., shall be framed with galvanized steel angles.
- C. Where access doors are shown, provide hinged doors with #202 Ventlok latch.

## 2.4 SHEET METAL SHOP DRAWINGS

Prior to fabrication of any sheet metal, submit Shop Drawings for all ductwork, showing coordination of mechanical, electrical, plumbing and structural components. All crafts shall sign off on final drawings. The shop drawing shall include a construction details booklet (multiple copies), one blue line set of drawings and one reproducible set of drawings. The booklets and reproducible set with comments noted will be returned. Contractor shall provide blue line sets of drawings from the reproducible set for distribution to Owner, Architect and others.

## 2.5 SCREENS

Furnish and install screen on all duct, fan, etc., openings which lead to or are outdoors. Screens shall be No. 16 gage, galvanized steel 1/2" mesh bolted into removable galvanized steel frame. Install screens over return air openings between floors.

## 2.6 CONNECTIONS TO LOUVERS

All connections to louvers shall be in a manner that will be watertight. Ductwork behind louver for a minimum of three feet shall have watertight soldered joints and shall be sloped to weep holes in bottom of louver. Duct shall be lapped over bottom louver blade where possible. Make connections to aluminum louvers with dielectric connections.

## 2.7 METAL CLOSURES

- A. Provide metal closures around all openings in floors or walls through which ducts or piping are passing.
- B. Build 3" high by 3" wide concrete "dam" around duct or return air penetrations of mechanical room floors above grade. Floor return air openings without sound attenuator attached shall be covered with 1" x 1/8" welded steel bar grating supported by 2" x 2" x 1/4" angles attached to slab with 3/4" round drilled anchors, 24" on center.
- C. MATERIALS:
  - 1. Where no fire rating required, and where no fire dampers installed: 18 gage galvanized sheet metal.
  - 2. Where fire rating required or where fire damper is installed: Gage of sleeves shall be as required by the conditions of U. L. listing, but not less than the gage of duct. Minimum 18 gage. Install 1 1/2" x 1/2" x 1/8" angles around duct on both sides of wall or floor penetration.
  - 3. Sleeves for floor pipe penetrations above grade shall be a section of Schedule 40 steel pipe extending 3" above finished floor and sealed watertight.

## 2.8 SADDLES

Provide sheet metal protective saddles at all pipe supports for insulated piping. Refer to Insulation Section.

## 2.9 INSTALLATION OF DUCTWORK AND AIR DEVICES

- A. Prior to all work of this section, Carefully inspect the installed work of all other trades and verify that all such work is complete to the point where fabrication and installation of the work of this section may properly commence.
- B. Verify the location of all ducts, structure, piping and equipment. Coordinate the routing of all work with that of other trades prior to installation. Verify that all ductwork will fit spaces indicated prior to fabrication or installation of any ductwork.
- C. Exact location of all registers, grilles or ceiling outlets shall be verified by the Architect before roughing-in. Reference shall be made to reflected ceiling plan in locating ceiling outlets.
- D. Ducts shall be installed in a neat and workmanlike manner.

## 2.10 ADJUSTMENTS AND CORRECTIONS

Balance all systems of ductwork including exhaust systems to obtain the air quantities indicated for each inlet and outlet. Air quantities shall be further adjusted as required to obtain uniform temperatures in the spaces.

END OF SECTION

## SECTION 23 33 00 – AIR DUCT ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

#### 1.2 SUBMITTALS

- A. Provide submittals as outlined in Section 23 00 00 General HVAC

### PART 2 - PRODUCTS

#### 2.1 DAMPERS

- A. **GENERAL:** Provide dampers where shown on Drawings and wherever necessary for complete control of air flow, including all supply and outside air ducts. Provide multi-blade volume dampers in all zone ducts at multi-zone air handling units. Where access to dampers through a suspended ceiling is necessary, coordinate the proper location of the access doors. Install, mount and connect into ductwork all control dampers furnished under the control contractors supervision.
- B. **SPLITTER DAMPERS:** Shall be constructed of single thickness, 16 gauge galvanized steel, hinged at leaving edge and founded at entering edge, securely riveted or welded to a square operating rod. The length of the splitter damper blade shall be 1½ times the width of the split in the main duct, but not less than 12".
- C. **VOLUME DAMPERS:** Factory constructed of 16 gage galvanized steel for frame and blades. Blades shall not exceed 48" in length or 6" in width, and shall be of the opposed interlocking type. The blades shall be supported on 1/2" diameter rust-proofed axles. Axle bearings shall be self-lubricating ferrule type.
- D. **FLEX TAP CONNECTIONS:** Taps on rectangular low pressure ducts for flexible connections to diffusers, etc shall be 22 gauge, round conical taps with adjustable single blade damper. Damper rod shall be continuous though tap with blade mechanically attached. Provide bearings at each end, and quadrant lock operator with wingnut and 2" standoff bracket for insulation. Refer to detail on the drawings for additional construction details.
- E. **DAMPER ADJUSTING DEVICES:** Each splitter or volume damper shall be fitted with an adjusting device extending beyond external duct insulation.
  - 1. **ACCESSIBLE CEILINGS:** Ventlok #641 regulators attached directly to duct and location marked in ceiling as approved.
  - 2. **NON-ACCESSIBLE CEILING:** Regulators exposed. Ventlok #666 rods and #607 end bearings.

## 2.2 FIRE DAMPERS

- A. Install fire dampers in all duct penetrations and return air openings in fire rated walls, ceilings, floors and chases. Provide fire damper at each sidewall register or grille. Provide additional fire dampers where specified by local building codes and also where shown on drawings.
- B. Construction shall conform to requirements of NFPA Pamphlet No. 90A with recommended steel sleeves, fusible links, spring catches, non-corrosive bearings, etc., and shall be U. L. labeled.
- C. Fire dampers shall be shutter type providing minimum restriction to air flow. Provide Type B for ducts passing through walls. Provide thinline Type A dampers at sidewall registers. Provide Type B (or Type A of equal free area) dampers at wall openings. Select damper thickness to fit within the thickness of the wall with OBD's or other specified devices. Dampers located in medium pressure ducts shall be compatible with this construction including the specified maximum leakage rate. Install dampers in accordance with conditions of their U. L. listing.
- D. Air devices in U. L. fire rated ceilings shall have compatible U. L. classified ceiling dampers with volume adjustment mechanism and extension collar equal to Ruskin CFD-A. Install complete system including thermal blanket on back of air device in accordance with the U. L. listing.
- E. Acceptable Manufacturers: Greenheck, Nailor, Pottoroff, Ruskin and Safe-Air

## 2.3 SMOKE DAMPERS

- A. Dampers shall be 1½ hour fire rated under U. L. Standard 555S. Dampers shall be normally closed with a leakage rate of no more than 10 CFM per square foot at 1" static pressure (Class II). Provide duct sleeve. Damper blades shall be airfoil type for low pressure drop and low noise when in the open position.
- B. Damper operator shall respond to remote signals to open and close, and shall fail in the closed position. Damper operator shall be 120 volts unless noted otherwise. Provide micro-switches to signal full open and full closed positions.
- C. Dampers noted to be combination smoke and fire shall have fusible link assembly to close damper on elevated temperature.
- D. Smoke dampers shall be Nailor Model 1211. Combination dampers shall be Nailor Model 1221.
- E. Acceptable Manufacturers: Greenheck, Nailor, Pottoroff, Ruskin and Safe-Air

## 2.4 ACCESS DOORS TO FIRE AND SMOKE DAMPERS

- A. Provide double wall galvanized steel, insulated access door in duct for inspection and service to fire damper and fusible link. Minimum size shall be 16"x16" with four cam latches unless limited by duct size. Access doors in stainless steel ducts shall be constructed of stainless steel.
- B. Construct access door airtight and conform to recommendations of NFPA and SMACNA.
- C. Opening of access panel shall be within 12" of the damper to allow resetting of the actuator.

## 2.5 FLEXIBLE DUCT

Flexible duct shall be U. L. Listed 181 Class I air duct with CPE inner liner, fiberglass insulation with a C=23, bi-directional reinforced metalized vapor barrier outer jacket and 6" w.c. pressure rating. The insulating value shall be meet the International Energy Code, minimum R=6. The maximum length between duct and air device shall be six feet. The maximum length between duct and single or double duct mixing box shall be three feet. Atco, Flexmaster, Peppertree, and Thermaflex. Connect inner liner to duct tap, air terminal box, round rigid duct or air device with stainless steel or plenum rated Panduit adjustable bands (hose clamps). Secure outer cover with nylon wire tie strap. Tape edges of outer cover to adjacent insulation or duct with FSK foil tape to present a finished appearance.

## 2.6 FLEXIBLE CONNECTIONS BETWEEN AHU, CVT BOX OR FAN AND DUCTWORK

Flexible connections shall be made from neoprene coated, woven glass fiber material, 30 ounce per square yard, installed air tight with at least 1" slack to insure that no vibration is transmitted from fan to ductwork. Air handling units with fans that are internally isolated from the housing do not require flexible connections.

## 2.7 ACOUSTICAL LINER

- A. GENERAL: Provide 1" thick acoustical lining in return air ducts and return air plenums. Do not install in any supply air duct or kitchen return air duct.
- B. MATERIAL: Owens-Corning "Aeroflex Duct Liner" or equivalent by CertainTeed; 1½ pound per cubic foot density, neoprene faced, "K" value not more than .27 at 75° F mean temperature difference.
- C. INSTALLATION: Adhere liner, with coated side toward air stream, to all interior sides of duct with 100% coverage of Foster 85-11. Further secure the liner with mechanical fasteners on maximum 12" centers. All edges and fasteners shall be coated with one brush coat of Foster 30-35.
- D. PLENUMS: Plenum interiors exposed to view through louvers and grilles shall be lined and have pins painted flat black.

## PART 3 - EXECUTION

- 3.1 Installation shall comply with manufacturer's requirements and installation details on the Drawings.
- 3.2 Install backdraft and control dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.
- 3.3 Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
  - A. At each change in direction and at maximum 50-foot spacing.
  - B. Upstream from turning vanes.
  - C. Upstream or downstream from duct silencers installed in ducts.

END OF SECTION

## SECTION 23 34 16 – HVAC FANS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

#### 1.2 SUBMITTALS

- A. Provide submittals as outlined in Section 23 00 00 General HVAC

### PART 2 - PRODUCTS

#### 2. FANS

- A. **GENERAL:** All fans shall be AMCA rated for air and sound. Each fan shall have fan blade and drive guards, disconnect switch and mounting isolators where applicable. Belt drive fans shall have adjustable motor base plates and adjustable cast iron drives sized for 150% of motor horsepower. Dampers shall be aluminum construction with stainless steel shafts and Teflon bushings. Fans and their accessories shall be a prewired assembly from the factory for single point connection by the electrical subcontractor.
- B. **INLINE FANS:** Direct or belt drive as noted with fan wheel and motor assembly mounted on hinged side access panel. Fan wheel shall be aluminum backward inclined, non-overloading centrifugal type with matching deep venturi cone. Interior of housing shall be fiberglass insulated for sound attenuation. Provide automatic belt tensioner and fan installation hardware for application shown.
- D. **FAN:** Centrifugal fans shall have aluminum, backward curved, non-overloading wheel. Propeller fans shall be of heavy aluminum construction with a minimum of five blades set in a smooth venturi orifice.
- C. **ACCEPTABLE MANUFACTURERS:** Acme, Cook, Greenheck and Big Ass Fans.

### PART 3 - EXECUTION

- 3.1 Installation shall comply with manufacturer's requirements and installation details on the Drawings.

END OF SECTION

## SECTION 23 63 00 – DUCTLESS DX-SPLIT SYSTEMS

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

#### 1.02 GENERAL REQUIREMENTS

Provide motor starters and controllers for motors provided under this Section. Refer to Section Miscellaneous Equipment and Requirements for starter and motor requirements. Equipment and accessories shall be prewired at the factory for single point connection by the electrical subcontractor.

#### 1.03 EQUIPMENT NAMEPLATES

Each piece of equipment shall have a nameplate identifying manufacturer, model number, serial number, voltage, phase, amperage, refrigerant type, etc. as applicable. For units outside, nameplate shall be stainless steel or have a protective cover to prevent sun fading.

### PART 2 - MATERIALS AND METHODS

#### 2.01 DUCTLESS SPLIT SYSTEM

- A. GENERAL: System shall consist of outdoor condensing unit connected to one or more duct free, wall or ceiling mounted fan coil units. System shall be designed to operate as a unit complete with microprocessor control system.
- B. AIR COOLED CONDENSING UNIT
  - 1. HOUSING: Cabinet shall be constructed of galvanized steel, bonderized and coated with baked-enamel finish. Provide access panels for ease of service.
  - 2. COMPRESSOR: Fully hermetic reciprocating or scroll type operating with R-22 refrigerant. Unit shall have internal protection for over temperature and over current. Provide crankcase heater. Refrigeration system shall have gage ports, service valves, accumulator, filter dryer and pressure relief. Heat pump units shall have reversing valve and heating mode metering device.
  - 3. CONDENSER FAN: Direct drive propeller type with internally protected, totally enclosed motor.
  - 4. CONTROLS AND SAFETIES: Unit shall have time delay restart, automatic restart on power failure, safety lockout, high and low pressure safeties.
- C. EVAPORATOR UNIT
  - 1. GENERAL: Indoor, ceiling or wall mounted, direct expansion fan coil unit complete with electric controls, microprocessor control system and integral temperature sensing.



2. FAN: Direct drive tangential blower with automatic motor-driven vertical air sweep. Fan motor shall be three speed type.
  3. COIL: Copper tube aluminum fin with refrigerant metering device. Provide condensate drain pan and drip pan under headers.
  4. CONTROLS: Shall be microprocessor-based and control space temperature, determine optimum fan speed and run self-diagnostics. Provide remote wireless controller for programming and temperature adjustment.
  5. FILTERS: Factory supplied, permanent cleanable type with rack.
- D. ACCEPTABLE MANUFACTURERS: Carrier, Daikin, Mitsubishi Sanyo and Hitachi.

END OF SECTION

## SECTION 26 00 00 – GENERAL ELECTRICAL

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

#### 1.02 GENERAL REQUIREMENTS

Provide all supervision, labor, equipment and materials required for the installation of complete and operating electrical systems in the building. Pay all fees and obtain all permits related to construction activities and utility service installation.

#### 1.03 GUARANTEE

All materials, apparatus and equipment furnished and installed under this Section of these Specifications shall be new and free from any defects when accepted by the Owner and shall be guaranteed in writing for a period of one year from the date of acceptance by the Owner. Provide extended equipment warranties as necessary to meet this requirement.

#### 1.04 COORDINATION

- A. Coordinate work of this Division with that of other Divisions so that various components of the building will be installed at the proper time, will fit the available space and will allow proper service access to those items requiring maintenance. This means adequate access to all equipment, not just that installed in this Section.
- B. Where various items of equipment and materials are specified and scheduled, the purpose is to define the general type and quality level, not to set forth the exact trim required to fit the various types of ceiling, wall or floor finishes. Provide materials which will fit properly the types of finishes actually installed.
- C. It is contractor's responsibility to verify and coordinate with manufacturer for latest part numbers for all high voltage and low voltage system components and equipment during bidding period. Provide latest version of equipment.

#### 1.05 DRAWINGS

- A. The drawings indicate approximate locations of the various items of electrical systems. These items are shown approximately to scale and attempt to show how these items should be integrated with building construction. Locate all the various items by on-the-job measurements, conformance with Contract Documents and cooperation with other trades.
- B. Prior to locating light fixtures, confer with Architect as to desired method of locating fixtures in the various areas. In no case should fixture locations be determined by scaling drawings.
- C. All light fixtures, speakers and other ceiling devices shall be located to conform to the ceiling grid system. Examine all drawings to become familiar with this requirement. Lighting fixtures in mechanical spaces are shown in their approximate location only. Do not install light fixtures until mechanical piping and ductwork is installed, then install lights in a location to provide best lighting.

- D. In certain instances, the Architect may require relocation of outlets, switches, etc. Where relocation is within five feet of location shown on drawings, and when Contractor is informed of necessary relocation before work is begun on this portion of the job, no extra compensation will be allowed.
- E. The drawings are schematic in nature and are not intended to show exact locations of conduit, but rather to indicate distribution, circuitry and control.

#### 1.06 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. The drawings and specifications are intended to be complimentary. Any work exhibited in either of them, whether in the other or not, is to be executed according to the true intent and meaning thereof, the same as if set forth in all.
- B. Disagreement between the Drawings or specifications or within the Drawings or specifications shall be estimated using the better quality or greater quantity of material or installation, and a request for information shall be made to the Engineer.

#### 1.07 ALTERNATES

Determine the scope of each specified alternate proposal by carefully reading all Divisions of the Documents. The Bid Form contains information explaining the extent of the construction to be performed under a specific alternate. Alternate proposals, which are not predominantly electrical in scope, are described in other Divisions of these Documents.

#### 1.08 CODES

All materials and their installation shall be in accordance with the National Electrical Code, local building codes and the National Safety Code. Nothing in the plans and specifications shall be construed to permit work not conforming to the most stringent of the codes. Particular attention shall be paid to the U. L. codes for fireproofing of conduit, electrical devices and light fixtures that are part of or pass through fire rated ceilings, walls and floors.

#### 1.09 VISITING THE SITE

The Contractor shall be familiar with the Drawings and Specifications and shall have examined the premises and understand the conditions under which he will be obligated to operate in performing the contract. No allowance shall be made consequently for any error through negligence in this regard.

#### 1.10 ELECTRICAL SERVICE

- A. GENERAL: Obtain (during the bidding period) from the Power Company all required information to provide a complete electrical service installation as shown on the Drawings.
- B. FEES: Pay all fees and installation costs charged by the Power Company for temporary service. Power Company fees and charges for the permanent service will be paid by Owner. Kilowatt hour charges shall be paid by contractor until building is accepted by Owner.
- C. SERVICE: The service characteristics are 480Y/277V, 3 phase, 4 wire. The Power Company is CenterPoint Energy.

- D. NEW SERVICE ENTRANCE: Provide bus-type weatherhead, bus-type CT/meter, free standing service rack with galvanized steel support poles, cable tap box, j-boxes, disconnect switch, protective bollards or other special construction as required by the Power Company. Refer to Power Company standards. Contractor must contact power co. for electrical service standard during bidding period.

#### 1.11 TEMPORARY SERVICE

Provide a temporary electrical service for construction power. Size and voltage as required for construction activities as specified by the General Contractor. Construction site distribution shall be overhead and comply with NEC and OSHA Standards. Remove all temporary wiring upon project completion.

#### 1.12 GENERAL REQUIREMENTS FOR ALL MATERIALS

- A. Provide all parts and accessories necessary for equipment and complete installation.
- B. Provide factory applied finish on all exterior surfaces of electrical equipment. Any item which has the finish marred must be refinished to a new condition before final acceptance.
- C. Provide three copies of spare parts lists and operating and maintenance instructions for all distribution apparatus, major equipment and auxiliary systems. These shall be bound in folders with suitable identification on front cover. Deliver to Architect prior to final acceptance.
- D. All materials must be new and of good quality and shall bear the stamp of approval of the Underwriters' Laboratories, Inc. (U. L.). Equipment and materials shall be used and installed consistent with the U. L. testing and U. L. requirements. All materials shall be certified to not contain any asbestos, PCB's or other material banned by the Environmental Protection Agency.

#### 1.13 COORDINATION DRAWINGS

- A. The Mechanical Contractor shall take the lead in coordinating the Mechanical (HVAC), Electrical, Plumbing and Fire Protection Systems within the building.
- B. Contractor shall provide coordination drawing showing Mechanical (HVAC), Electrical, Plumbing and Fire Protection Systems within the building. Submitting the contract drawings as coordination drawings will not be acceptable.

1. Indicate the proposed locations of pipe, duct, equipment and other materials. Include the following:
  - a. Wall and type locations
  - b. Clearances for installing and maintaining insulation.
  - c. Locations of light fixtures and sprinkler heads.
  - d. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.
  - e. Equipment connections and support details.
  - f. Exterior wall and foundation penetrations.
  - g. Routing of storm and sanitary sewer piping.
  - h. Fire-rated wall and floor penetrations
  - i. Sizes and locations of required concrete pads and bases.
  - j. Valve stem movement.
  - k. Structural floor, wall and roof opening sizes and details.
2. Indicate scheduling, sequencing, movement and positioning of large equipment in the building during construction.

3. Prepare floor plans, elevations and details to indicated penetrations in floors, walls and ceilings and their relationship to other penetrations and installations.
  4. Prepare reflected ceiling plans to coordinate and integrate installations, air *distribution* devices, light fixtures, communication systems components and other ceiling *mounted* items.
- C. The Contractor and Sub-Contractors shall not install any item until the coordination *has been* completed and reviewed by the Construction Manager, Owner and A/E Team.
- D. This Contractor shall be responsible for coordination of all items that will affect the installation of the work of this Division. This coordination shall include but not be limited to: ampacity, capacity, electrical and piping connections, space requirements, system construction, building requirements and special conditions.
- E. By submitting shop drawings on the project, this Contractor is indicating that all *necessary* coordination has been completed and that the systems, products and equipment *submitted can* be installed in the building and will operate as specified and intended, in full coordination with all other Contractors and Subcontractors.

#### 1.14 SUBMITTALS

- A. The purpose of these submittals is to attempt to aid the contractor in such a manner that improper or unacceptable materials are not delivered to or installed on the job. Approval of these submittals shall not be construed as releasing The Contractor from compliance with the Contract Documents. All materials and equipment shall be subject to final acceptance by the Engineer at completion of construction.
- B. Equipment and material submittals must show sufficient data to indicate complete compliance with contract documents as follows:
1. Proper sizes and capacities.
  2. That the item will fit in the available space in a manner that will allow proper service.
  3. Construction methods, materials and finishes.
- C. Catalog data must be clearly marked to indicate the item or model number being submitted and must include all specified accessories. All information on a catalog sheet not pertaining to the item being submitted must be marked out.
- D. All submittals must be bound in book form with a table of contents listing all items in that specific submittal. Loose catalog sheets or drawings will not be acceptable. All submittals on the project need not be submitted in one book. The front sheet of each copy of the submittal shall have the following typed information:
1. Job name and location.
  2. General Contractor's name, address, Project Manager's name and telephone number.
  3. Submitting Sub-contractor's name, address, Project Manager's name and telephone number.
  4. Supplier's company name, address, salesman's name and telephone number.
  5. Signature of an officer or attorney-in-fact of the Sub-contractor with date and title and a statement that the submittal materials and equipment complies with the contract Documents.

Any submittal without all of the above information will be rejected without review.

- E. For any item to be installed in or on a finished surface (such as tee bar acoustical ceiling, plaster wall), Contractor certifies by making the submittal that he has checked all applicable contract Documents and that the item submitted is compatible with the surface finish on which it is to be installed.
- F. Submit shop drawings and/or brochures for:

Switchgear	Wiring Devices	Light Fixtures
Lighting Control Devices	Fire Alarm System	

- G. If a submittal is returned to the Contractor marked “Rejected” or “Revise and Resubmit”, only one (1) additional submittal will be permitted without the Contractor incurring charges for the additional re-submittals. Lee Truong & Yu Engineers (LTY) shall be reimbursed by the Contractor for any expense in connection with any necessary submission in addition to the two (2) submissions allowed. Contractor will be billed by LTY at a rate of \$125/hr for these occurrences.

#### 1.15 SUBSTITUTIONS

- A. The names of manufacturer and model numbers have been used in the Contract Documents to establish types of equipment and standards of quality and are intended to be the Basis of Bid. If only one manufacturer is named for a specific item of equipment alternate manufacturers shall be acceptable as a substitution/approved equal as specified in this Article.
- B. All other brands, including any additional names which may be listed as “Alternates” or “Approved Equal” must conform with the specifications, size, accessories, etc. of the first named brand and be subject to Paragraph D and E of this Article. Alternate equipment must be equal from the standpoint of materials, construction and performance. Request for substitution must be accompanied by complete data and descriptive sheets during the bidding period as described in Paragraph D and E of this Article.
  - 1. Submitted on Bidder’s letterhead attached to Proposal Form with individual deductive amounts stipulated and the documentation required in Paragraph E-03.
  - 2. All savings for Owners selection of deductive amounts by acceptance of alternate or substituted items are to be paid to the Owner.
- C. All equipment within common group or category (e.g. switchgear, lighting fixtures, fire alarm, etc.) shall be same manufacturer.
- D. Proposed Substitutions/Approved Equals:
  - 1. Submitted no less than 7 calendar days prior to bid date.
  - 2. Submit proposed substitutions with catalog data and/or manufacturer’s shop details indicating all modifications required to conform with specified brand. Include all relevant items necessary to make a determination of equal status or submittal shall be deemed incomplete and rejected.
  - 3. If submittal contains sufficient information to prove compliance with the Contract Documents, then that alternate submittal will be acceptable. Approved submittals for bidding purposes only will be published by addenda.
- E. Substitutions with prior approval:
  - 1. Submitted on Bidder’s letterhead attached to Proposal Form with individual additive/deductive amounts stipulated and the documentation required in Paragraph B-2.
  - 2. Owner reserves the right to accept or reject any or all substitution proposals before execution of Contract.
  - 3. Provide all design/engineering services required to make adjustments in space, systems, utilities, etc. and pay all additional costs of utilities, construction or professional services that may be incurred due to the acceptance of any substitution.

#### 1.16 PROTECTION OF EQUIPMENT

- A. Do not deliver equipment to jobsite until progress of construction has reached the stage where equipment is actually needed, or until building is closed in enough to protect equipment from the weather. Equipment allowed to stand in weather will be rejected, and Contractor is obligated to furnish new equipment at no cost to Owner.

- B. Adequately protect equipment (including all Owner-furnished items) from damage after delivery to job. Cover with heavy cloth as required to protect from damage.
- C. Equipment which has been damaged by construction activities will be rejected. Contractor shall furnish new equipment at no cost to Owner.

#### 1.17 FOUNDATIONS AND EQUIPMENT SUPPORTS

- A. GENERAL: Provide all foundations and supports.
- B. CONCRETE HOUSEKEEPING PADS: Concrete pad to be provided under Division 3, for all floor mounted equipment. 5-1/2" high concrete in central plant, main normal and emergency electrical rooms, fire pump room. 4" high concrete for other electrical rooms. Concrete pads shall be sized for the equipment to be supplied. Pad shall exceed base dimensions by approximately 4" all around. Reinforce pads with 6" x 6" woven wire mesh and #4 bar around perimeter. Tool pad to form chamfered edge. Furnish galvanized anchor bolts with layout templates for installation in equipment pads. Bolts shall be of the size and quantity recommended by the manufacturer and where vibration isolators are used, they shall be anchor bolted to the equipment pad.  
Note: Concrete pad for outdoor power company pad mounted transformer shall be constructed per power company standard. Also, Concrete pad for emergency generator and outdoor switchgear shall have the same requirement as the power company pad mounted transformer. Re: Power co. standard for outdoor conc. pad height.
- C. OUTDOOR ELECTRICAL EQUIPMENT: Provide structural pad to support pad mounted transformers and outdoor switchgear. Provide galvanized pipe or angle iron structure to support weatherheads, meters, and outdoor protective devices and disconnect switches.
- D. INSIDE ELECTRICAL EQUIPMENT: Securely attach panels to block walls with concrete bolts. When attaching to sheetrock or other less substantial walls, provide blocking and unistrut cross supports to securely attach panel to structural members. Where panels are required to be freestanding provide angle iron support structure bolted to floor and building structure.
- D. VIBRATION ISOLATION: Install dry type transformers on four waffle pad type isolators.

#### 1.18 NOISE

Eliminate any abnormal noises which are not considered by the Architect to be an inherent part of the systems as designed. Abnormal buzzing in equipment components will not be acceptable.

#### 1.19 RECORD DRAWINGS

- A. Obtain a set of project drawings and keep these at jobsite during construction. During the course of construction, mark on these prints any changes which are made, noting particularly locations for those items which will need to be located for servicing. At completion of job, mark each sheet "Record Drawings", date, signature, and deliver to Architect.
- B. Approval: Prior to final acceptance of the Work of this Division, the Contractor shall submit three prints of properly certified Record Drawings to the Engineer for review and shall make changes, corrections or additions as the Engineer may require to the Record Drawings. Two final sets furnished to Owner.

#### 1.20 MOUNTING HEIGHTS

A. GENERAL: Heights are measured to centerline from the finished floor. Where devices are located in block walls Architect may require height to be adjusted so junction box is in a desired relationship with the mortar joint. Device must still be mounted within the acceptable height range for ADA.

B. DEVICE:

Light switch	46"
Receptacle	18"
Receptacle at counter	7" above countertop
Data outlet	18"
Telephone outlet	18"
Telephone outlet at counter	7" above countertop
Wall telephone	46"
Desk telephone	18"
Clock outlet	12" below ceiling or 96" maximum
Wall exit light	Bottom 4" above door frame or 96"
Fire alarm pull station	46"
Fire alarm horn or flasher	on ceiling if possible otherwise at 82"
Wall TV outlet	18"
Outdoor bells or speakers	as shown on the Architectural Drawings
Wall Pack Lights	as shown on the Architectural Drawings

Note: See Technology consultant's Drawings for additional mounting height requirement for technology devices.

#### 1.21 ELECTRICAL INSPECTIONS

A. Contractor shall formally request inspections from Lee Truong & Yu Engineers (LTY) to review any and all electrical installations. Inspections shall include but not be limited to: system tests, grounding tests, underground installations prior to backfill, rough-in installations, wall cover inspections, above ceiling inspections, final inspection.

B. Information required from Contractor on each and every request for inspection is as follows:

1. Specific type of inspection (i.e. underground conduit installation, wall cover up, fire alarm demonstration, etc.).
2. Exact location of test (i.e. area of building with wing or room numbers).
3. Description of test (i.e. partial inspection, walls only, chase walls, wall cover, ceiling cover, etc.)
4. Exact time of any tests that are to be observed. Estimated time test will start will not be acceptable.
5. Verification from General Contractor with name of person that verified, that specific test has been verified by the Contractor and all sub-contractors to meet all requirements of the Specifications and Codes (prior to inspection request).

C. Contractor shall provide a MINIMUM of 48 hour notice prior to requested inspection time *when possible*.

D. INSPECTION REPORTS: After each inspection, LTY will generate an inspection report and distribute promptly. The Contractor will then be given 7 working days from date of report to address all deficiencies listed on the report. The GENERAL CONTRACTOR shall verify that all items on each inspection report have been addressed by their subcontractors in this time period. Once verified the GENERAL CONTRACTOR shall sign-off on each deficiency listed on the report and return the signed-off copy of the inspection report to LTY via e-mail. After the signed-off report is returned to LTY, the GENERAL CONTRACTOR shall request a re-inspection by LTY to close the report. If after 7 working days no re-inspection is requested by the GENERAL CONTRACTOR to close a report, LTY reserves the right to



re-inspect whenever our schedule allows, with these re-inspections still being subject to Paragraph E below.

- E. TEST REJECTIONS AND RE-INSPECTIONS: If a test is rejected or a re-inspection of an issued LTY Inspection Report is found to NOT be completely addressed, only ONE (1) additional inspection will be permitted without the Contractor incurring charges for each additional inspection required. LTY shall be reimbursed \$500 by the GENERAL CONTRACTOR for expenses in connection with EACH inspection in addition to the two (2) inspections allowed.
- F. GOVERNMENTAL INSPECTIONS: Contractor shall test and demonstrate systems, allow for LTY and Owner inspections, and correct all punch list items before arranging for inspections from the Fire Marshall or other final "Certificate of Occupancy" inspection requirements. This will require that the contractor complete systems in a timely manner to meet construction schedules.

## 1.22 TESTING BY CONTRACTOR

### A. GENERAL:

1. All wiring, instruments, apparatus and equipment shall be tested for continuity, ground and short circuits before the circuits are energized. For 120 Volts circuits, the neutral/s may require disconnecting. A complete record of all testing shall be submitted to Owner at completion.
2. Tests shall be made during the course of construction as specified and as required by authorities having jurisdiction. Such tests shall be conducted by this Division as a part of the Work and shall include all personnel, material, and equipment required to perform tests until satisfactory results are obtained. Any defects detected during testing shall be satisfactorily repaired or the equipment involved shall be replaced and the tests re-executed.
3. Any resultant delay as a result of such necessary re-test, does not relieve the Contractor of his responsibility under this contract.
4. Notify the Engineer and the Owner's Representative in writing two weeks prior all scheduled testing to allow time for scheduling witness of testing, where elected by the Engineer and Owner's Representative.

- B. GROUND TESTING: The resistance of the grounding system to ground shall not exceed 3 ohms for water pipe ground or 6 ohms for driven ground rods. If tests indicate a higher value, additional ground rods shall be installed to reduce the resistance to a value of 6 ohms or less. Whenever connection is required to an existing ground conductor, tests shall be made before connection to insure that the existing ground conductor is unbroken and continuous. Ground tests shall be performed after at least 7 days of dry weather with test meter supplying a minimum of 50 amps to the ground rod. Auxiliary current electrode shall be approximately 85 feet from ground rod and auxiliary potential electrode shall be 62% of this distance from the ground rod in between the two rods.

- C. INSULATION TESTING: Test all electrical equipment bussing, underground feeders and feeders 1/0 and larger at 85% of rated insulation value. Insulation tests shall be made with a 500 volt "Megger" as manufactured by James G. Biddle Company or equal. Test one conductor at a time with other two grounded. Attempt to raise voltage to maximum in one minute. Do not exceed 2 MA. Polarization Index (amps ratio - 1 minute/10 minutes) to be at least 3 unless approved otherwise.

- D. Thermographic Testing: Conduct a thermographic test of the main switchboards, distribution panels, panelboards, automatic transfer switches, busway joints, motor control centers, transformers, disconnect switches, contactors, relay panels, dimming system controller and other electrical distribution apparatus and connections using an infrared temperature scanning unit. The test shall be performed by an independent testing laboratory (General Electric, Eaton Electrical Systems and Solutions or Siemens Industrial Service). Connections that are not indicating higher temperature levels acceptable shall be tightened, lugs replaced and/or OCPD replaced as required to eliminate the condition. Conduct test, using test reporting forms, between 6 and 8 months after beneficial occupancy, but in no case beyond the one year warranty period. Correct unacceptable conditions prior to end of the warranty period.

- E. Conductors and Cable Testing: Refer Electrical Wiring Specification Section.

- F. Lighting Control Device and Equipment Testing
- G. Football Lighting and Dimmable Light Control System Testing
- H. Emergency Generator Set and Emergency Lighting and Fire Pump Testing
- I. Electrical Switchboards/Panelboards, XFMR and other electrical switchgear Testing: Refer Electrical Switchgear Specification Section.
- J. Fire Alarm System Testing
- K. ADDITIONAL TESTING: The Contractor shall make such other tests as may be or become necessary to assure satisfactory operation of each unit device or equipment.
- L. Testing Submittals:
  1. Personnel: Submit evidence to show that the personnel who will actually test the systems are qualified and state certified.
  2. Testing Procedures: Submit four copies of all proposed testing procedures to the Engineer for review at least 30 days prior to conducting any testing.
  3. Reporting Forms: Submit four copies of proposed forms to be used in recording testing data and results to the Engineer for review at least 30 days prior to conducting any testing on the project.
  4. Test Data and Results: Submit four copies of complete data and certified test results for each test performed, including, but not limited to:
  5. Operational Certification: Submit four certified copies of an operational certification which documents that all equipment and systems have been fully tested to verify proper operation in accordance with the design shown in the Construction Documents and manufacturer's recommendations.
  6. Certification: Certifications stating that submitted test data and results are true and correct shall be provided for all submittals under this Section. Certification shall be executed by an authorized officer if the Contractor is a corporation, by a partner if the Contractor is a partnership, by the Owner if the Contractor is a sole proprietorship or by the authorized representative if the Contractor is a joint venture.
  7. Calibration List: Submit four copies of a listing of testing devices to be used for the project to the Engineer for approval. Listing shall include documentation that devices are properly and currently calibrated.
  8. Test Log: The Contractor shall maintain a test log at the site to document the results of all successful and unsuccessful testing and balancing as it is performed. This log shall be available for review by the Engineer and a copy of the log shall be submitted to the Engineer and Owner's Representative prior to the Substantial Completion inspection. A space shall be provided on the test log for signoff by the Owner's Representative.

## 1.23 CERTIFICATIONS AND TEST REPORTS

- A. The Engineer may, at their option, witness any or all on and off-site acceptance and operational testing. Submit a detailed listing of certification and testing for each system indicating estimated dates for completion of system installation. This listing of certification and testing shall be submitted at least 30 days before any testing is conducted.
  1. Test procedures and test result reporting forms shall be submitted for review no later than the date of the certification and testing listing submittal.
  2. Notify the Engineer in writing two weeks prior to all scheduled testing to allow time for Engineer to schedule witnessing of testing, where elected by the Engineer.
  3. Submit four copies of all certifications and test reports to the Engineer for review adequately in advance of completion of the Work to allow for remedial action as required to correct deficiencies discovered in equipment and systems.
  4. Certifications and test reports to be submitted shall include, but not be limited to those items outlined in the testing requirements for all Specification Sections of this project manual.

1.24 OPERATING AND MAINTENANCE MANUALS:

A. Submit two copies of Operating and Maintenance Manuals to the Engineer for approval prior to the beginning of operator training. Provide four approved Operating and Maintenance Manuals for use in operator training. Manuals shall be bound in rigid cover, 3-ring binders with spine and cover labels and shall provide operating and maintenance information for every piece of equipment furnished under this Specification. All sections shall be typed and indexed into sections and labeled for easy reference. Bulletins containing information about equipment which is not installed on the project shall be properly marked up or stripped and reassembled. All pertinent information required by the Owner for proper operation and maintenance of applicable equipment supplied by Division 26, 27 and 28 shall be clearly and legibly set forth in memoranda which shall, likewise, be bound with bulletins. As a minimum, the following information shall be provided as applicable:

1. Complete description of each system, item of equipment, and apparatus provided under this Division, including ratings, capacities, performances, data and curves, characteristics identifying name and number, locations, and wiring diagrams, including sources for all parts.
2. Fully detailed parts lists, including all numbered parts and recommended spare parts, of each item of equipment and apparatus provided under this Division.
3. Manufacturer's printed instructions describing operation, service, maintenance, and repair of each item of equipment and apparatus.
4. Typed record of tests made of materials, equipment, and systems included under this Division. Such records shall state the dates the tests were conducted, name(s) of person(s) making and witnessing the tests, and citing any unusual conditions relevant to the tests.
5. Identifying names, name tags designations and locations for all equipment.
6. Fuse and motor heater information including location and use.
7. Equipment and motor nameplate data.
8. Copies of all approved Shop Drawing submittals.
9. Fabrication drawings.
10. Equipment and device bulletins and cutsheets clearly highlighted to show equipment installed on the project and including performance curves and data as applicable.
11. Maintenance instructions clearly highlighted to show all required periodic maintenance and lubrication.
12. Wiring diagrams.
13. Operating instructions clearly highlighted to show proper operating procedures for all equipment.
14. Exploded parts views and parts lists for all equipment and devices.
15. Color coding charts for all painted equipment and conduit.
16. Location and listing of all spare parts and special keys and tools furnished to the Owner.

1.25 TOOLS

Provide and deliver to the Owner's authorized representative any special tools required for maintenance of systems, equipment, and apparatus installed under this Division prior to requesting final acceptance of the installation.

1.26 OWNER'S INSTRUCTIONS

A. Contractor shall have appropriate factory-trained representatives to provide the following periods of on-site instructions to Owner's designated personnel upon completion of the systems' installation:

Electrical Systems:	4 Hours
Lighting Control Systems:	4 Hours
Fire Alarm System:	4 Hours

B. Outline: Prior to instruction of Owner Personnel, prepare a typed outline, listing the subjects that will be included in this instruction, and submit the outline for review by the Engineer.

- C. Recording: Contractor shall record all the instructions in MP4 format video. Submit rvideo in USB Drivers to Owner. Provide separate USB driver for each different system.
- D. Certification: At the conclusion of the instruction period obtain the signature of each person being instructed on each copy of the approved outline to signify that he has a proper understanding of the operation and maintenance of the systems and resubmit the signed outlines.
- E. Other Requirements: Refer to other Division 26, 27 and 28 Sections for additional Operator Training requirements.

1.27 CONTRACTOR WARRANTIES AND GUARANTEES:

- A. General: Contractor shall guarantee all material and equipment installed by him against defects in workmanship and material for a period of 24 months after final acceptance of the work by the Owner and he shall repair or replace any materials or equipment developing such defects within that time, promptly on due notice given him by the Owner and at Contractor's sole cost and expense.
- B. Equipment: All equipment bearing a manufacturer's guarantee, such as electrical equipment, devices, components, and similar items, shall be construed to have an extended guarantee to the Owner by the manufacturer. Any such equipment that proves defective in materials or workmanship within the guarantee period is to be replaced by the Contractor in accordance with the manufacturer's guarantee.
- C. Start-up: The Electrical Contractor shall provide instructions and equipment starting service on new equipment for two complete years after date of final acceptance of the work by the Owner, at Contractor's sole cost and expense.

END OF SECTION

## SECTION 26 05 00 – ELECTRICAL WIRING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

#### 1.2 GENERAL INSTALLATION REQUIREMENTS

- A. All electrical work dealing with electrical circuits or power requirements of 50 volts or higher shall be performed by a licensed journeyman electrician supervised by an on-site master electrician.
- B. All cables not installed in conduit shall be plenum rated.
- C. All conductors and cable shall be properly labeled at both ends and at any intermediate splice.
- D. All low voltage cables shall be installed in continuous length without splice.
- E. All plenum rated cables above accessible ceilings shall be supported from and near structure with nylon straps or D-rings. Do not weave through joists for support. All exposed cabling, and cabling above inaccessible ceilings shall be installed in raceway.
- F. Install conduit sleeves for all masonry penetrations of plenum rated cables.
- G. In areas of remodeling, remove all conduit and wire that is not to be reused.
- H. Provide grounding bushings for all connections at concentric and eccentric knockouts, and where reducing washers are used.
- I. All junction boxes and other devices above ceiling that may require maintenance shall be located within 18” of the ceiling.
- J. All exterior junction boxes in the ground shall be concrete type with traffic rated tops.
- K. Junction box covers shall be labeled with circuit numbers and relay numbers of wiring within the box. Circuit labels shall be readable from the floor level without removing the cover. Junction boxes, and covers shall be color coded by voltage. Color code as follows: 120/208V – Green, 240V – Blue, 277/480V – Orange, HVAC Controls – Yellow, Fire Alarm and Emergency Circuits – Red
- L. General Contractor shall coordinate with Electrical Contractor and Low Voltage Subcontractors that all conduits, J-boxes, sleeves and 120V circuit under all sections in Divisions 26, 27 & 28 shall be provided and installed by Electrical Contractor under the base proposal pricing – No exception. All low voltage cable must be installed in conduit except the plenum rated low voltage above the accessible lay-in ceiling may be supported by cable trays 18” above the ceiling without conduit.

## PART 2 - MATERIALS AND METHODS

### 2.1 RACEWAY SYSTEMS

- A. **REQUIRED:** Complete raceway systems for all wiring. This includes, but is not limited to feeders, branch circuit wiring, temperature controls wiring, data cabling, telephone, audio and video cabling, intercom system, local sound system, clock system, security/CCTV/access control systems and fire alarm system wiring. Generally auxiliary system and controls wiring is plenum rated so conduit system would consist of junction boxes and conduit in walls or above inaccessible ceilings only. Control and interlock wiring shall be provided under the Mechanical Section. Note that the access control system requires conduit from door frame card readers to a junction box above an accessible ceiling that is no more than 10 feet high.
- B. **RACEWAY CAPACITY:** It shall be the Contractor's responsibility to determine the correct sizes of all types of raceway, to be installed, as instructed in the NEC and all applicable Codes. Runs of underground conduit longer than 80 feet shall be one size larger than NEC requirement, 4" maximum.
- C. **INSTALLATION:**
1. **LOCATION:** Conceal all raceway systems in ceilings, walls and floors, except feeders serving equipment in mechanical and electrical equipment rooms, and in such other areas as indicated where conduit may be exposed. Keep at least 8" away from any heat producing items. Do not install normal conduit and feeders below grade or in floor slabs unless there is no other way to conceal conduit except emergency feeder for emergency generators, automatic transfer switches, emergency switchgear and fire pumps shall be installed underground with red concrete encased. Chiller feeders in mechanical yards may be run above grade with chiller piping support rack if chiller piping are above grade. Outdoor Pad Mounted Switchgear feeders shall be run below grade with red concrete encased. Do not install conduit on roof unless specifically shown to be on the roof or authorized in writing by the Engineer. All junction and pull boxes above accessible ceilings shall be mounted so that the access panel is no higher than 18" above the ceiling.
  2. **ROUTING:** Conduit shall be installed parallel to building coordinates, except for underground feeders from panel to panel may be installed in the most direct manner. Install all horizontal conduit at structure unless mounted to a wall.
  3. **EXPOSED RACEWAY:** Run parallel to walls, ceiling or structural members, in a manner to present a neat appearance. Before installation, explain to the Inspector the proposed method of routing and obtain his approval. Hold all horizontal conduit at ceiling or structure, unless mounted on wall. No outdoor exposed conduit unless authorized in writing by the Engineer. No outdoor conduit shall be penetrated on top of the outdoor switchgear, starter or disconnect switch. – No exception.
  4. **SUPPORT:** Provide adequate and sturdy support for all parts of raceway system. Conduit concealed in walls or slabs may be supported with wire hangers, provided they are of heavy gage and spaced to give adequate strength. Exposed conduit must be supported with materials specifically made for this purpose; do not use wire hangers. Do not attach any parts of raceway system to air conditioning ducts or ceiling systems. Wiring above ceiling without conduit shall be supported from structure with J hooks. Unless described by detail on the drawings, provide Tolco Pipe Pier Supports four feet on center to support conduit on the roof. Select for proper weight loading. All panelboards shall be mounted on 1-5/8 x 1-5/8 unistrut, and not directly install to plywood on a sheetrock surface. All supports shall be NEC approved.
  5. **CONTINUITY:** Make all joints and connections in a manner which will insure mechanical strength and electrical continuity. Use double locknuts and insulated bushings for rigid conduit, and insulated type connectors for EMT conduit 1" and larger for connections to boxes. Use insulated grounding bushings when internal ground wire is installed.

6. PULL BOXES: As required by the National Electrical Code.
7. EXPANSION FITTINGS: Install O. Z. or equal expansion fitting in each run of conduit which crosses building expansion joint, and in all runs longer than 200 feet.
8. CORROSION PROTECTION: For all non-coated metal raceway in contact with concrete or mortar, tape with 3M corrosion protective tape, or equal. Tape shall extend for approximately 6" before entering and after exiting concrete.
9. PULL WIRE: Install nylon pull cord in all empty electrical power raceway systems.
10. OPENINGS: Keep all raceway openings closed in a manner to prevent entry of moisture and foreign materials until conductors are installed.
11. FIRE PROOFING: All power and telephone raceway components passing through or installed within U. L. fire rated walls, ceiling or floor structures shall be fireproofed in the manner prescribed by the U. L. Fire Resistive Index and local building codes. All penetrations shall be fireproofed with 3M Fire Barrier CP25WB caulk, moldable putty or FS-195 wrap/strip installed per the manufacturer's recommendations.
12. MARKING: All junction and pull boxes shall be marked noting electrical circuits contained. Junction boxes, and covers shall be color coded by voltage. Color code as follows: 120/208V – Green, 240V – Blue, 277/480V – Orange, HVAC Controls – Yellow, Fire Alarm and Emergency Circuits – Red. Paint colors shall be light enough to ensure that the circuit numbers can be easily distinguished. On inside of all device wall plates and inside of junction boxes, indicate panel and circuit number feeding the device.
13. SEALING: All conduit, junction box, outlet box and other penetrations of the building envelop, exterior and interior ceiling, floors and walls shall be sealed with non-hardening caulking or other non-hardening material.
14. Access Doors: This Contractor shall provide wall or ceiling access doors for installation in finished surfaces for unrestricted access to all concealed items of electrical equipment.

D. MANUFACTURERS: All components of raceway systems must be made in U.S.A. and bear U. L. label.

## 2.2 CONDUIT

### A. CONDUIT TYPES

1. RIGID GALVANIZED STEEL – Threaded fittings. Hot Dipped galvanized steel. Expansion fittings shall be OZ type “DX” Appleton type “XJ”, Crouse-Hinds type “XC” or an approved equal & shall have bonding jumpers. Cut ends shall be recoated with cold galvanized paint.
2. PVC COATED RIGID GALVANIZED STEEL - Plasti-Bond REDH<sub>2</sub>OT with ETL Verified PVC-001 label or equal Perma-Cote or KorKap with ETL Verified PVC-001 label. Provide Plasti-Bond coated couplings, fittings and pulling elbows from the same manufacturer. Installation of the PVC Coated Conduit System shall be performed in accordance with the Manufacturer’s Installation Manual. To assure correct installation, the installer shall be certified by Manufacturer to install coated conduit.
3. PVC CONDUIT – [Schedule 80](#) (Schedule 80 for Power Co. service conduit)

4. EMT – Steel conduit with steel set screw fittings. Provide insulated throat watertight fittings where conduit is exposed to dampness inside building. All EMT connectors shall have insulated throats or bushings.
5. FLEXIBLE METAL CONDUIT – Greenfield, galvanized steel conduit for field installation of conductors (maximum 24” long).
6. LIQUID TIGHT FLEXIBLE METAL CONDUIT – SealTite Type UA galvanized steel conduit with PVC waterproof coating for field installation of conductors (maximum 24” long except light fixtures up to 72”), Neoprene gaskets and O-rings, insulated throat.
7. MC CABLE – Flexible steel conduit with factory installed, stranded copper conductors and green insulated ground wire. Steel interlocked armor with colorTrak ID system, full size aluminum bonding/grounding conductor and additional Green Grounding wire. Acceptable Manufacturer AFC or Equal. Note: Type MC shall not be used for wiring any emergency system.
8. SURFACE RACEWAY – Wiremold steel raceway, ivory finished and mechanically connected to walls or casework. Type based on application. (only allowed where specifically noted on the drawings). Wiremold must be paintable. Coordinate with General Contractor to paint wiremold with the same wall color.
9. ELECTRICAL GUTTERS AND WIREWAYS - Provide galvanized steel electrical gutters and wireways, sizes per NEC, minimum 16 gauge thickness, with rounded edges and smooth surfaces; constructed in compliance with applicable standards; and with additional features as indicated or required. Provide hinged or removable cover on raceway where noted on drawings. All power wiring raceways shall have a cover. No stamped knock out’s. Provide all sheet metal parts with rust inhibiting phosphatizing primer coating and finished in gray enamel. All hardware shall be cadmium plated to prevent corrosion.

**B. TYPE OF CONDUIT FOR VARIOUS LOCATIONS:**

1. UNDERGROUND: Rigid galvanized steel or [Schedule 80 PVC](#) (Schedule 80 PVC for Power Co. conduit). Elbow in contact with concrete shall be PVC coated, rigid galvanized steel. Install PVC coated, rigid galvanized steel, long radius elbows where conduit turns up to grade. Elbow shall extend a minimum of 2” above the grade or concrete slab. Encase all normal and emergency underground conduit under building slab or outside building slab in a 3" red concrete envelope located a minimum of 48” below grade. Install red tracer tape on top of red concrete. Notify Inspector for inspection of duct bank at least 24 hours prior to concrete placement. Do not install conduit below grade or in floor slabs unless there is no other way to conceal conduit [and authorized in writing by the Engineer & Owner](#). Conduit below building slab or conduit for telephone, data, etc. also require concrete encasement. Note: Do not install underground conduits unless approved by Owner in writing. Conduits must installed under building slab containing branch circuits for such as island casework or floor mounted electrical and low voltage communications, etc. shall be a minimum of 24 inches below top of slab and on select fill. All other conduits including main feeders for electrical voice / data video / communications, transformer primary and secondary, and panel feeds shall be minimum 48 inches below top of slab with red concrete encased and on select fill.
2. IN POURED CONCRETE WALLS: PVC coated, rigid galvanized steel or Schedule 80 PVC. Install PVC coated rigid steel fittings on PVC conduit prior to conduit exiting concrete.
3. IN MASONRY WALLS: Galvanized steel EMT with steel, watertight fittings.
4. EXPOSED OUTSIDE OF BUILDING: Rigid galvanized steel. For conduit in mechanical courtyard within 50 feet of a cooling tower provide PVC coated, rigid galvanized steel conduit and fittings.



5. INSIDE OF BUILDING IN CEILING CAVITIES, IN EXPOSED FLOOR OR ROOF STRUCTURE AREAS, OR IN DRY WALL TYPE CONSTRUCTION: Galvanized steel EMT or rigid galvanized steel.
  6. EXPOSED ON EXISTING MASONRY OR PLASTER WALLS IN FINISHED AREAS: Wiremold V500 metallic raceway, ivory finish, complete with various boxes, devices, offsets and transitions. For data systems provide Wiremold 2000 Series or larger consistent with cabling requirements, ivory finish, metal raceway with various devices, offsets and transitions. Provide Wiremold 4000 two compartment if both data and power wiring are installed together. All raceway shall be mechanically fastened to walls or cabinets. No tapes or glues allowed. Wiremold must be paintable. Coordinate with General Contractor to paint wiremold with the same wall color.
  7. IN CONCRETE SLABS: Do not install conduit in concrete slabs.
  8. FLEXIBLE METAL CONDUIT CONNECTIONS: Use only for connection to motors and transformers from rigid conduit system. Do not loop flexible conduit between light fixtures or receptacles. Provide liquid tight construction and fittings for transformers at all locations. Also, provide liquid tight construction and fittings for in wet, damp or outside areas. Also, Connections to mechanical equipment in main mechanical or boiler room, and kitchen equipment shall be in liquid tight. Do not install inside an air handling unit room. Minimum length shall be 18". Maximum length shall be two feet except light fixture whips may be up to six feet.
  9. LIGHT FIXTURE WHIPS: MC cable.  
Note: Type MC shall not be used for wiring any emergency system.
- C. MINIMUM CONDUIT SIZE: 3/4" for power, 1" for data, 1.25" for A/V. Maximum 40% cross section area of each conduit shall be filled with cable. No exception.
- D. FITTINGS:
1. RIGID CONDUIT: All rigid galvanized steel conduit shall have threaded fittings with insulated bushings.
  2. EMT CONDUIT: Provide insulated bushings for all EMT conduit 1" or larger or housing #6 or larger wires.
  3. GROUNDING: Provide fitting with grounding lug where conduit attaches to a painted box (disconnect switch, starter, transformer case, etc), conduit attaches to a box through a knockout which has an associated larger knockout or a reducing washer is used, or conduit contains a feeder from switchgear to switchgear or between switchgear and transformer.
  4. TELEPHONE AND DATA CONDUIT: Provide protective bushing on the end of telephone, data, sound system or other conduit stubbed into the ceiling cavity.
- E. SPARE CONDUIT: Provide five empty 1" conduit from all recessed electrical panels to above the nearest accessible ceiling.
- F. LOW VOLTAGE CONDUCTORS: Low voltage conductors may be run in accessible ceilings without conduit. Provide conduit sleeve with protective end fittings through all walls and floors where raceway system is not installed. All exposed conductors shall be in conduit. All splices shall be in supported junction boxes. Low voltage conductors installed without conduit shall be independently supported on ring hangers, and plenum rated. Low voltage conductors for audio and data wiring shall be stranded unless otherwise recommended by the manufacturer.

## 2.3 PULL BOXES

- A. **REQUIRED:** Pull boxes, junction boxes, wiring troughs and cabinets wherever required for proper installation of various electrical systems.
- B. **CONSTRUCTION:** Made of code gage steel with sides formed and welded, screw covers unless shown to have hinged doors. Hinged doors to be same as furnished on panel boards, with same locking device. Knockouts shall be factory made or formed in field with a cutting tool which will provide a clean, symmetrically cut hole. Do not gang boxes or use extension rings to increase capacity.
- C. **DUCTBANK MANHOLES AND PULL BOXES:** Install manholes and pull boxes in accordance with the manufacturer's written installation instructions. Manholes shall be rigidly supported and level with the top of manhole rings flush with finished paving or grade at the point of installation. Seal all joints and openings to prevent the entry of water.
- D. **PRECAST CONCRETE MANHOLES:**
  - 1. **General:** Provide precast concrete manholes as detailed on the Drawings and as required for installation of new ductbank systems and connection to existing ductbank systems at locations shown on the Drawings.
  - 2. Manholes shall be steel reinforced and the complete manhole assembly shall be designed for H-20-44 bridge loading. Submittals shall clearly indicate all dimensions and reinforcing steel.
  - 3. **Concrete:** Manholes shall be constructed using concrete with a 4500 psi 28 day strength. Concrete mix shall be designed in accordance with ASTM standards.
  - 4. **Reinforcing Steel:** Steel shall be intermediate or hard grade billet steel conforming to ASTM A15, deformed in accordance with ASTM A305.
  - 5. **Manholes:** Manhole and pull box covers shall be cast iron cover mounted in a 30" Type "B" or "WRM" frame and shall be traffic type for heavy vehicular traffic. The frame and neck shall be doweled into the manhole to prevent movement away from the opening. Power manhole and pull box covers shall be marked "ELECTRIC". Communication manhole and pull box covers shall be marked "COMMUNICATIONS". Voice manhole and pull box covers shall be marked "TELEPHONE". Data manhole and pull box covers shall be marked "DATA".
  - 6. **Conduit Entry:** Plastic conduits shall include a bell end inside the manhole or pull box, mounted flush and grouted to seal openings. Precast fiber type terminators shall be provided for each ductbank entry.
  - 7. **Grounding:** A minimum #4/0 bare copper ground wire shall penetrate the side wall in the bottom section of each manhole and pull box and extend 48" inside and outside of the manhole pull box.
  - 8. **Accessories:** Knockouts, cable racks, sumps, steps, joint seals and other accessories required for a complete installation shall be provided.

#### 2.4 OUTLET BOXES

- A. **REQUIRED:** For all switches, light fixtures, receptacles and the various other outlets shown.
- B. **CONSTRUCTION:** Galvanized steel, one piece construction, in all cases suitable for intended use. Provide "gang" boxes where devices are shown grouped. Use hot dipped galvanized cast iron for floors or exterior locations.
- C. **TYPES FOR VARIOUS LOCATIONS:**
  - 1. **CEILINGS:** 4" square, 2-1/8" deep.
  - 2. **DRY WALLS:** 4" square, 2-1/8" deep standard galvanized switch box. Provide shallow boxes where necessary. Provide tab to align box with studs.
  - 3. **MASONRY WALLS:** Galvanized switch boxes designed especially for masonry installations. Depths of boxes must be properly coordinated for each specific installation. Box shall be installed within 1/8" of surface of block.

4. FLOOR: Watertight, adjustable, cast iron.
  5. SURFACE MOUNTED: Boxes surface mounted on walls or floor shall be Bell, cast aluminum box with appropriate plate and threaded hubs.
  6. BACK-TO-BACK OUTLETS: Outlets shown back-to-back on the drawings are to be installed with a minimum of 6" of lateral separation between outlets for minimum sound transmission. "Through-the-wall" type boxes are not permitted.
  7. SPECIAL: Boxes for VGA outlets shall have 1.25" knockouts/lugs.
- D. MOUNTING PLATES: Boxes mounted in drywall construction shall have extension plates matched to wall thickness so the box can be mounted flush with the metal stud and the wiring device mounts flush with the wall.
- 2.5 CONNECTIONS TO MOTORS, EQUIPMENT AND DEVICES
- A. POWER WIRING: Make wiring connections to all mechanical, plumbing and other equipment being installed as a part of this Contract. In addition, make connections to Owner furnished equipment as shown.
  - B. CONTROL WIRING: Control and interlock wiring for HVAC Systems will be provided by the Mechanical Contractor. Motorized dampers of the same voltage as the associated fan shall be wired by the electrical contractor when the damper is in close proximity to the fan. Under this section provide a 20 amp, 120 volt circuit to the control panel in each mechanical room from the local low voltage panel.
  - C. CONNECTIONS TO EQUIPMENT: Make connection to each motor and motor starter. Each piece of equipment subject to vibration shall have not less than 18" nor more than 24" of flexible conduit. All horizontal runs of conduit (not strapped to walls) must be kept above 7 feet high, with a vertical drop to equipment. Conduit blocking walk and service space is not acceptable and will require relocation. Conduit on and adjacent to equipment must be located to allow free access to all removable panels for equipment service. Wire adjacent to heat producing equipment, such as boilers and electric heaters, must be of a type approved for this use.
  - D. CONNECTIONS TO TRANSFORMERS: Install not less than 18" nor more than 24" of flexible conduit at each connection to floor mounted transformers.
  - E. CONNECTIONS TO RECEPTACLES: All multiple devices on a circuit such as receptacles shall be back wired with pigtail so device does not provide continuity path.
  - F. CONNECTIONS TO UPS(s): Coordination for UPS(s): General Contractor shall coordinate with electrical contractor to provide matching twist lock plugs, twist lock receptacle, circuits and circuit breakers per submit UPS(s) at no additional cost to Owner during Contractor period. No exception. For Example, the plan indicated 208, 30A circuit and outlet for each UPS. If UPS required to be 208V, 50A (Larger) to handle the load per IT supplier calculation, Contractor shall revise the CB(s), electrical devices and circuit at no additional cost to Owner. GC must bring this to the attention of the Electrical Contractor during bidding period.
  - G. CONNECTIONS TO FURNITURES: Electrical contractor to provide hard wiring to connect to furnitures with power connection requirement. These connections are not on the electrical plans. Contractor shall obtain a furniture plans from Architect and furniture supplier to coordinate and provide all the final electrical hard wiring and connections. Include this requirement in base proposal. No Exception.

2.6 CONDUCTORS

- A. **REQUIRED:** A complete system of conductors in all raceway systems except where shown otherwise. No conductors are to be installed in telephone conduit. Emergency or exit circuitry shall be installed in a separate raceway system.
- B. **BUILDING WIRE:** 600 Volt, soft drawn annealed copper, 98% conductivity, continuous from outlet to outlet. Minimum wire size #12 except remote control wire may be #14. All wire shall be stranded Type THHN, THW-2 or THWN-2 (wet rated for 90° C). All wires shall be color coded with same color connected to same ungrounded phase throughout the installation.
- C. All main feeders for generator power from generators to generator power distribution equipment and transfer switches and from transfer switches to emergency power distribution panels and main feeders to fire pump shall be type RHW 2 hour rated conductors in a suitbale raceway and installed in continuous 2 hour rated vertical chases or stacked 2 hour rated electrical rooms. Exception: Conduit and emergency feeders installed underground with red concrete encased do not need to have type RHW 2 hour rated conductors.
- D. **BURIED GROUND WIRE:** Conductors used to interconnect ground rods of a grounding triad or supplemental ground loop shall be minimum #2, bare, tinned, solid copper wire. Connect this wire to rod with short length of same wire, thermo-welded to loop and rod.
- E. **MANUFACTURERS:** Cerro, Encore, Republic, Triangle, Southwire Co. and United
- F. **CONNECTORS:** Make all connections on #10 and smaller wire with Code approved solderless pressure type insulated connectors; Ideal Wingnut. Solderless lugs must be used for all terminations.
- G. **TEST:** After installation of all conductors, and before final acceptance, make such tests as are required to determine proper functioning of all circuits. Furnish all necessary instruments required to make such tests and correct any deficiencies found.
  - 1. Feeder Insulation Resistance Test
  - 2. Neutral Testing
  - 3. Neutral Testing
  - 4. Pre-energization Check
  - 5. Voltage and Current Values
  - 6. Submittals: Contractor shall furnish all instruments and personnel required for tests. Submit four copies of certified test results to Architect for review. Test reports shall include conductor tested, date and time of test, test results, relative humidity, temperature, and weather conditions.

## 2.7 CIRCUITRY

- A. The intent of the drawings is to indicate schematically the circuitry required.
- B. Install a dedicated neutral for each circuit requiring a neutral. The ungrounded and neutral conductors of a multiwire branch circuit must be grouped together by cable ties and circuit number tags at the point of origination in side electrical panel. Do not install more than four current carrying conductors in a conduit except nine #12 or #10 conductors may be installed in 3/4" or larger conduit. Install a dedicated neutral for each circuit serving electronic data processing equipment, lighting dimmers and motors. Segregate data processing circuits from other types of circuits. Do not install 480/277 volt conductors in the same conduit with 208/120 volt conductors. Install a green ground wire for each circuit or group of circuits in one conduit.
- C. The work performed in grouping conductors in a single raceway shall comply with all applicable articles in the latest edition of the NEC and Local Codes which shall include, but shall not be limited to, ampacity de-rating of conductors and maximum capacities of raceways.

## 2.8 POWER CONDUCTOR COLOR CODING

A. 480/277 VOLT SYSTEM: Conductors shall have insulation of the proper color as listed below:

Phase A	- Brown
Phase B	- Purple
Phase C	- Yellow
Neutral	- Natural Gray
Ground	- Green
Isolated Ground	- Green w/yellow stripe

B. 208Y/120 VOLT SYSTEMS: Conductors shall have insulation of the proper color as listed below:

Phase A	- Black
Phase B	- Red
Phase C	- Blue
Neutral	- White
Ground	- Green
Isolated Ground	- Green w/yellow stripe

C. 240/120 VOLT DELTA SYSTEMS

Phase A	- Black
Phase B	- Orange (high leg of delta)
Phase C	- Blue
Neutral	- White w/colored stripe
Ground	- Green
Isolated Ground	- Green w/yellow stripe

D. Contractor may use colored tape marking for size 8 and larger phase and neutral conductors, and size 4 and larger ground conductors.

E. Switch legs are to be color coded the same as the un-switched phase, i.e., all wiring from lighting control panels and contactors shall retain the phase color.

F. If existing construction has a consistent but different color coding, match existing.

## 2.9 SPECIAL SYSTEMS CABLE COLOR CODING

A.	Fire Alarm	Red
B.	P/A Communications	White
C.	Misc Low Voltage/Sound	Gray
D.	Data Cabling	Blue
E.	Fiber Optics	Black installed in Orange inner duct
F.	Fiber Patch Cables	Orange
G.	Security Wiring	Purple
H.	CCTV Wiring	Black
I.	CATV Wiring	White

- J. BMCS (EMS) Yellow (varying shades of Yellow for trouble shooting)
- K. Access Control Purple

Note: Verify with Owner for special system cable color coding prior to ordering any cables.

## 2.10 GROUNDING

- A. GENERAL: Permanently and securely ground the mechanical and plumbing equipment and piping systems, conduit system, panel boards and all other components of the electrical system installed or connected by the Sub-contractor. Follow NEC and building code requirements. Splicing is strictly prohibited for grounding wire.
- B. CIRCUIT GROUNDS: Provide a green ground wire sized per the NEC for every circuit.
- C. EQUIPMENT ENCLOSURES: Make firm ground to raceway system and cable trays. Equipment connected with flexible conduit or sealtite, shall have the specified ground wire installed inside conduit. Do not wrap on the outside of the conduit.
- D. TRANSFORMERS: Each transformer shall have its enclosure and secondary neutral terminal (except when a neutral terminal does not exist) bonded to the building steel and local, driven ground rod.
- E. SYSTEM GROUND: Ground system neutral in service entrance equipment to the building steel and three 3/4" x 10 foot, copperclad, driven ground rods. Install ground rods outside in an equilateral triangle pattern, 10 feet on a side, with rod tops 12" below grade. Connect ground wire from rod to rod in a complete loop then extend to service equipment. Use cadweld connections below grade. Refer to drawings.
- F. DATA SYSTEM GROUNDING: At each MDF and IDF provide a 24"x3"x1/4" copper ground bar mounted to the wall with isolating standoffs. Provide eight lugs for connecting ground wires up to #6 AWG. Ground the IDF Room bars to the MDF ground bar with #3/0 AWG daisy chained from bar to bar. Ground the MDF ground bar to the service ground bar in the main switchboard with #3/0 AWG.
- G. ELECTROMAGNETIC SHIELDING: In rooms painted with EMI shielding paint provide grounding system between the painted walls and the local ground bar. These areas include MDF and IDF rooms. Provide Ground-Connection-Set ESK manufactured by Less-EMF Inc. Kit consists of a plate mounted to the wall, with a continuous Conductive Tape extending from the ground bar and attached each wall completely around the room. The mounting plate shall be electrically connected to the room ground bar with the included cable. Refer to manufacturer's instructions for complete details of the installation.
- H. RACEWAY/STEEL CONDUIT: All grounding wires shall be enclosed on a steel raceway and use proper lugs, cadweld, and ground clamps.
- I. GROUND WIRE CONDUIT: Conduit containing a ground wire shall be grounded at each end to the ground wire.
- J. TELEPHONE GROUND: Install a #6 ground wire from the telephone board to the MDF ground bar.
- K. SOUND SYSTEM GROUND: Install a #6 ground wire from the amplifier equipment to the ground bar in the Service Entrance Equipment.
- L. METAL FENCES: Provide bonding and grounding for metal fences per NEC and OSHA requirement. Provide minimum a #6 ground wire from building main ground bar to metal fences. Bond all each piece of metal fence together. Fences doors shall be bonded and grounded at open and close positions.

## 2.11 EXCAVATING, TRENCHING AND BACKFILLING:

- A. General: The work hereunder includes whatever excavating and backfilling is necessary to install the electrical work. Coordinate the electrical work with other work in the same area, including excavating and backfilling, dewatering, floor protection provisions, other temporary facilities, other underground services (existing and new), landscape development, paving, structural foundations, and floor slabs on grade. Coordinate with weather conditions and provide temporary facilities needed for protection and proper performance of excavating and backfilling.
- B. Standards: Except as otherwise indicated, comply with the applicable provisions of Division 2 for electrical work excavating and backfilling. Refer instances of uncertain applicability to the Architect/ Engineer for resolution before proceeding with the Work.
- C. The bottoms of trenches shall be excavated to required depths, slope and grade. The bottom of the trench shall be accurately excavated to provide firm, uniform bearing for the bottom of the raceways and ductbanks. Where mud or unstable soil is encountered in bottom of trench, it shall be removed to firm bearing and the trench shall be backfilled with bedding sand to proper grade and tamped to provide uniform firm support.
- D. The bottom of trenches shall be accurately graded to provide proper fall and uniform bearing and support for each section of the conduit on undisturbed soil or 2" of sand fill at every point along its entire length. In general, grading for electrical ductbanks and conduits shall be from building to manhole, and from a high point between manholes to each manhole.
- E. Exercise care not to excavate below required depth, leaving a flat bed of undisturbed earth, firm and secure, before laying cable, and ductbanks. In the event rock is encountered, excavate 6" below required depth and backfill to required depth with bedding sand, and compact to minimum 95% compaction and shall provide soil density test.
- F. All grading in the vicinity of excavation shall be controlled to prevent surface ground water from flowing into the excavations. Any water accumulated in the excavations shall be removed by pumping or other acceptable method. During excavation, material suitable for backfilling shall be stacked in an orderly manner a sufficient distance back from edges of trenches to avoid overloading and prevent slides or cave-ins. Material unsuitable for backfilling shall be wasted and removed from the site and properly disposed of at contractor's expense.
- G. The Contractor shall be fully responsible for the safety of persons, materials and equipment in or near trenches or other excavations and provide all required sloping, shoring, railings and other protective provisions. The Contractor shall provide a trench shoring plan and design which is sealed by a registered professional engineer. Refer to Divisions 1 and 2 for additional requirements.
- H. If any unknown and/or uncharted utilities are encountered during excavation, promptly notify Architect/ Engineer and wait for his instructions before proceeding.
- I. If such unknown utilities are encountered and work is continued without contacting the Architect/ Engineer for instructions, and damage is caused to said utilities, the Contractor shall repair at his own expense, such damage to the satisfaction of the owner or utility company concerned.
- J. Trenches shall not be backfilled until all required tests have been made by the Contractor and approved by the Architect/Engineer and any local authorities having jurisdiction.
- K. Backfill shall be compacted or cement stabilized sand up to 6" above the top of conduit or ductbank. Backfill up to grade shall be in maximum 6" lifts with minimum 95% compaction of lifts. Refer to Division 2 or elsewhere in Contract Documents for additional trenching and backfill requirements.

- L. Opening and Reclosing Pavement, Landscape Areas and Lawns: Where excavation requires the opening of existing walks, street, drives, other existing pavement or lawns, such surfaces shall be cut as required to install new conduit and to make new connections to existing conduits. The sizes of the cut shall be held to a minimum, consistent with the work to be accomplished. After the installation of the new work is completed and the excavation has been backfilled and flooded, the area shall be patched or replaced, using materials to match those cut out or removed. Patches shall thoroughly bond with the original surfaces, shall be level with them, and shall meet all the requirements established by the authorities having jurisdiction over such areas. All removed work shall be replaced by craftsman who regularly install the types of work being replaced.
- M. Excavation in Vicinity of Trees: All trees including low hanging limbs within the immediate area of construction shall be adequately protected to a height of at least 5' to prevent damage from the construction operations and/or equipment. All excavation within the outermost limb radius of all trees shall be accomplished with extreme care. All roots located within this outermost limb radius shall be brought to the attention of the Architect before they are cut or damaged in any way. The Architect will give immediate instructions for the disposition of same. All stumps and roots encountered in the excavation, which are not within the outermost limb radius of existing trees, shall be cut back to a distance of not less than 18" from the outside of any concrete structure or pipeline. No chips, parts of stumps, or loose rock shall be left in the excavation. Where stumps and roots have been cut out of the excavation, clean compacted dry bank sand shall be backfilled and tamped.

## 2.12 ELECTRICAL SYSTEM IDENTIFICATION:

### A. Identification of Equipment:

1. All pieces of major electrical equipment shall have a manufacturer's label identifying the manufacturer's address, equipment model and serial numbers, equipment size, and other pertinent data. Care shall be taken not to obliterate this nameplate in any way.

2. The Contractor shall make it possible for the personnel operating and maintaining the equipment and systems in this project to readily identify the various pieces of equipment, junction boxes, etc., by marking them. All items of equipment, pull boxes, junction boxes, etc., shall be clearly marked using engraved nameplates as hereinafter specified. The item of equipment shall indicate the same number as shown on the Drawings, where applicable.

3. White background and black letters equipment nameplates shall be three ply laminated plastic, a minimum of 3/32" thick, black background, white letters for normal power, orange background, white letters for emergency power, and blue-white-blue for UPS power. Letters shall be similar to Roman Gothic of a size that is legible (1/2" minimum for main nameplates and 3/8" minimum for branch device nameplates) and appropriate to the application. Attachment of nameplates shall be by stainless steel screws. Rivets or adhesives are not acceptable. Nameplates on equipment installed in finished areas shall be installed inside equipment. Verify location with the Engineer.

a. Electrical equipment to be identified includes: All switchboards, distribution panels, transformers, motor control centers, panelboards, automatic transfer switches, disconnect switches, motor controller/starters, lighting control panels, pull boxes, junction boxes, and similar equipment.

b. Nameplates on switchboards, automatic transfer switches, transformers, distribution panels, motor control centers, disconnect switches, motor controller/starters, and panelboards shall give voltage and current characteristics and the source feeding the panel. Current characteristics shall indicate the size of the overcurrent devices serving the equipment and not the equipment current rating.

Example:

PANEL 1LA

120/208V, 3 PH, 4 W, 225 A

Fed from: DPA-3



Located: Elect Room 1.102

c. Nameplates Individual overcurrent devices and pilot lights in switchboards, distribution panels, motor control centers, and similar equipment shall have nameplates showing the load served and its location, where remote. Nameplates on motor starters shall indicate variable speed, time delay operation, etc., where applicable.

d. Blank nameplates shall be mounted on each spare or bussed space in motor control centers, and on each spare or space in distribution panels.

e. Branch circuit panelboards shall have neatly typed circuit directories behind clear plastic. Identify circuits by room numbers. Room numbers shall be those finally selected by the Owner; not necessarily those given on contract Drawings. Spares and spaces shall be indicated with erasable pencil; not typed. Circuit numbers shall be provided in the directory and at each circuit breaker.

- B. Conduit Systems: Provide adequate marking of major conduit which is exposed or concealed in accessible spaces, to distinguish each run as either a normal power, emergency power, fire alarm, control wiring or voice/data conduit. Except as otherwise indicated, use white banding with black lettering except that emergency power orange and white, fire alarm conduit markers shall use red banding. Provide self-adhesive or snap-on type plastic markers. Indicate voltage ratings of conductors exceeding 250 volts. Locate markers at ends of conduit runs, near switches and other control devices, near items of equipment served by the conductors, at points where conduit passes through walls or floors, or enters non-accessible construction and at spacings of not more than 30' along each run of exposed conduit.
- C. Cable Tray Systems: Provide engraved nameplates identifying cable tray systems as to use, on maximum 50' centers on all tray systems and whenever a tray enters a room or concealed accessible location. Nameplate text shall be submitted to the Engineer for review.
- D. Underground Cable Identification: Bury a continuous, preprinted, red and silver metallic ribbon cable marker, Brady No. 91600 Series or an approved equal with each underground cable (or group of cables), regardless of whether conductors are in conduit or direct buried. Locate each directly over cables, 12" above cable below finished grade. Ribbons shall be detectable from above grade using a pipe or cable locator.
- E. Cable/Conductor Identification: Coordinate a uniform and consistent scheme of color identification of power wiring throughout the building system. Identification shall be by the permanent color of the selected covering. On large conductors, secure identification by means of painted color banding or plastic tape.

1. Color scheme shall be as follows, [or as required to match the existing color coding in the building for 120/240 V systems with high leg provide Orange for phase B]:

208/120 Volt

Phase A Black  
Phase B Red  
Phase C Blue  
Neutral White  
Ground Green

480/277 Volt

Phase A Brown  
Phase B Purple  
Phase C Yellow  
Neutral Gray  
Ground Green

2. Wiring for switches shall be same color as phase wire.

3. Colored insulation in sizes up through #4. Conductors #3 and larger may have black insulation, but color coded with 1/2" wide band of colored tape, at accessible locations. Rap conductor minimum 6" width.
  4. Feeder cables shall be tagged in pull boxes, wireways, wiring gutters of panels, and at other accessible locations. Tags shall be fireproof, nonconductive material, approved by Architect.
  5. Maintain same conductor color from service entrance to last device.
- F. Phase Rotation: Phase rotation shall be maintained throughout the project.
1. Phase rotation shall be clockwise or counterclockwise, per serving power company standards, A-B-C, and identified as such left-to-right, top-to-bottom, and front-to-back with color coding as specified above at switchboards, panelboards, transformers, motor control centers, motor starters, and similar locations.
  2. Motor phase reversal, if necessary, shall be made at motor controller.
- G. Branch Circuit and Control Wiring Tags: All branch circuit and control wiring conductors shall be tagged using self-sticking vinyl cloth or mylar cloth wire markers. Embossed pressure sensitive plastic or metal ribbon markers will not be accepted. Tags shall be installed at all wiring splice, tap and termination points and shall correspond to the designations shown on the control wiring diagrams or panel schedules.
- H. Branch Circuit Pull Boxes and Junction Boxes: Branch circuit pull boxes shall be neatly stenciled with a black permanent marker indicating the panel name and branch circuit number. Boxes on emergency power systems shall be painted orange prior to marking. Boxes on fire alarm power systems shall be painted red prior to marking.
- I. Miscellaneous Switch Plates or Device Plates: Device and switch plates for all 15 and 20amp devices circuited to "emergency" and "normal" circuits, special purpose outlets, pilot lights, remote operated light switches, all remote control devices, and other devices noted on the Drawings shall be identified by engraving the switch plate or device plate.
1. Nomenclature shall include the panel and circuit of the outlet or switch, or the indication of the pilot, or the area of control, or equipment served. Consult the Architect/Engineer for label nomenclature.
  2. Provide Plates for all Wiring Devices
  3. Engraving shall be 3/16" condensed Gothic and shall be filled with black enamel.
- J. Manufacturers: Provide electrical identification products as manufactured by Ideal, T&B, 3M, Panduit, Seaton, EMED Co. or an approved equal.
- K. WARNING SIGNS AND OPERATIONAL TAGS:
1. Warning Signs: Provide warning signs where there is hazardous exposure associated with access to or operation of electrical facilities. Provide text of sufficient clarity and lettering of sufficient size to convey adequate information at each location; mount permanently in an appropriate and effective location. Comply with recognized industry standards for color and design.
  2. Operational Tags: Where needed for proper and adequate information on operation and maintenance of electrical systems, provide tags of plasticized card stock, preprinted. Tags shall convey the message, example: "DO NOT OPEN THIS SWITCH WHEN BURNER ISOPERATING".

END OF SECTION

## SECTION 26 06 00 – ELECTRICAL SWITCHGEAR

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

### PART 2 - MATERIALS AND METHODS

#### 2.01 STUDIES PROVIDED BY SWITCHGEAR MANUFACTURERS:

- A. GENERAL: All studies shall be prepared and sealed by a manufacturer's professional engineer.
- B. COORDINATION STUDIES: Provide coordination studies and recommend selecting and setting of circuit breakers for all switchgear and circuit breakers prior to submitting any switchgear for review and approval.
- C. SHORT CIRCUIT ANALYSIS: Provide short circuit analysis to determine short circuit rating of all electrical switchgear. Provide short circuit rating label on the all electrical switchgear.
- D. ARC FLASH STUDIES: Provide arc flash studies and arc flash rating and protection equipment label on all switchgear.

#### 2.02 DISTRIBUTION PANELS

- A. GENERAL: Construction in accordance with NEMA standards. Panels and circuit breakers shall be listed for use with 75° C wiring. All products shall be manufactured in the United States.
- B. CABINETS: Panelboard assembly shall be safety dead front type, enclosed in a code gauge steel cabinet with removable end walls. Fronts shall be of code gauge, full-finished steel with rust-inhibiting primer and baked enamel finish. Provide locking door unless panel is located in a mechanical room. Provide the largest cabinet available for the ampacity panel schedules. Provide NEMA 1 enclosure for panels in mechanical room. Provide NEMA 3R enclosure outdoor. Provide NEMA 4XSS enclosure or NEMA stainless steel cover as noted on the panel schedules for electrical panels located in kitchen, machine shop and tool rooms.
- C. BUSSING: Bus structure and main lugs shall have current ratings as shown on the panelboard schedule. Such ratings shall be established by heat rise tests with maximum hot spot temperature on any connector or bus bar not to exceed 50 degrees C rise above ambient. Heat rise tests shall be conducted in accordance with Underwriters' Laboratories Standard UL 67. Phase busses, solid neutral and ground buss shall be silver plated copper braced for the scheduled fault current (50,000 amperes minimum). Provide scheduled short circuit rating per short circuit analysis shown on the plans if higher short circuit value is calculated by engineers. Bussing shall accept the largest circuit breaker available for the ampacity scheduled even though only smaller size CB's are listed. Where space only is shown, bussing shall allow any combination of 1, 2 and 3 pole circuit breakers of various frame sizes.

- D. **CIRCUIT BREAKERS:** Circuit breakers shall bolt in or have Square D I-Line plug on construction. Circuit breakers shall be equipped with individually insulated, braced and protected connectors. Tripped indication shall be clearly shown by the breaker handle taking a position between ON and OFF. Trip ratings of the circuit breaker shall be as shown on the panelboard schedule. All spaces shown shall include all buss connectors and any other provisions necessary for future breaker additions. **Circuit breaker 800A and larger shall be 100% rated.** Minimum 18,000 amperes interrupting capacity for circuit breakers 100A and larger.
- E. **ADJUSTABLE TRIP CIRCUIT BREAKERS:**
1. **GENERAL:** When adjustable trip circuit breakers are provided, manufacturer shall provide system coordination study with recommended settings as part of electrical switchgear submittal for engineer review.
  2. **INSTALLATION:** Contractor shall notify Owner when adjustable trip settings are installed for each adjustable trip circuit breaker. When adjustable trip settings are preset from the factory the contractor shall provide written documentation certifying that all adjustable trip settings have been set in accordance with the system coordination study.
  3. **CLOSEOUT DOCUMENTS:** Provide system coordination study and installed trip settings with O&M Manuals for each adjustable trip circuit breaker.
  4. **WARRANTY:** During the warranty period the contractor shall provide and install new adjustable trip settings as required at no cost to the owner.
- F. **SURGE SUPPRESSION:** Panels noted to have integral or external TVSS or SPD surge suppression shall include TVSS/SPD. For externally mounted TVSS/SPD, Contractor shall provide minimum 30A/3P circuit breaker in panel to connect to TVSS/SPD.
- G. **NAMEPLATES:** Provide lamacoid nameplate for panel stating name, voltage, amps & bracing. Provide lamacoid nameplate for each device and space stating equipment served and trip setting. Attach with mastic and two screws.
- H. **ACCEPTABLE MANUFACTURERS:** General Electric, Eaton, Siemens or Square D.

## 2.03 LIGHTING PANELS

- A. **GENERAL:** Circuit breaker type; Square D Type NQOD for 120/208-240 Volts, NF for 277/480 Volts. Construction shall comply with NEMA and U. L. Standards. Panels and circuit breakers shall be listed for use with 75° C wiring. Mount panel with top of can at 72" above finished floor. All products shall be manufactured in the United States.
- B. **CABINETS:** Safety dead front type with front hinged to box; box made of code gage galvanized steel; provide wire bending space per NEC Table 373-6; door with flush type combination lock and latch, all keyed alike.

- C. **CIRCUIT BREAKERS:** Plug in for 120/208-240 Volts, bolt in for 277/480 Volts; quick make, quick break, trip free, thermal magnetic trip; automatic tripping indicated by handle at midpoint position; multi-pole breakers to have common trip (handle ties are not acceptable). Minimum interrupting ratings shall be 14,000 Amps symmetrical at 277/480 Volts and 10,000 Amps symmetrical at 120/208-240 Volts. Provide scheduled short circuit rating per short circuit analysis shown on the plans if higher short circuit value is calculated by engineers. All main circuit breakers shall be rated 22,000 Amps minimum. Ratings as scheduled on drawings. Square D I-line construction with plug on breakers is acceptable for 277/480 Volts. Install circuit breakers in same order as shown on the drawings. Where spaces are noted, provide bus connectors and all other provisions necessary to add future breakers of any size and number of poles up to 100 amp and three poles.
  - D. **BUSSING:** Silver plated copper bussing, solid neutral and ground buss sized in accordance with NEMA temperature rise standards and installed completely throughout panel for installation of future breakers where schedule shows space only. Lugs U. L. rated for Cu/Al terminations. Unless indicated otherwise on drawings, bus bracing shall be 22,000 Amps symmetrical. Panels with 24 or more circuits shall have a minimum of 225 Amp bussing. Provide a ground bar in the Service Entrance Equipment and in each electrical panel having a branch circuit ground wire.
  - E. **SURGE SUPPRESSION:** Panels noted to have TVSS surge suppression shall include TVSS internally mounted in panel housing wired to buss. Where TVSS cannot be internally mounted provide externally mounted TVSS in NEMA1 enclosure wired to 30A/3P circuit breaker in panel.
  - F. **DIRECTORY:** Complete at end of job, typewritten, stating equipment or rooms served by circuit. Type even circuits on right side of card, odd on left side.
  - G. **FINISH:** Gray enamel over rust inhibiting treatment after fabrication and before assembly. After installation, and before acceptance by the Owner, assembly shall be painted with a rust inhibiting paint (color selected by Architect). Recessed cans may have galvanized finish.
  - H. **NAMEPLATE:** Provide lamacoid nameplate with 5/16" letters on front face showing panel name and voltage. Attach with mastic and two screws. Coordinate to give same name as shown on panelboard schedule. Example:
 

Panel LA        225 MCB  
 120/208 Volts, 3 Phase, 4 Wire  
 Feed from DPA-2  
 Room 1.102
  - I. **ACCEPTABLE MANUFACTURERS:** General Electric, Eaton, Siemens or Square D.
- 2.04 **SURGE PROTECTION DEVICES (SPD)**
- A. **GENERAL:** Provide SPD equipment for electrical panels and equipment as noted on the Drawings. TVSS shall be installed internally to electrical panels or in NEMA 1 housing and mounted adjacent to the equipment to be protected. Connect SPD to three pole circuit breaker in the panel with wiring as short and straight as possible.
  - B. **DISPLAY:** Provide digital transient counter with battery backup.
  - C. **SUPPRESSION MODES:** System shall provide suppression of L-L, L-N, L-G and N-G transients.

- D. RESPONSE TIME: 1 nanosecond or less.
- E. EMI/RFI ATTENUATION: 38 dB or better.
- F. WARRANTY: 10 year, non-prorated replacement.
- G. TVSS RATING:
  - 1. Panels 800 amps and smaller: 160 kAmps per phase
  - 2. Panels larger than 800 amps: 320 kAmps per phase
- H. ACCEPTABLE MANUFACTURERS: Eaton, Siemens or Square D.

#### 2.05 TRANSFORMERS, DRY TYPE

- A. GENERAL: Provide U. L. labeled, plated copper wire wound, two winding type units, NEMA 3R construction suitable for mechanical room damp/wet location installed. Refer to Drawings for KVA ratings. Refer Drawings for K=4, K=13 and Isolation XFMR Ratings. All products shall be manufactured in the United States. Transformer must be an ultra-efficient that exceeds the U.S. Dept. of Energy's new and more stringent efficiency legislation effective Jan. 1, 2016. Transformer shall also be manufactured in an advanced ISO 14001 certified facility.
- B. Shield: Provide an electrostatic shield between the transformer primary and secondary to attenuate source side line interference for transformers indicated to be shielded and for all transformers with a K-factor rating greater than 1.0
- C. TEMPERATURE RISE: Design shall use 220° C insulation and operate with a maximum temperature rise of 115° C above a 40° C ambient.
- D. TAPS: High voltage windings shall be provided with two 2½% taps FCAN and four 2½% taps FCBN.
- E. NOISE: The manufacturer shall properly isolate the core and coil from the enclosure with vibration isolation pads in order to minimize the transmission of vibration and noise. Noise levels shall not be more than NEMA and ANSI Standards.
- F. IDENTIFICATION: Install lamacoid nameplate with 5/16" letters on front face showing transformer name and voltage. Attach with mastic and two screws. Coordinate to give same name as shown on drawings. Example:
 

Transformer XA 112.5 KVA  
480V-208Y/120 Volts, 3 Phase, 4 Wire  
Feed from DPA-3  
Room 1.103
- F. MANUFACTURERS: General Electric, Eaton, Siemens or Square D.

#### 2.06 FUSED AND SAFETY SWITCHES

- A. GENERAL: Provide disconnect switch for each motor, motor starter, electric duct heater and other equipment required by the NEC, fusible or non-fusible as required. Where motor circuit protective device is in the same room, within 50 feet of and in sight of the equipment, no additional switch is required; if those conditions do not prevail provide switch at the equipment and as indicated on Drawings. Equipment shall be listed for use with 75° C wiring. Disconnect switches for motors controlled by variable frequency drives shall have auxiliary “early break” contact to turn off VFD when motor is disconnected. All products shall be manufactured in the United States.
- B. TYPE: Heavy duty switch sized for load served; non-fusible where used purely as disconnect device. Fused switches shall accommodate Class RK1 fuses. NEMA 3R enclosure for switches in mechanical rooms, NEMA 3R for switches outside unless noted to be NEMA 4X on the Drawings. Also, provide NEMA 4X for switches in shops, labs, classrooms as noted on the plans. Switches located in the kitchen area shall be NEMA 4X stainless steel. Switches in the pool area and pool equipment area shall be non-metallic NEMA-4X.
- C. FUSES: Fuses to 600 amps shall be low peak, dual element, time delay fuses – LPS Class RK1. Larger fuses shall Limitron KTU Class L fuses. Provide 10% spare fuses of each size, minimum of three per size. Install in cabinet in main mechanical room.
- D. NAMEPLATE: Provide each device with an engraved lamacoid nameplate (5/16" high letters) showing load served. Attach with mastic and two screws.
- E. MANUFACTURERS: General Electric, Eaton, Siemens or Square D.

## 2.07 CONTACTORS

- A. GENERAL: Contactors shall have poles and rating consistent with the load being served but shall have a minimum of three poles, 30 amps (20 amps tungsten) per pole at 600 volts. The load may consist of all types of ballast and tungsten lighting, resistance and motor loads.
- B. CONTACTS: The unit shall have 100% rated double-break, silver-cadmium-oxide power contacts, field convertible from N.O. to N.C. and vice-versa and with clearly visible N.O. and N.C. contact-status indicators.
- C. Pilot Lights: Provide green “Off” and red “On” pilot indicator lights on the face of the contactors.
- D. CONTROL: The unit shall be electrically held installed in a NEMA 1 enclosure. List circuits controlled inside enclosure. Coil voltage shall match load voltage so control power comes from circuit controlled. Provide 120 volt coil and controls transformer with input and output fusing. Provide HOA switch to allow manual control of lights. List circuits controlled inside enclosure.
- E. ENCLOSURES: Provide NEMA 1 for standard installations and NEMA 4X for installations outdoors and wet areas including kitchen. Comply with Code requirements for other environments.
- F. ACCEPTABLE MANUFACTURERS: General Electric, Eaton, Siemens or Square D.

## 2.08 MOTOR CONTROLLERS

Motor starters and contactors shall be provided under the Mechanical Section, installed under the Electrical Section. Starters installed in motor control centers shall be provided under this section. Locate starters next to electrical panel serving equipment unless shown otherwise. Note that all motors require starters (or contactor if motor is small and single phase).

## 2.09 NAMEPLATES

In addition to the nameplate specified with the various equipment, provide the following engraved lamacoid nameplate with 5/16" high letters on each lighting panel, distribution panel and transformer:

**CAUTION**  
**DO NOT ADD OR MODIFY CIRCUITS WHILE ENERGIZED**  
**THIS PANEL IS POWERED FROM PANEL DA.**

Replace PANEL with TRANSFORMER as appropriate. Replace PANEL DA with the actual device as shown on the Drawings.

## PART 3 - EXECUTION

### 3.01 INSTALLATION OF SWITCHGEAR

- A. GENERAL: Install switchgear where shown, in accordance with the manufacturer's written instructions and recognized industry practices to ensure that the switchgear comply with the requirements and serve the intended purposes.
- B. Standards: Comply with the requirements of NEMA and NEC standards and applicable portions of NECA's "Standard of Installation", for installation of switchgear.
- C. Torque bus connections and tighten mechanical fasteners.
- D. Concrete Pads: Install switchgear on a reinforced concrete house keeping pad. The housekeeping pad shall extend 3" beyond the housing of the switchgear unless shown otherwise. Switchgear shall be bolted to the house keeping pad using 3/8" minimum galvanized bolts and anchors on 30" maximum centers. Furnish the exact position of any block outs, dimensions, and location of the housekeeping pads in a timely manner so as to prevent delay of the concrete work.
- E. Adjustment: Adjust operating mechanisms for free mechanical movement.
- F. Finish: Touch-up scratched or marred surfaces to match original finish.

### 3.02 TESTING



- A. Pre-energization Checks: Prior to energization, check switchgear for continuity of circuits and for short circuits.
- B. Switchgear Insulation Resistance Test: Each switchgear bus shall have its insulation resistance tested after the installation is complete except for line and load side connections. Tests shall be made using a Biddle Megger or equivalent test instrument at a voltage of not less than 1000 volt dc with resistance recorded after 30 and 60 seconds of operation at slip speed. Resistance shall be measured from phase-to-phase and from phase-to-ground. Bus which does not meet or exceed manufacturer's bus insulation resistance specifications shall be repaired or replaced and retested until an acceptable resistance is obtained.
- C. Ground Fault Protection System Test: Following completion of the construction work and prior to final acceptance testing, the ground fault protection system shall be field-tested and reset to the recommended settings in the coordination study for both current and time by a representative of the manufacturer's engineering service department. The field test shall be conducted in a similar manner to the factory test in that a cable from a low voltage, high-current test set shall be passed through each current sensor. The time and current values for the ground fault function of circuit breakers shall be checked against the ground fault characteristic curves and relays which fail to pick-up within the published curves shall be recalibrated or replaced. This test shall also demonstrate the complete system reliability in that the overcurrent devices shall actually open.
- D. Submittals: Contractor shall furnish all instruments and personnel required for tests. Submit four copies of certified test results to Engineer for review. Test reports shall include switchgear tested, date and time of test, relative humidity, temperature, and weather conditions.
- E. Thermographic Testing: Conduct a thermographic test of the switchgear and their connections using an infrared temperature scanning unit. The test shall be performed by an independent testing laboratory (General Electric, Eaton Electrical Systems and Solutions or Siemens Industrial Service). Connections indicating higher temperature levels than are acceptable shall be tightened or corrected as required to eliminate the condition. Conduct test, using test reporting forms, between 6 and 8 months after beneficial occupancy, but in no case beyond the one year warranty period. Correct unacceptable conditions prior to end of the warranty period.

END OF SECTION

## SECTION 26 09 26 – Standalone Digital Lighting Control System

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

- A. The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

#### 1.02 QUALITY ASSURANCE

- A. Product manufacturer shall have a minimum of (5) years' experience in the manufacturing of occupancy sensors.
- B. All components shall be UL listed, meet all state and local applicable code requirements.
- C. All components shall offer a five (5) year manufacturer's warranty.

#### 1.03 ACCEPTABLE MANUFACTURERS

- A. "Stand Alone" Digital Lighting Control System: "Wattstopper" or equal product from "n-Light", "Greengate" or "Lutron"

#### 1.04 GENERAL

- A. Provide the quantity of "Stand Alone" digital lighting controller, digital lighting switches, occupancy sensors and power packs required for complete and proper volumetric coverage to completely cover the controlled areas. Contractor shall verify room coverage and ceiling heights with manufacturer and provide the quantity of occupancy sensors as required. Rooms shall have one hundred (100) percent volumetric coverage of small motion detection to completely cover the controlled areas to accommodate all occupancy habits of single or multiple occupants at any location within the room(s). The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only rooms that are to be provided with sensors. Proper judgment must be exercised in executing the work so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural or architectural components. Provide sensors to provide complete and proper volumetric coverage. Sensor wall switches are not allowed.
- B. Stand Alone Digital Lighting Controllers shall be located in accessible ceiling spaces.
- C. In rooms such as Library / Cafeteria with light switches / circuits operating separate areas of room, provide Digital Lighting Controllers and sensor(s) for control of each switched area.
- D. Low voltage cabling is to be green with black stripe in color, Wattstopper LMRJ Series Pre-terminated RJ45 Cables, Plenum Rated.
- E. Where ceilings are above 12 feet provide wall mounted sensors at 10 feet AFF where practical or shown on

prints, and high bay sensors where the wall mounted would not be practical.

## PART 2 - MATERIALS AND METHODS

### 2.01 OCCUPANCY SENSORS AND LIGHTING CONTROL EQUIPMENT

- A. GENERAL: Provide occupancy sensors with associated accessories including Stand Alone Digital Lighting Controllers and Digital Light Switches for rooms noted on the drawings. Units shall be suitable for both 120V and 277V. Refer to the Drawings for proposed layout. Supplier shall have factory review layout, provide additional devices as necessary at no additional cost, and certify the proper operation of the sensor system. Devices shall be factory set at 100% sensitivity and 30 minutes or more minimum ON time.
- B. Stand Alone Digital Lighting Controller: Provide non-Dimming Room Controller for room with non-dimmable light fixtures. Digital Lighting Controller shall have quantity of relays match the number of lighting load in each room. For Example, provide minimum of 3 relays to control 3 lighting loads. Wattstopper LMRC-213 or equal. For room with more than 3 lighting loads, provide additional Digital Lighting Controllers.
- C. Stand Alone Digital Lighting Controller-Dimmable: Provide Dimming Room Controller for room with dimmable light fixtures. Digital Lighting Controller shall have quantity of relays match the number of lighting load in each room. For Example, provide minimum of 3 relays to control 3 lighting loads. Wattstopper LMRC-213 or equal. For room with more than 3 lighting loads, provide provide additional Digital Lighting Controllers.
- D. WALL MOUNTED DUAL CIRCUITS SWITCH OCCUPANCY SENSOR: Dual Circuits to control two lighting loads. Passive infrared type with 180° field of view, tamper resistant lens. Unit shall have no minimum load requirement and fit standard single gang outlet box. Provide LED walk test indicator and one or two electronic OFF-AUTO switches depending on switching arrangement. Unit shall have field adjustable time delay and sensitivity adjustment. Wattstopper LMDW-102 or equal.
- E. WALL MOUNTED SINGLE CIRCUIT SWITCH OCCUPANCY SENSOR: Single Circuits to control only one lighting load. Passive infrared type with 180° field of view, tamper resistant lens. Unit shall have no minimum load requirement and fit standard single gang outlet box. Provide LED walk test indicator and one or two electronic OFF-AUTO switches depending on switching arrangement. Unit shall have field adjustable time delay and sensitivity adjustment. Wattstopper LMDW-101.
- F. DUAL TECHNOLOGY CEILING MOUNTED: Dual technology infrared and ultrasonic detection system. Unit shall have field adjustable time delay and sensitivity adjustment. LMDC-100 or equal depending on room size and configuration. White Finish.
- G. ULTRASONIC CEILING MOUNTED : Ultrasonic detection system for locker rooms and restrooms. Unit shall have field adjustable time delay and sensitivity adjustment. Wattstopper LMUC-100 or equal depending on room size and configuration. White Finish. Provide 120/277V line voltage type sensor and power pack for location with toggle key switch.
- H. CEILING MOUNTED (SMALL ROOMS): Infrared technology with field adjustable timer. Wattstopper LMPC-100 or equal.
- I. CEILING MOUNTED HIGH BAY SENSOR: Wattstopper LMPC-100-5 or equal.
- J. WALL MOUNTED HIGH CEILING AREAS: Wall mounted Infrared detection system rated for ceiling higher than 10 FT. Wattstopper LMPX-100 or equal.
- K. POWER PACK: Wattstopper BZ-150 or equal.

- L. EMERGENCY LIGHTING CONTROLLER / GENERATOR TRANSFER DEVICE - GTD: Generator transfer device to transfer power source for light fixture from normal circuit to emergency circuit. Wattstopper ELCU-200 or equal. Note: This is only apply for project with emergency generator.
  - M. EMERGENCY LIGHTING CONTROLLER FOR DIMMABLE LIGHT FIXTURE: Generator transfer device to transfer power source for light fixture from normal circuit to emergency circuit. Device shall disconnect 2-10V dimming control wire when transfer power source from normal power to emergency power Wattstopper or equal. Note: This is only apply for project with emergency generator.
  - N. PHOTOSENSOR: Wattstopper LMLS-500 or equal.
  - O. DIGITAL WALL LIGHT SWITCH:
    - 1. Single Button: Wattstopper LMSW-101
    - 2. Dual Buttons: Wattstopper LMSW-102
    - 3. Three Buttons: Wattstopper LMSW-103
    - 4. Four Buttons: Wattstopper LMSW-104
    - 5. Eight Buttons: Wattstopper LMSW-108
  - P. DIMMER LIGHT SWITCH: Wattstopper LMDM-101 or equal.
  - Q. LOW VOLTAGE MOMENTARY CONTACT KEY SWITCH: Wattstopper LVS-1K-G or equal. Provide key supplied with each switch. Note: Key must match existing Key in existing school district or campus. Coordinate with Owner for key type and acceptable manufacturer of key switch prior to ordering.
  - R. DIGITAL INPUT/OUTPUT INTERFACE: Wattstopper LMIO-101 or equal.
  - S. ACCESSORIES: Provide power packs for ceiling mounted units including multiple switching capabilities, wire guards where noted and hard ceiling adapters as necessary. Provide auxiliary dry contact (NO in lights off state), -RP option.
  - T. Spares: Include additional spare devices including installation, raceway and wiring where directed during construction. Items not installed shall become spares and be delivered to the Owner.
    - a. Room Controllers (3)
    - b. Occupancy Sensors (3 of each type)
    - c. Emergency Bypass Controllers (3)
    - d. Low Voltage Switches (3 of each type)
    - e. Daylight Harvesting Photocells
  - U. SUBMITTAL: Include equipment, wiring diagrams and installation floor plan.
- 2.02 Outdoor Lighting Control
- A. GENERAL: Outdoor lighting circuits shall be controlled by lighting contactors and BAS control points or photocells or time clocks per plans. Lighting contactors shall be provided by Electrical Contractor. BAS lighting control points shall be provided by Mechanical Contractor. Photocells/Time clocks shall be provided by Electrical Contractor.
- 2.03 SUBMITTALS
- A. Submit manufacturer's data on lighting control system and components including shop drawings, detailed point to point wiring diagrams, and floor plans showing occupancy and daylighting sensor locations. Provide typical mounting details for occupancy and daylighting sensors for this application. Include equipment, wiring diagrams, programming and installation floor plan.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. The installing electrical contractor shall complete, prior to request of Manufacturer factory start up and site commissioning, complete installation of all relay panels, their respective loads landed and confirmed operations, switches installed, and confirmed operational, and the entire data network shall be pulled from all panels to the designated IT room as indicated on plans.
- B. The installing contractor shall, prior to request of Manufacturer factory start up and site commissioning, request a site visit by the local authorized Manufacturer rep to assist in identification of any open ended issues, thereby eliminating potential for delays and system commission interruptions. The pre commissioning meeting shall include the local rep (Edwin Jones Co. ), the Houston ISD project manager, the Houston ISD energy manager, the electrical contractor and the general contractor
- C. Upon confirmation of progress by local factory authorities, the installing electrical contractor will complete the start up request form found in the Manufacturer submittals, including any relay/circuit, and switching changes from the contract documents. This is essential to facilitate substantial completion.
- D. The installing electrical contractor shall clearly label all low voltage wiring inside the relay controllers. Labels shall be typed and indicate what they are connected to (switch, occupancy sensor, etc..) and what room they are connected to. Labels shall be Panduit Permanent Labels or Brother Cable Labels. The room # shall include both the architectural plan room numbers as well as the room numbers to be shown on the signage.
- E. All low voltage wiring inside the relay controllers must be clean and organized. Wire nuts are not acceptable, only compression fittings.
- F. Low voltage wire shall be terminated so the wire jackets match the color coding on the termination blocks.
- G. Attic stock. Electrical contractor shall provide the following spare parts package to turn over to the owner within thirty (30) days of substantial completion of the project. This material is to be ordered separately when commissioning is scheduled in order to ensure the longest warranty period possible.
  - a. Room Controllers (3 of each type)
  - b. Occupancy Sensors (3 of each type)
  - c. Low Voltage Switches (3 of each type)
  - d. Daylight Harvesting Photocells (3)
  - e. Provide installation for the above items where directed during construction at no additional cost to Owner. Items not installed shall become spares and be delivered to maintenance department.
- H. Install Stand Alone Digital Lighting Controller in ceiling cavity above digital light switch.
- I. Low voltage RJ45 cabling installed from Digital Lighting Controller to sensor(s) and from sensor to sensor shall be supported every 4 feet at a minimum height of 3 feet (near deck when less than 3 feet) above grid/ceiling. Support system shall be ceiling wire attached to structure and clipped to ceiling support grid using Caddy drop wire securing clip #EC311. Cabling is to hang plumb to devices.
- J. Low voltage cables at exposed area or above sheet rock ceiling shall be installed in conduit.
- K. Provide ceiling sensors rated for specified ceiling height as shown on Architectural Ceiling Plan. See Architectural Ceiling Plan for specified ceiling height.

- L. Provide wire guard for occupancy sensor in areas subject to physical damage.
- M. Occupancy sensor feature, setting and control sequence must comply with latest IECC code and City requirement.
- O. Occupancy Sensors shall have dual technology infrared and ultrasonic detection system. Unit shall have field adjustable time delay and sensitivity adjustment.
- P. Location of all sensors is approximate. Review installation instructions before installing sensors.
- Q. To prevent false activation, Ultrasonic ceiling mount sensors should be mounted away from the path of strong air turbulence. In normal airflow conditions sensors should be mounted four to six feet away from source. For typical placement, ref to location diagrams. In locations with strong air turbulence a PIR ceiling sensor should be considered.
- R. Contractor should follow manufacturer's recommended placement and verify circuits with respect to digital lighting controller and power pack needed in the field.
- S. Adjust sensor to de-energize lighting after 30 minutes of inactivity.
- T. Room lighting controllers shall be mounted on the wall 18" above ceiling tile near the entry light switch of each space with occupancy sensors.

### 3.02 SUPPORT SERVICES

- 1) System Start Up and Commissioning
  - a) Manufacturer shall provide a factory authorized technician to confirm proper installation and operation of all lighting control system components. The startup requirement is intended to verify:
    - i) That all occupancy and daylighting sensors are located, installed, and adjusted as intended by the factory and the contract documents.
    - ii) The occupancy sensors and daylighting sensors are operating within the manufacturers specifications.
    - iii) The sensors and room controllers interact as a complete and operational system to meet the design intent.
  - b) Manufacturer to provide a written statement verifying that the system meets the above requirements.
- 2) System Training
  - a) Manufacturer shall provide factory authorized technician to train owner personnel in the operation, programming and maintenance of the lighting control system including all occupancy sensors and daylighting controls.
- 3) System Programming
  - a) Manufacturer shall provide system programming including:
    - i) Wiring documentation.
    - ii) Switch operation.
    - iii) Occupancy sensors.
    - iv) Photocells
  - b) Provide computer generated documentation on the commissioning of the system including a room by room description of:
    - i) Sensor Parameters, time delays, sensitivities and daylighting setpoints.
    - ii) Sequence of operation (e.g. manual on, auto off, etc.)
    - iii) Load Parameters (e.g. blink warning, etc.)

- 4) Re-Commissioning
  - a) After 90 days from occupancy the factory authorized representative and electrical contractor shall re-calibrate all sensor time delays and sensitivities to meet the Owner's Project Requirements. Provide a detailed report to the Architect/Owner of all re-commissioning activity and changes.
- 5) Warranty
  - a) Provide a five (5) year complete manufacturer's warranty on all products to be free of manufacturers' defects.
  - b) System warranty shall be for one (1) year of complete maintenance coverage after final acceptance of the system and include all material and labor to provide consistent peak performance of the system. Post-warranty maintenance shall be available on contract or call basis.

END OF SECTION

## SECTION 26 10 00 – AUXILIARY SYSTEMS

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

### PART 2 - SYSTEMS

2.01 GENERAL: See Electrical Site Plan, Electrical Floor Plan and Technology Consultant's Site Plans and Floor Plans for additional auxiliary system devices not shown on electrical Drawings. General Contractor shall coordinate with Electrical Contractor and Low Voltage Subcontractors that all conduits, cable trays, J-boxes, sleeves and 120V circuit under all sections in Divisions 26, 27 & 28 shall be provided and installed by Electrical Contractor under the base proposal pricing – Contractor must provide conduit and j-boxes to server low voltage devices and equipment not only shown on electrical plans but also shown on Technology Consultant's Plans and Specifications. No exception. All low voltage cable must be installed in conduit except the plenum rated low voltage above the accessible lay-in ceiling may be supported by cable trays 18" above the accessible lay-in ceiling tile without conduit. Low voltage cables shall be installed in conduit above sheet rock / plaster ceiling or at location without ceiling.

#### 2.02 VIDEO & AUDIO SYSTEM

For each TV, video & audio outlet, provide J-box and 1.25" conduit to accessible ceiling. For floor outlets, provide 1.25" conduit to accessible ceiling.

#### 2.03 TELEPHONE & DATA NETWORK CABLING

For each data and telephone outlet, provide J-box and 1" conduit to accessible ceiling. For floor outlets, provide 1" conduit to accessible ceiling.

#### 2.04 SECURITY SYSTEMS

For each Security, Access Control and Camera Device, provide J-box and 3/4" conduit to accessible ceiling.

#### 2.05 FIRE ALARM SYSTEMS

For each wall mounted fire alarm device, provide J-box and 3/4" conduit to accessible ceiling.

#### 2.06 PULL STRING AND STAINLESS COVER PLATE

For all systems, provide pull strings and stainless blank cover plate. Cover plate outdoor shall be weatherproof type.

#### 2.07 SHEET ROCK, PLASTER or OTHER HARD CEILING



Provide conduits for all low voltage cables above sheet rock, plaster or other hard ceiling. Provide and install recessed access panels/doors as necessary. Coordinate with GC and Low Voltage Sub-Contractor for required access panels/door locations during bidding period.

2.08 EXPOSED CEILING

Provide conduits for all low voltage cables in area with exposed ceiling or cloud ceiling.

2.09 EXTERIOR CONDUITS

Provide conduits for all low voltage cables installed outdoor. For project with multiple buildings, provide minimum 2”C between buildings for each different type of low voltage system. Provide additional two 4” conduits between buildings for spares. All underground conduits outside building shall be encased in red concrete, see Electrical Wiring Specification Section for additional requirements.

END OF SECTION

## SECTION 26 27 26 –WIRING DEVICES

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

### PART 2 - MATERIALS AND METHODS

#### 2.01 WIRING DEVICES

- A. GENERAL: All devices must be suitable for use intended, and have voltage and current ratings adequate for loads served. All devices shall have terminals designed for use with stranded wire. All receptacles shall have a grounded pole and green painted grounding screw. Grounded receptacles shall ground lug internally connected to mounting tabs. Wall outlets shall be installed with the ground pin down. Devices installed in or served through fire rated structures shall be fireproofed in a manner compatible with the U. L. fire rating.
- B. ACCEPTABLE MANUFACTURERS: Catalog numbers listed below are Hubbell, unless indicated otherwise. Equivalent items made by P&S will be acceptable provided they meet specification requirements. Note: Verify with Architect and Owner for desired color prior to ordering wiring devices.
- C. WALL SWITCHES: (20 Amp/277 Volt) HBL1221-White (Red if on generator)
- D. KEYED SWITCHES: (20 Amp/277 Volt) HBL1121L-White (Red if on generator)  
Note: Key must match existing campus keyed switches. Deliver all “keys” to Architect.
- E. LOW VOLTAGE LIGHTING CONTROL BUTTONS: See Lighting Control Specification.
- F. CONVENIENCE OUTLETS: (20 amp/125v/3 wire) HBL5362WTR. (Red if on generator):  
Extra Heavy Duty, Tamper-Resistant, One-piece nickel-plated brass ground strap, oversized “bell” shaped ground contacts, along with nickel plated steel retaining shields. .
- G. GFI OUTLETS: (20 amp/125v/3 wire):  
GFR8300SGI-White Color: Extra Heavy Duty, Tamper-Resistant & White color, 10KA short circuit rating, nickel-plated brass ground strap, Green LED power indication, Red LED ground fault indicator, no power at face if reverse wired.  
Note: For location where GFCI outlets will be non-accessible or hard to access such like outlets inside Drinking Fountain Enclosure, behind dishwasher, oven, steamers or other kitchen equipment, contractor shall provide Hubbell GFBFHP20W remote GFCI protection reset devices at accessible location included wiring and conduit to connect to electrical outlet behind inaccessible or hard to accessible equipment.
- H. ISOLATED GROUND COMPUTER OUTLETS IN IDF/MDF ROOMS: (20 amp/125v/3 wire)  
IG8300-Orange Color (Red if on generator): Extra Heavy Duty, Tamper-Resistant & Orange color.
- I. USB CHARGER RECEPTACLES: (20 amp/125v/3 wire): Hubbell USB8300AC5W Hospital Grade, Tamper-Resistant, One-piece nickel-plated brass ground strap, oversized “bell” shaped ground contacts, along with nickel plated steel retaining shields. Provide two USB ports, one type A and one type c. 5A @ 5VDC USB charging capacity.
- J. SPECIAL DEVICES: Refer to Drawings, all specification grade. Provide matching cord and cap.
- K. PLATES: Provide Type 302/304 smooth stainless steel plates for all devices; provide combination and/or gangable plates where adjacently located multi-outlet assemblies are indicated on drawings which shall include multi-switch installations. Plates for surface mounted switch or outlet boxes shall be Sierra galvanized steel handy box plates (H series). Mounting screws shall be stainless steel. Jumbo plates are not

acceptable.

- L. OUTDOOR COVERS: Electrical devices noted “WP” installed under canopies or other areas not subject to direct rainfall shall have aluminum self closing covers that are rated for wet location with cover closed. Devices subject to direct rainfall shall have Hubbell WP26M aluminum cover rated for wet location with cord connected to device.
- M. FLOOR OUTLETS:
  - 1. Provide Legrand Wiremold Evolution Series Floor Boxes: Minimum 4 gangs of capacity, see plan for additional gangs required. Auto-close egress doors, accepts standard size wall plates, die cast aluminum cover assemblies, finished interior. Legrand 1 Box or EFB Series. Above grade concrete floor boxes shall have fire classification of the floor, Legrand EFB\*S-FC Series. Color to be selected by Architect. Gym Floor Box must rated for vandalproof and extreme heavy duty.
  - 2. All on-grade floor boxes: Provide matching conduit access holes to accommodate power/AV/data devices and cabling shown on the plans. Also, provide on-grade barrier installed prior to the concrete pour in order to provide a barrier between the soil. The on-grade barrier comes with leveling feet and anchor points.
  - 3. All fire-rated above grade floor boxes: Provide U.L. fire classified floor boxes rated for floor structures. Provide matching fittings and accessories such as power junction boxes and low voltage cabling replacement fitting boxes and conduits to accommodate power/AV/data devices and cabling shown on the plans.
  - 4. All floor boxes, Provide matching cast metallic Flange and cover assembly for carpet, tile or other floor material. Finishes and colors available for Architect to select: Aluminum, Brass, Black, Gray and Ivory.
  - 5. All floor boxes: Provide matching Sub-Plates, sub-plate accessories and wiring devices to match power/AV/data devices shown on the plans.
- N. Recessed power and TV Box: For outlets to serve TV, Contractor shall provide recessed type metal power and TV Box with recessed device plate and connectors to recess the TV plug and Data plug into the wall, acceptable manufacturer shall be Hubbell, P&S and approved equal.
- O. Provide circuit identification on all electrical wiring devices. Provide circuit label on the front of the device plate. Mark electrical circuit number on the back of faceplate and also mark the electrical circuit number inside the device junction boxes of the devices.

## 2.03 TIME CLOCKS

7-Day Electronic Astronomic Time Clock.

- 1. Provide Intermatic Model ET8215C Series with two (2) 20A contacts to serve exterior lighting fixtures for project with lighting controlled by Time Clock. Note: For project with lighting controlled by BAS or photo cell only, time clock is not required. See plan for additional information.
- 2. Provide the Intermatic Model ET8000 Series time clock(s) for all 120V, 20A plumbing hot water heater circulation pump circuit(s) as shown on the electrical floor plans, typical of all.
- 3. Contractor shall program time clock per Owner’s schedule.
- 4. Provide additional set of batteries for maintenance.
- 5. See Drawings for additional information.

END OF SECTION

## SECTION 26 50 00 – LIGHT FIXTURES

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General, Supplementary and Special Conditions, apply to the work specified in this Section.

### PART 2 - MATERIALS AND METHODS

#### 2.01 LIGHT FIXTURES

- A. GENERAL: Provide all fixtures as shown, completely wired and securely attached to supports. Include all necessary accessories including heavy duty, chrome plated wire guards on high bay and indirect and over exit lights located in the gymnasium. Provide wire guards for 1x4 strip light fixtures in electrical and mechanical rooms. Fixture models scheduled are to show general type of fixtures required. Furnish mounting design and trim to fit type of ceiling and finish on which fixture is to be installed. Fixture shall be designed to operate satisfactorily where installed including the required fire proofing. All fixtures are static unless noted to be otherwise on the fixture schedule. All lens and doors shall be securely attached to the housing with spring operated latches to prevent release due to vibration or gravity.
- B. PAINT: All light fixture housings shall have a complete coverage of white alkyd reflecting enamel, 85% minimum reflectivity, applied after fabrication then baked in a temperature controlled oven until paint is thoroughly cured. Prior to applying the enamel, each metallic surface shall be prepared for painting by using a five stage hot zinc phosphatizing process. Baked polyester powder finish is acceptable.
- C. PLASTIC REFRACTORS/DIFFUSERS: Material shall be light-stable 100% virgin acrylic, translucent (98% minimum transmission), conforming to minimum standards of IES-NEMA-SPI. Material shall perform as applied in a normal interior environment for a period of 20 years, without noticeable deformation and with a transmission loss not exceeding 5%. Nominal thickness of material shall be .125" for either extrusions or injections.
- D. LAMPS and LIGHT FIXTURES: Provide all lamps as scheduled. Provide all LED light fixtures. All LED fixtures shall be qualified under ENERGY STAR or Design Lights Consortium programs. Provide 5 year manufacturer's warranty for all LED light fixtures. LED light fixtures shall have 0-10v Dimming Driver, True 120-277V (Not 240V), IP41 Minimum, Variable dimming, 100 lumens per watt, 4000K color temperature.
- E. LED DRIVERS: LED Driver shall have 0-10v Dimming, True 120-277V (Not 240V). All drivers shall be electronic type with a maximum of 10% THD, a minimum ballast factor of 0.90, a minimum power factor of .99 and crest factor less than 1.6. Drivers shall have lamps wired in parallel so failure of one lamp does not extinguish all lamps or degrade ballast performance. Provide single lamp module drivers where one lamp module of the fixture is shown to be connected to a remote emergency power source. Ballasts installed in suspended light fixtures shall be specifically selected and installed in a manner so as to emit no discernible buzzing or hum. Drivers installed in fixtures mounted in U. L. fire rated ceilings or ceilings with insulation on top shall be of low heat type to allow operation under these conditions. Drivers shall be suitable for use with occupancy sensors that will cause a higher rate of switching. Drivers for outdoor fixtures or unheated areas shall be rated for 0° operation. Drivers shall be warranted for five years from date of substantial completion of the project. All drivers shall be certified as CEE-Qualifying High Performance Drivers. Drivers shall be manufactured by Advance, Motorola or Magnetek. Provide 5 year manufacturer's warranty for all drivers.

- F. EMERGENCY POWER PACKS / INVERTERS: High output, self-contained, unit mounted internal to fixture to power two lamps. Battery shall be long life nickel cadmium sized for 90 minute operation. Unit shall have 120/277 volt solid state charger and automatic transfer switch. Unit shall provide a nominal 1100 lumen output from the specified light fixtures and minimum average 1FC for each room with emergency light fixture shown. Provide and install indicator light and test button. For light fixtures require remotely mounted battery packs, provide required power packs installed at readily accessible location and provide proper wire size per manufacturer's instruction. LED light fixture battery or inverter battery pack must be manufactured by Philips.
- G. FIRE PROTECTION: Provide fixture fire protection as required by U. L. Fire Resistive Index for the type ceiling to be installed. Provide additional fireproofing as required by the local building code. Protection is specified under the Ceiling Section of these Specifications.
- H. SUPPORT: Adequate, sturdy support as necessary to prevent possibility of fixture falling. Layin fixtures shall be supported with wire hangers at all four corners. Surface and pendant fluorescent fixtures must be supported with two supports per four foot section. All pendants must have swivel aligners located at the top ends; pendants shall be 1/2" rigid steel conduit, unless specifically indicated otherwise on drawings, painted as directed by Architect on jobsite. Support surface mounted fluorescent fixtures from structural members other than ceiling tees by providing Unistrut members laid across main ceiling tees or by attachment directly to structure. Provide caddy clips for recessed fixtures. Pendants for indirect light fixtures shall be securely attached to structure or Unistruts across joists using threaded connections. High bay fixtures and all light fixtures mounted higher than 14FT shall have manufacturer supplied quick disconnect mounting hardware and safety cable.
- I. LIGHT POLES: All poles shall be selected to support the scheduled fixtures and equipment for 130 MPH wind loading plus 1.3 gust factor. All poles shall be round aluminum tapered pole. Provide a reinforced concrete support base 24" in diameter by 72" in ground with 30" above grade. For poles taller than 40 feet, Contractor shall have light fixture manufacturer to hire a professional engineer to provide the Structural Design Calculations and Drawings for light pole and light pole base.
- J. INTERIOR PHOTOMETRIC: Lumens output shown on the light fixture schedule is only the minimum lumens output. Contractor shall submit floor plans with all interior light fixtures. Contractor shall provide photometric calculations and increase light fixture lumens level as required to meet the light level table below.

Light Level Table:

<u>Room Type</u>	<u>Average maintained light level in foot candles at work surface.</u>
Classrooms	50 FC minimum
Any Instructional Space	50 FC minimum
Office and Workrooms	50 FC minimum
Computer Labs	50 FC minimum
Kitchen	50 FC minimum
Gym	75 FC minimum
Science Labs	60 FC minimum
Auditorium and Stage	50 FC minimum
Student Dining / Commons	50 FC minimum
Mechanical Rooms	50 FC minimum
Corridors	30 FC minimum
Restrooms	30 FC minimum
Lockers / Storages	30 FC minimum

- K. EXTERIOR PHOTOMETRIC: Submit site plan with all exterior light fixtures mounted on the building, at the parking lots and other exterior area. Provide photometric calculations and adjust light fixture distribution optic and lumens output as required. Lighting level at the project property lines must comply with latest version of LEED green building requirement in order to prevent lighting pollution outside the school property lines. Contractor shall provide photometric floor plan layout in AutoCad Drawings during submittal and construction period to determine optimal mounted height of light fixtures. Provide average 3-5 maintained light level with max to min ration of 10 to 1.

- L. Spares: Include additional spare devices including installation, raceway and wiring where directed during construction. Items not installed shall become spares and be delivered to the Owner.
  - a. LED Driver (3 of each type)
  - b. Lamps (3 of each type)

END OF SECTION

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**SECTION 31 11 00**

**CLEARING AND GRUBBING**

CONDITIONS OF THE CONTRACT, SECTIONS AA THROUGH CB AND DIVISION 1 APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
- 01 Completely clear and grub the entire project site unless otherwise indicated on the Drawings.
  - 02 The Contractor should visit the site prior to bidding and familiarize themselves with all existing conditions.
  - 03 The Contractor shall have control over the site clearing schedule relative to improved and unimproved areas of the site.
- B. Related Work:
- 01 Section 02 32 00 – Geotechnical Investigation.
  - 02 Section 31 20 00 – Earth Moving.
  - 03 Section 31 22 19 – Finish Grading.
  - 04 Section 32 92 23 – Sodding.
  - 05 Section 32 93 00 – Landscaping.

**PART 2 – MATERIALS**

**2.1 TOPSOIL SPOILS**

- A. Existing topsoil cleared from the site may be used for topsoil in the final grading process provided it meets the requirements of topsoil as specified in section 31 20 00 – Earth Moving.
- B. Topsoil intended for re-use shall be stockpiled separately from all other spoil types.
- C. Excessive vegetation growth on topsoil stockpiles shall not be allowed. Topsoil for re-use shall be free of deleterious vegetation prior to being placed. Contractor shall use whatever means necessary to prevent contamination of topsoil intended to be re-used.

**PART 3 - EXECUTION**

**3.1 CONDITIONS AT SITE**

- A. Prior to start of work, coordinate with Architect and Owner for locations of proposed stockpiles of spoils material.
- 01 The Owner may request that excess fill be trucked and deposited on another Owner site in proximity to the project site.
- B. Where site areas are identified to remain primarily or fully in their state, coordinate with Architect on site to specifically define the limits of such areas.
- 01 Such areas shall be clearly marked, and contractor shall use all means necessary to eliminate detrimental traffic in the area, prevent damage and preserve the area.
- C. Where tree areas are indicated to remain, contractor shall carefully remove all underbrush and ground vegetation for grading and drainage. Coordinate with Architect for specific work required.

- 1 D. Excavate all work in an orderly and careful manner, with due consideration for any and all  
2 surrounding areas, plants or structures which are to remain.  
3  
4 E. Periodically water as required to allay dust and dirt.  
5  
6 F. Protect any adjacent property and improvements from damage, and repair and / or replace  
7 any portions damaged through this operation.  
8

9 **3.2 PREPARATION**

- 10 A. Thoroughly inspect the site and verify condition that will affect the work.  
11  
12 B. Within the scope of Work, all areas of the site shall be landscaped and / or sodded. The  
13 Contractor shall have discretion of scheduling when non-improved areas of the site shall  
14 be cleared and grubbed and prepared for the application of sodding and / or landscaping.  
15  
16

17 **3.3 CLEARING AND GRUBBING**

- 18 A. Clear and grub the premises of all ground vegetation, underbrush, surface material, growth  
19 and the like, as required to remove any obstruction to the work indicated on the Drawings.  
20  
21 B. Except for site areas indicated to remain, grub the entire ground surfaces down to 6 inches  
22 minimum below present grades.  
23  
24 C. Remove any stones, stumps and roots larger than 1 inch in diameter to a depth not less than  
25 18 inches below the original grade level.  
26  
27 D. Unless indicated to remain, remove all trees, shrubs, underbrush and vegetation.  
28  
29 E. Completely remove all trees, including root balls. Backfill and compact depressions /  
30 excavations as described in section 31 20 00 – Earth Moving.  
31  
32 F. Except for grass, all vegetation, underbrush and trees shall be removed from the site and /  
33 or disposed of in a proper manner. Stockpiling of vegetation shall not be permitted beyond  
34 a temporary basis.  
35  
36 G. All excavated materials and spoils not intended for re-use on the site shall be removed from  
37 the site.  
38  
39 H. Vegetation / plants / trees indicated to remain which are damaged, removed, killed, or  
40 constricted from normal growth patterns due to Contractor activities shall be replaced with  
41 a comparable item, or the full replacement amount credited to the Owner.  
42  
43 I. Grubbing:  
44 01 Grub areas required for roadways, paving, and construction to a minimum depth  
45 of 18 inches below the existing grade.  
46 02 When encountered, remove entire main roots and stump roots.  
47 03 Tree stumps should be grubbed to a minimum depth of 3 feet within paving areas.  
48  
49 J. Once clearing and grubbing is complete, grade the site to provide positive drainage as much  
50 as practical as required to eliminate ponding of water in areas of new Work.  
51  
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**END OF SECTION**



1 **SECTION 31 22 19**

2  
3 **FINISH GRADING**

4  
5 CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.  
6

7  
8 **PART 1 - GENERAL**

9  
10 **1.1 DESCRIPTION**

- 11  
12 A. Refer to Section AB – Instructions to Proposers, Section AF – Subcontractor /  
13 Manufacturer Prequalification, and section 01 25 00 – Request for Substitution  
14 Procedures.  
15
- 16 B. Scope of Work:
- 17 01 Fine grading to meet required finish elevations indicated on the Drawings;  
18 distribution of top-soil over the site; and coordination with installation of  
19 sodding and landscaping.
  - 20 02 Disc the existing and / or filled subgrade to a depth of 6 inches using a  
21 landscape scarifier.
  - 22 03 Remove all roots, rocks, stumps, trash and all construction debris prior to  
23 rough grading.
  - 24 04 Following the removal of all foreign materials, and when the rough grading is  
25 completed, provide and place previously stripped material or silty or sandy  
26 clay material in the amounts required to bring the rough grade to within 2  
27 inches of finish grade.
  - 28 05 Assure bonding of layers of fill material by discing in compliance with the  
29 specifications.
  - 30 06 Spread 2 inches of topsoil over graded areas after rough grading has been  
31 completed and approved.
    - 32 a. Topsoil previously stripped and stockpiled may be used, provided it  
33 meets all requirements for topsoil (re: section 31 22 00).
    - 34 b. The Contractor shall furnish all additional topsoil that may be  
35 required to provide finish elevations.
    - 36 c. Existing topsoil and additional topsoil fill material shall be free of  
37 debris, stumps, roots and stones larger than 3/4 inch diameter.
    - 38 d. Samples of topsoil shall be submitted to the Architect and Owner for  
39 approval prior to installation.
    - 40 e. Topsoil must be suitable for rapid grass growth with little to no clay.
  - 41 07 Final and fine grading shall be done using a tractor pulled landscape rake and  
42 hand raking, removing all debris immediately prior to landscaping / hydro-  
43 mulching. The final graded ground surface shall be relatively smooth, free of  
44 organic material and all construction material debris; and in suitable condition  
45 to commence landscaping work.
- 46
- 47 C. Related Work:
- 48 01 Section 02 32 00 – Geotechnical Investigation.
  - 49 02 Section 31 11 00 – Clearing and Grubbing.
  - 50 03 Section 31 20 00 – Earth Moving.
  - 51 04 Section 32 92 00 – Sodding.
  - 52 05 Section 32 92 13 – Hydromulching.
  - 53 06 Section 32 92 23 – Sodding.
  - 54 07 Section 32 93 00 – Landscaping
- 55  
56

1 **1.2 PROJECT CONDITIONS**

- 2
- 3 A. The Contractor will be responsible to maintain and control the grading around the
- 4 building so that the grade is sloped to prevent water from ponding adjacent to or
- 5 entering the building and / or accumulating in the graded areas throughout the progress
- 6 of the Work.
- 7
- 8 B. Utilities and other remaining obstacles shall be properly identified prior to
- 9 commencement of the final grading.

10

11 **1.3 QUALITY ASSURANCE**

- 12
- 13 A. Testing Laboratory Services. Test results shall meet or exceed the standards.
- 14
- 15 B. American Society for Testing and Materials:
- 16 01 ASTM D698-78, Test for Moisture Unit Weight Relations of Soils and Soil
- 17 Aggregate.
- 18 02 ASTM D2922, Tests for Density of Soil and Soil Aggregate in place by
- 19 Nuclear Methods.
- 20 03 ASTM D1557, Moisture Density Relations of Soils and Soil-Aggregate
- 21 Mixtures.
- 22

23 **PART 2 - PRODUCTS**

24

25 **2.1 MATERIALS**

- 26
- 27 A. Refer to Section 31 20 00 – Earth Moving for description of fill and topsoil materials.
- 28

29 **PART 3 - EXECUTION**

30

31 **3.1 FIELD QUALITY CONTROL**

- 32
- 33 A. Preparation:
- 34 01 Upon completion of grading and prior to placement of topsoil, Contract shall
- 35 thoroughly remove all construction debris, weeds, foreign plants, rocks 3/4"
- 36 diameter or larger, and other non-soil materials.
- 37 02 Remove by hand or hand rake if / where necessary.
- 38
- 39 B. Inspection:
- 40 01 The Contractor, prior to placing any topsoil, shall contact the Architect and
- 41 Owner when the grading is complete and all foreign materials have been
- 42 removed, to review these areas for compliance with the contract requirements.
- 43 02 Prior to placement of any topsoil, the Architect and Owner will review with
- 44 the Contractor the areas designated complete and ready for final grading.
- 45 03 The topsoil installation shall proceed immediately when the designated areas
- 46 have been reviewed and determined acceptable.
- 47 04 The Contractor shall contact the Architect and Owner to review the areas when
- 48 the topsoil has been placed, debris removed, and all final grading has been
- 49 completed.
- 50 05 This review shall occur prior to any sodding, seeding, hydromulching, and/or
- 51 other landscaping operations proceeding within these designated areas.
- 52 06 Any construction materials, discovered or uncovered during and / or after the
- 53 landscaping / sodding operations, shall be the responsibility of the Contractor
- 54 to remove and replace each area to its finished condition.
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56 **3.2 INSTALLATION**

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- A. Work under this section consists generally of the following operations:
  - 01 Disc the existing and / or filled subgrade to a depth of 6 inches using a landscape scarifier.
  - 02 Place topsoil material in the amounts required to bring the rough grade to within 2” of finish sodded grade; and within 1” of areas to receive hydromulch.
  - 03 Assure bonding of layers of fill material by discing in compliance with the specifications.
  - 04 Final and fine grading shall be done using a tractor pulled landscape rake and hand raking, removing all debris immediately prior to landscaping / sodding / hydro-mulching. The final graded ground surface shall be relatively smooth, free of organic material and all construction material debris; and in suitable condition to commence landscaping work.
  
- B. Solid Sodded Areas:
  - 01 Grading at areas to receive solid sodding shall account for nominal thickness of root base / soil included in the solid sod blankets.
  - 02 Grading at solid sodded area at building perimeter shall result in top of grass blanket soil flush with the bottom of the brick ledge, sidewalks and flatwork; unless shown otherwise on the Drawings.
  - 03 Sodding shall not impede the drainage of water off or over sidewalks and flatwork.
  - 04 Where solid sodding adjoins areas of hydro-mulched sodding, grade area to provide a level transition from one sodded area to the other after grass / hydromulch is established and fully rooted.

**3.3 PROTECTION AND MAINTENANCE**

- A. The Contractor shall be responsible for the protecting and maintaining completed finish grading prior to the start of sodding and landscape work by the Owner.
  
- B. Damage caused by surface run-off, construction vehicular traffic, use of equipment or other Contractor controlled activities shall immediately be repaired and restored to originally accepted state.

**END OF SECTION**

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**SECTION 31 23 00**

**EARTHWORK**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1- GENERAL**

**1.1 SUMMARY**

- A. This section includes excavating, filling and backfilling, compacting, grading, and testing for structures, utilities, pavings, and walks.
- B. Definitions in this section include the following:
  - 1. Backfill: Soil materials used to fill an excavation.
  - 2. Base Course: Layer placed between the sub-base course and asphalt paving.
  - 3. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.
  - 4. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.
  - 5. Drainage Course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.
  - 6. Excavation: Removal of material encountered above subgrade elevations.
    - a. Additional Excavation: Excavation below subgrade elevations as directed by Architect. Additional excavation and replacement material will be paid for according to contract provisions for changes in the work.
    - b. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
  - 7. Fill: Soil materials used to raise existing grades.
  - 8. Haunching: Material placed on either side of pipe from top of bedding up to springline of pipe and horizontally from one trench sidewall to opposite sidewall.
  - 9. Initial Backfill: Portion of trench, backfill that extends vertically from springline of pipe up to level line 12 inches above top of pipe, and horizontally from one trench sidewall to opposite sidewall.
  - 10. Pipe Embedment: Portion of trench backfill that consists of bedding, haunching and initial backfill.
  - 11. Omitted
  - 12. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

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- 13. Sub-base Course: Layer placed between the subgrade and a concrete pavement or walk.
  - 14. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below sub-base, drainage fill, or topsoil materials.
  - 15. Trench Zone: Portion of trench backfill that extends vertically from top of pipe embedment up to pavement subgrade or up to final grade when not beneath pavement.
  - 16. Utilities: Include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.
- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.

**PART 2 – PRODUCTS**

**2.1 MATERIALS**

- A. Soil Materials: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Unsuitable Soils: ASTM D 2487 soil classification groups ML, CL-ML, MH, OL, OH, and PT, or a combination of these group symbols. Materials that cannot be compacted to the required density due to gradation, plasticity, or moisture content. Materials that contain large clods, aggregates, and stones greater than 4 inches in any dimension, debris, vegetation, and waste, or any other deleterious materials. Materials that are contaminated with hydrocarbons or other chemical contaminants.
- C. Suitable Soil: Suitable soil materials are those meeting specification requirements. Unsuitable soils meeting specification requirements for suitable soils after treatment with lime or cement are considered suitable, unless otherwise indicated. Suitable material must be free of aggregate greater than 4 inches in any dimension, debris, vegetation and waste, chemical contaminants or any other deleterious materials.
- D. Backfill and Fill: Suitable soils meeting specified quality requirements placed and compacted under controlled conditions.
- E. Select Backfill: Class III clayey gravel or sand (GC or SC) or Class IV lean clay (CL) with plasticity index between 7 and 20 or clayey soils treated with lime to meet plasticity criteria and density requirement as per the soil report.
- F. Random Backfill: Any suitable soil or mixture of soils within Classes I, II, III and IV as per ASTM D 2487 Unified Soil Classification.
- G. Embedment Material: Soil material placed under controlled conditions within the embedment zone extending vertically upward from top of foundation to an elevation, 12-inches above top of pipe, including pipe haunching and initial backfill.
  - 1. For water lines embedment, use bank run sand classified as SP, SW, or SM by Unified Soil Classification System (ASTM D 2487) meeting following requirements:
    - a. Less than 15 percent passing number 200 sieve when tested in accordance with ASTM D 1140. Amount of clay lumps or balls may not exceed 2 percent.
    - b. Material passing number 40 sieve shall meet the following requirements when tested in accordance with ASTM D 4318: Liquid limit not exceeding 25% and plasticity index not exceeding 7.

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- 2. For sanitary and storm sewer embedment use cement stabilized sand.
- H. Trench Zone Backfill: Classified soil material meeting specified quality requirements and placed under controlled conditions in the trench zone from top of embedment zone to base course in paved areas or to the surface grading material in unpaved areas.
  - 1. For water lines, backfill in trench zone, including auger pits, intermediate and site pits with bank run sand or select backfill.
  - 2. For sewer pipes use cement stabilized sand as trench zone backfill under pavement and to within one foot back of curb to a level 12 inches below the pavement.
  - 3. For sewer pipe under natural ground use select backfill in trench zone.
- I. Backfill under the Building: Backfill under the building should be as per the soil report.
- J. Fill for Site Grading: Fill for site preparation in grade adjustment should be as per the soil report.
- K. Sub-base Material: Sub-base material should be as per the soil report.
- L. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- M. Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.
- N. Detectable Warning Tape: Polyethylene film warning tape encasing a metallic core, minimum 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Preparation: Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Provide erosion and sedimentation control measures.
- C. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding project site and surrounding area.
- D. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
- E. Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
  - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
- F. Excavate for structures, pavements, and walks to the indicated elevations and dimensions. Extend excavations for placing and removing concrete formwork, for installing services and other construction, and for inspections. Trim bottoms to required lines and grades to leave solid base to receive other work.

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- G. Excavate utility trenches to indicated gradients, lines, depths, and invert elevations of uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit.
  - 1. Excavate trenches deeper than bottom of pipe elevation, 6-inches deeper in rock, 4-inches deeper elsewhere, to allow for bedding course. Hand excavate for bell of pipe.
- H. When wet soil is encountered on trench bottom and dewatering system is not required, over excavate an additional 6 inches. Place non-woven geotextile fabric and then compact 12 inches of crushed stone in one lift on top of fabric. Compact crushed stone with four passes of vibratory type compaction equipment.
- I. Proof roll subgrades, before filling or placing aggregate courses, with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.
- J. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities.
- K. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Architect.
  - 1. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.
- L. Stockpile borrow materials and satisfactory soil materials, without intermixing, in shaped, graded, drained, and covered stockpiles. Stockpile soil materials away from edge of excavations and outside drip line of remaining trees.
- M. Utility Trench Backfill: Place, compact, and shape bedding course to provide continuous support for pipes and conduits over rock and other unyielding bearing surfaces and to fill unauthorized excavations.
  - 1. Water Line Embedment Materials:
    - a. Maximum 6 inches compacted lift thickness.
    - b. Compact to achieve minimum of 95 percent of maximum dry density as determined according to ASTM D 698.
    - c. Moisture content to be within -3 percent to +5 percent of optimum as determined according to ASTM D 698.
  - 2. Sewer Embedment Materials:
    - a. Maximum 6 inches compacted lift thickness.
    - b. Compact to achieve minimum of 95 percent of maximum dry density as determined according to ASTM D 698.
    - c. Moisture content to be on dry side of optimum as determined according to ASTM D 698 but sufficient for effective hydration.
  - 3. Trench Zone Backfill: Cement Stabilized Sand:
    - a. Maximum lift thickness determined by contractor to achieve uniform placement and required compaction, but do not exceed 12 inches.
    - b. Compact by vibratory equipment to minimum of 95 percent of maximum dry density determined according to ASTM D 558.
    - c. Moisture content on dry side of optimum determined according to ASTM D 558 but sufficient for cement hydration.

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- 4. Bank run sand or select backfill:
  - a. Place in maximum 8-inch loose layers.
  - b. Compact by equipment providing tamping or kneading impact to minimum of 95 percent of maximum dry density determined according to ASTM D 698.
  - c. Moisture content within 2 percent below or 5 percent above optimum determined according to ASTM D 698.
  
- N. Fill: Place and compact fill material in layers to required elevations.
  
- O. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
  - 1. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.
  
- P. Compaction under for fill for other area except utility trenches: Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand operated tampers.
  
- Q. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
  - 1. Under structures, building slabs, steps, and pavements, scarify and re-compact top 12 inches of existing subgrade and each layer of backfill or fill material at 95 percent. Fill under precast planks is to be loose un-compacted fill.
  - 2. Under walkways, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill material at 92 percent.
  - 3. Under lawn or unpaved areas, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill material at 85 percent.
  
- R. Grading: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated. Grade lawns, walks, and unpaved subgrades to tolerances of plus or minus 1 inch and pavements and areas within building lines to plus or minus 1/2 inch.
  
- S. Sub-base and Base Courses: Under pavements and walks, place sub-base course on prepared subgrade. Place base course material over sub-base. Compact to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.
  
- T. Under slabs-on-grade, place drainage course on prepared subgrade. Compact to required cross sections and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.
  
- U. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
  - 1. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work complies with requirements.
  - 2. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; re-compact and retest until specified compaction is obtained.



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- V. Repair and reestablish grades to the specified tolerances where complete or partially complete surfaces become eroded, rutted, settled, or where they lose compaction.
- W. Where settling occurs before project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
- X. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

**END OF SECTION**



1 N. ASTM D 4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of  
2 Soils.

3 **1.3 SUBMITTALS**

4 A. Conform to requirements of Section 01 33 00 - Submittal Procedures.

5 B. Submit proposed target cement content and production data for sand-cement mixture in  
6 accordance with requirements of Paragraph 2.3, Materials Qualifications.

7 **1.4 DESIGN REQUIREMENTS**

8 A. Use sand-cement mixture producing minimum unconfined compressive strength of 100  
9 pounds per square inch (psi) in 48 hours.

- 10 1. Design will be based on strength specimens molded in accordance with ASTM D 558 at  
11 moisture content within 3 percent of optimum and within 4 hours of batching.  
12 2. Determine minimum cement content from production data and statistical history. Provide  
13 no less than 1 ½ sacks of cement per ton of dry sand.  
14

15 **PART 2 - PRODUCTS**

16 **2.1 MATERIALS**

17  
18 A. Cement: Type I Portland cement conforming to ASTM C 150.

19 B. Sand: Clean, durable sand meeting grading requirements for fine aggregates of ASTM C 33, or  
20 requirements for bank run sand of Section 31 23 01 - Utility Backfill Materials, and the following  
21 requirements:  
22

23 1. Classified as SW, SP, SW-SM, SP-SM, or SM by Unified Soil Classification System of  
24 ASTM D 2487.

25 2. Deleterious materials:

26  
27 a. Clay lumps, ASTM C 142 - less than 0.5 percent.

28 b. Lightweight pieces, ASTM C 123; less than 5.0 percent.

29 c. Organic impurities, ASTM C 40, color no darker than standard color.  
30

31 3. Plasticity index of 4 or less when tested in accordance with ASTM D 4318.  
32  
33

34 C. Water: Potable water, free of oils, acids, alkalis, organic matter or other deleterious  
35 substances, meeting requirements of ASTM C 94.  
36

37 **2.2 MIXING MATERIALS**

38 A. Add required amount of water and mix thoroughly in pugmill-type mixer.

1 B. Stamp batch ticket at plant with time of loading. Reject material not placed and compacted within  
2 4 hours after mixing.

3 **2.3 MATERIAL QUALIFICATION**

4 A. Determine target cement content of material as follows:

- 5 1. Obtain samples of sand-cement mixtures at production facility representing range of
- 6 cement content consisting of at least three points.
- 7 2. Complete molding of samples within 4 hours after addition of water.
- 8 3. Perform strength tests (average of two specimens) at 48 hours and 7 days.
- 9 4. Perform cement content tests on each sample.
- 10 5. Perform moisture content tests on each sample.
- 11 6. Plot average 48-hour strength vs. cement content.
- 12 7. Record scale calibration date, sample date, sample time, molding time, cement feed dial
- 13 settings, and silo pressure (if applicable).

14 B. Test raw sand for following properties at point of entry into pug-mill:

- 16 1. Gradation
- 17 2. Plasticity index
- 18 3. Organic impurities
- 19 4. Clay lumps and friable particles
- 20 5. Lightweight pieces
- 21 6. Moisture content
- 22 7. Classification

24 C. Present data obtained in format similar to that provided in sample data form attached to this  
25 section.

26 D. The target content may be adjusted when statistical history so indicates. For determination of  
27 minimum product performance use formula:

$$f'c\% = 1/2 \text{ standard deviation}$$

28 **PART 3 - EXECUTION**

30 **3.1 PLACING**

31 A. Place sand-cement mixture in maximum 12-inch-thick loose lifts and compact to 95 percent of  
32 maximum density as determined in accordance with ASTM D 558, unless otherwise specified.  
33 Refer to related specifications for thickness of lifts in other applications. Target moisture content  
34 during compaction is  $\pm 3$  percent of optimum. Perform and complete compaction of sand-cement  
35 mixture within 4 hours after addition of water to mix at plant.

36 B. Do not place or compact sand-cement mixture in standing or free water.

37 **3.2 FIELD QUALITY CONTROL**

38 A. Testing will be performed under provisions of Section 01 45 00 - Testing Laboratory Services.

- 1 B. One sample of cement stabilized sand shall be obtained for each 150 tons of material placed per  
2 day with no less than one sample per day of production. Random samples of delivered cement  
3 stabilized sand shall be taken in the field at point of delivery in accordance with ASTM 3665.  
4 Obtain three individual samples of approximately 12 to 15 lb each from the first, middle, and last  
5 truck and composite them into one sample for test purpose.
- 6 C. Prepare and mold four specimens (for each sample obtained) in accordance with ASTM D 558,  
7 Method A, without adjusting moisture content. Samples will be molded at approximately same  
8 time material is being used, but no later than 4 hours after water is added to mix.
- 9 D. After molding, specimens will be removed from molds and cured in accordance with ASTM D  
10 1632.
- 11 E. Specimens will be tested for compressive strength in accordance with ASTM D 1633,  
12 Method A. Two specimens will be tested at 48 hours plus or minus 2 hours and two  
13 specimens will be tested at 7 days plus or minus 4 hours.
- 14 F. A strength test will be average of strengths of two specimens molded from same sample of  
15 material and tested at same age. Average daily strength will be average of strengths of all  
16 specimens molded during one day's production and tested at same age.
- 17 G. Precision and Bias: Test results shall meet recommended guideline for precision in ASTM D  
18 1633 Section 9.
- 19 H. Reporting: Test reports shall contain, as a minimum, the following information:
- 20 1. Supplier and plant number
  - 21 2. Time material was batched
  - 22 3. Time material was sampled
  - 23 4. Test age (exact hours)
  - 24 5. Average 48-hour strength
  - 25 6. Average 7-day strength
  - 26 7. Specification section number
  - 27 8. Indication of compliance / non-compliance
  - 28 9. Mixture identification
  - 29 10. Truck and ticket numbers
  - 30 11. The time of molding
  - 31 12. Moisture content at time of molding
  - 32 13. Required strength
  - 33 14. Test method designations
  - 34 15. Compressive strength data as required by ASTM D 1633
  - 35 16. Supplier mixture identification
  - 36 17. Specimen diameter and height, in.
  - 37 18. Specimen cross-sectional area, sq. in.
  - 38

1 **3.3 ACCEPTANCE**

- 2 A. Strength level of material will be considered satisfactory if:
- 3 1. The average 48-hour strength is greater than 100 psi with no individual strength test  
4 below 70 psi.
- 5 2. All 7-day individual strength tests (average of two specimens) are greater than or equal to  
6 100 psi.  
7
- 8 B. Material will be considered deficient when 7-day individual strength test (average of two  
9 specimens) is less than 100 psi but greater than 70 psi. See Paragraph 3.4 Adjustment for  
10 Deficient Strength.
- 11 C. The material will be considered unacceptable and subject to removal and replacement at  
12 Contractor s expense when individual strength test (average of two specimens) has 7-day  
13 strength less than 70 psi.
- 14 D. When moving average of three daily 48-hour averages falls below 100 psi, discontinue shipment  
15 to project until plant is capable of producing material, which exceeds 100 psi at 48 hours. Five  
16 48-hour strength tests shall be made in this determination with no individual strength tests less  
17 than 100 psi.
- 18 E. Testing laboratory shall notify Contractor, Project Manager, and material supplier by facsimile  
19 of tests indicating results falling below specified strength requirements within 24 hours.
- 20
- 21 F. If any strength test of laboratory cured specimens falls below the specified strength, Contractor  
22 may, at his own expense, request test of cores drilled from the area in question in accordance  
23 with ASTM C42. In such cases, three (3) cores shall be taken for each strength test that falls  
24 below the values given in 3.3.A.
- 25 G. Cement stabilized sand in an area represented by core tests shall be considered satisfactory if the  
26 average of three (3) cores is equal to at least 100 psi and if no single core is less that 70 psi.  
27 Additional testing of cores extracted from locations represented by erratic core strength results  
28 will be permitted.

29 **3.4 ADJUSTMENT FOR DEFICIENT STRENGTH**

- 30 A. When mixture produces 7-day compressive strength greater than or equal to 100 psi, then  
31 material will be considered satisfactory and bid price will be paid in full.  
32
- 33 B. When mixture produces 7-day compressive strength less than 100 psi and greater than or  
34 equal to 70 psi, material shall be accepted contingent on credit in payment. Compute credit  
35 by the following formula:  
36

$$\text{Credit per Cubic Yard} = \frac{\$30.00 \times 2 (100 \text{ psi} - \text{Actual psi})}{100}$$

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- C. When mixture produces 7-day compressive strength less than 70 pounds per square inch, then remove and replace cement-sand mixture and paving and other necessary work at no cost to City.

**END OF SECTION**

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**SECTION 31 23 33**

**TRENCHING AND BACKFILLING**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Refer to Section AB – Instructions to Proposers, Section AF – Subcontractor / Manufacturer Prequalification, and section 01 25 00 – Request for Substitution Procedures.
- B. Scope of Work: Include the following work in addition to items normally part of this section:
  - 01 Coordinate, excavate and backfill all trenching required for underground service raceways, duct banks, storm sewer and any other utility lines.
  - 02 Provide necessary safety systems to comply with local and State laws.
- C. Related Work:
  - 01 Section 02 32 00 – Geotechnical Investigation.
  - 02 Section 31 11 00 – Clearing and Grubbing.
  - 03 Section 31 22 00 – Earth Moving.
  - 04 Section 31 22 19 – Finish Grading.
  - 05 Section 31 23 00 – Excavation and Fill.
  - 06 Section 31 32 13.19 – Lime Soil Stabilization.
- D. Unknown Utilities and Obstacles:
  - 01 If any unknown and uncharted utilities are encountered during excavation, promptly notify the Architect and wait for his instructions before proceeding.
  - 02 If such unknown utilities are encountered and work is continued without contacting the Architect for instructions, and damage is caused to said utilities, repair such damage to the satisfaction of the Owner at no additional cost to the Owner.
  - 03 If any unforeseen major obstacle is encountered in excavation, the Owner will have a survey made to determine the course of action which will relieve the Contractor of undue expense.

**1.2 SUBMITTALS**

- A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.
- C. Shop Drawings: Submit complete shop drawings consisting of trench locations and types of backfill proposed to be used at each location.

**1.3 REFERENCES**

- A. ASTM International:
  - 01 ASTM C40 – Standard Test Method for Organic Impurities in Fine Aggregates for Concrete.



- 1                   02       ASTM C123 – Standard Test Method for Lightweight Particles in Aggregate.
- 2                   03       ASTM C142 – Standard Test Method for Clay Lumps and Friable Particles in
- 3                   Aggregates.
- 4                   04       ASTM C150 – Standard Specification for Portland Cement.
- 5                   05       ASTM D1140 - Standard Test Methods for Determining the Amount of Material
- 6                   Finer than 75-µm (No. 200) Sieve in Soils by Washing.
- 7                   06       ASTM D2216 - Standard Test Methods for Laboratory Determination of Water
- 8                   (Moisture) Content of Soil and Rock by Mass.
- 9                   07       ASTM D2487 - Standard Practice for Classification of Soils for Engineering
- 10                  Purposes (Unified Soil Classification System).
- 11                  08       ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and
- 12                  Plasticity Index of Soils.

13  
14       **PART 2 – MATERIALS**

15  
16       **2.1       MANUFACTURERS**

- 17
- 18           A.       Specification of bentonite materials is based on Sodium Bentonite as manufactured by
- 19           Texas Sodium Bentonite Inc.
- 20
- 21           B.       Products from other manufacturers will be considered provided the product meets or
- 22           exceeds specified properties and requirements.
- 23

24       **2.2       STRUCTURAL FILL MATERIAL**

- 25
- 26           A.       Structural fill shall be lean clay, free from vegetation or other objectionable matter,
- 27           reasonably free from lumps of the earth, and when tested in accordance with standard
- 28           testing laboratory procedures shall meet the following requirements:
- 29           01       The liquid limit shall not exceed 35.
- 30           02       The plasticity index shall not be less than 10, nor more than 20.
- 31           03       Sand shall not be blended with clay to form select fill.
- 32
- 33           B.       Structural fill shall be used to construct 100% of the building pad, including trench
- 34           backfill within the limits of the building pad depth.
- 35           01       The building pad shall extend a minimum of 5'-0" beyond the footprint of the
- 36           building.
- 37

38       **2.3       NON-STRUCTURAL FILL MATERIAL**

- 39
- 40           A.       Non-structural fill shall be silty clay, free from vegetation or other objectionable matter,
- 41           reasonably free from lumps of the earth, and when tested in accordance with standard
- 42           testing laboratory procedures shall meet the following requirements:
- 43           01       The liquid limit shall not exceed 40.
- 44           02       The plasticity index shall not be more than 30.
- 45
- 46           B.       Based on specimens taken during the soils investigation, on-site material below top soil
- 47           stripping should be suitable for use as non-structural fill; subject to lime stabilization at
- 48           paved areas.
- 49

50       **2.4       CEMENT STABILIZED SAND**

- 51
- 52           A.       Cement: shall consist of Type I, II or V Portland cement conforming to ASTM C-150.
- 53
- 54           B.       Sand: Clean, durable sand meeting the following requirements:
- 55           01       Deleterious Material – Clay: ASTM C142 – less than 0.5%.
- 56           02       Deleterious Material – Lightweight Pieces: ASTM C123 – less than 5%.

- 1                   03       Deleterious Material – Organic Impurities: ASTM C40 – shall not show a color
- 2                                   darker than the standard color.
- 3                   04       Plasticity Index: ASTM D4318 – 6 or less.
- 4                   05       Gradation Requirements: 100% passing 3/8” sieve; less than 5% passing a no.
- 5                                   200 sieve; minimum sand equivalent of 30.
- 6
- 7                   C.       Water: Potable; and free of oils, acids, alkalis, organic matter and other deleterious
- 8                                   materials.
- 9
- 10                  D.       Sand-Cement Mixture: shall consist of the proper percentage of cement per cubic yard or
- 11                                   per ton of sand with sufficient water to hydrate the cement. A minimum of 1.5 sack of
- 12                                   cement per ton of sand shall be required.
- 13

14       **2.5       SODIUM BENTONITE**

- 15
- 16                  A.       Sodium bentonite shall be a fine sand texture, with minimum 75% montmorillonite
- 17                                   content, manufactured specifically for the purpose of preventing the passage of water
- 18                                   under normal ground hydrostatic conditions.
- 19
- 20                  B.       Physical Properties: bentonite material shall generally meet the following properties:
- 21                                   01       Unified Soil Classification           CH                   ASTM D2487
- 22                                   02       Moisture Content                       6.8 maximum     ASTM D2216
- 23                                   03       Percent Passing no. 200 Sieve       98% minimum    ASTM D1140
- 24                                   04       Liquid Limit                           365                ASTM D4318
- 25                                   05       Plastic Limit                           26                 ASTM D4318
- 26                                   06       Plasticity Index                       339                ASTM D4318
- 27

28       **PART 3 - EXECUTION**

29

30       **3.1       TRENCHING**

- 31
- 32                  A.       Excavate trenches to required depths, slope and grade.
- 33
- 34                  B.       Remove mud and other unstable soil encountered in trench bottom to firm bearing and
- 35                                   backfill with sand to proper grade and compact to uniform firm support for the bottom of
- 36                                   the raceways and duct banks.
- 37
- 38                  C.       In the event rock is encountered, excavate 6 inches below required depth, and backfill to
- 39                                   required depth with sand to proper grade and compact to uniform firm support. (95%
- 40                                   maximum density at paved areas).
- 41
- 42                  D.       Make full and complete repair of streets, roadways, and walks which have been cut with
- 43                                   materials of like nature to those cut away.
- 44
- 45                  E.       Remove all trenching spoils material from the site.
- 46

47       **3.2       BACKFILLING**

- 48
- 49                  A.       Refer to Section 01 31 29 - Notification of Architect Requirements.
- 50
- 51                  B.       Do not backfill trenches until all required tests have been made on the utility lines
- 52                                   installed.
- 53
- 54                  C.       Bedding for pipes shall be as required / described in the Plumbing and / Civil Drawings
- 55                                   and specifications.
- 56

- 1 D. Backfill trenches outside limits of concrete work with select fill material in maximum 8  
2 inch layers. Compact each layer of select fill to 95% ASTM Density, D-698.  
3  
4 E. Backfill all trenches under pavement or concrete flatwork with cement stabilized sand in  
5 maximum 8 inch layers to within 1 foot of pavement subgrade surface. Complete the  
6 backfill with structural fill material. Compact each layer to 95% ASTM Density, D-698.  
7  
8 F. Backfill all trenches under the building slab with structural fill material in maximum 8  
9 inch layers. Compact each layer of cement stabilized sand to 95% ASTM Density, D-  
10 698.  
11  
12 G. Compaction of backfill at trenches shall be performed only with methods and / or  
13 equipment specifically designed for the purpose.  
14  
15 H. Perform all testing as recommended by the testing laboratory on each lift of backfill  
16 installation.  
17

### 18 **3.3 SODIUM BENTONITE TRENCH DAMS AT BUILDING**

- 19  
20 A. It is a requirement of this provision to prevent the migration of water underneath the  
21 building foundation through trenches which pass through the building perimeter.  
22  
23 B. The bentonite trench dams must be installed across the entire trench, including below the  
24 pipe, at the foundation wall.  
25  
26 C. Required Locations: At all trenches 8" in width or wider which cross the building  
27 foundation perimeter grade beam (outside to inside the building footprint), provide a  
28 trench dam comprised of sodium bentonite. No additives permitted.  
29  
30 D. Trench dams shall be between 12" and 24" wide directly adjacent to the foundation wall  
31 / grade beam outside the building foundation. The dam shall completely fill the trench,  
32 encompassing the pipe, to within 4" of finish grade, or to the top of grade below exterior  
33 concrete surfaces.  
34  
35 E. Applicable trenches shall include but are not limited to:  
36 01 Water service piping.  
37 02 Sanitary sewer piping.  
38 03 Electrical (and similar) service conduits / duct banks.  
39 04 Storm sewer piping.  
40

### 41 **3.4 COORDINATION**

- 42  
43 A. It is critical for the building plumbing contractor and the site utility contractor (if they  
44 are not one in the same) to coordinate points of interface connection.  
45  
46 B. Design is based on flow lines and invert elevations as indicated on the civil and plumbing  
47 drawings.  
48  
49 C. The contractors shall use whatever means are necessary to coordinate accurate interface  
50 from the building systems to the site systems. Excessive flexible connections or other  
51 connections which adversely affect the storm / sanitary sewer flow as designed shall not  
52 be allowed.  
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**END OF SECTION**

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**SECTION 31 32 00**

**SOIL STABILIZATION**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the contract, including general and supplementary conditions and other Divisions 1 Specifications, apply to this section.

**1.2 SUMMARY**

- A. Section includes providing soil stabilization of the exposed subgrade at the base of excavations below pavements as follows:
1. Lime Slurry Stabilization: Provide lime slurry stabilization of top 6" of subgrade at the base of excavations and each lift of select fill below vehicular pavements, uniformly distributed into the treated depth of the soil so that the dry lime solids content equals a minimum of 6% of the dry soil weight (approximately 28.4 lb. of lime solids per square yard of treated area), uniformly compacted with a smooth surface suitable for placing subsequent work.
  2. Portland Cement Stabilization: Provide Portland cement stabilization of top 6" of subgrade at the base of excavations and each lift of select fill below vehicular pavements, uniformly distributed into the treated depth of the soil so that the dry Portland cement solids content equals minimum of 5% of the dry soil weight (23.6 lb. of Portland cement solids per square yard of treated area), uniformly compacted with a smooth surface suitable for placing subsequent work.
  3. Geotextile Soil Stabilization: Provide woven geotextile soil stabilization over prepared subgrade areas to receive crushed limestone base course.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Commercial Lime Slurry: Provide a pumpable suspension of hydrated lime solids in water. Use lime made from "high calcium" type limestone. Use potable water for mixing, free of deleterious material and suitable for the purpose intended. Provide lime slurry complying with TX DOT Item 264, Type B, Commercial Lime Slurry requirements, such that the solids portion of the mixture, when considered on-the-basis of "solids content", shall consist principally of hydrated lime of composition, purity and fineness sufficient to meet the following requirements as to chemical composition and residue.
1. Chemical Composition and Purity: Hydrated lime  $\text{Ca(OH)}_2$  solids content not less than 87% by weight of lime slurry solids content.
  2. Residue (Wet Sieve): Percent by weight residue retained in the "solids content" of lime slurry shall comply with the following:
    - a. Residue retained on a No. 6 (3,360-micron) sieve Max. 0.2%
    - b. Residue retained on a No. 30 (590-micron) sieve Max. 4.0%

1  
2 3. GRADES

- 3  
4 a. Grade 1: Dry solids content not less than 31% by weight of the slurry.  
5 b. Grade 2: Dry solids content not less than 35% by weight of the slurry.  
6 c. Grade 3: Dry solids content not less than 46% by weight of the slurry.  
7

8 B. Fly Ash: TX DOT Departmental Materials Specification D-9-8900

9  
10 C. Portland Cement: ASTM C 150, Type I or II

11  
12 D. Subgrade Soil Stabilization Fabric: Woven, slit film, UV-stabilized, polypropylene fabric with an  
13 apparent opening sieve size (ASTM D 4751) of 40, 1% open area, permittivity (ASTM D 4491) of  
14  $0.05 \text{ sec}^{-1}$ , permeability (ASTM D 4491) of 0.002 cm/sec, and flow rate (ASTM D 4491) of 4  
15 gal/min/ft<sup>2</sup>; “Mirafi 600X”, or 4WS(UV)” distributed by Geo-Civ Products, Inc., Houston, TX,  
16 (Tel) 713-466-0104, or “Tenax TNT 100” by Tenax Corp., Jessup, MD, (Tel) 800-874-7437.  
17

18 **PART 3 - EXECUTION**

19  
20 A. LIME SLURRY APPLICATION:

- 21  
22 1. Apply lime slurry with a distributor truck equipped with an agitator, which will keep the  
23 lime and water in a uniform mixture.  
24  
25 2. Distribute the lime slurry by successive passes over a measured section of subgrade and  
26 fill course until squired lime content has been achieved.  
27  
28 3. Thoroughly mix the lime/soil treated subgrade and fill course until a homogeneous, friable  
29 mixture free of clods is obtained.  
30  
31 4. Aerate or sprinkle mixture to obtain optimum moisture content (-2% to +2%).  
32  
33 5. Begin compaction at bottom of treated subgrade course and continue until entire depth  
34 of course is uniformly compacted to not less than 95% of maximum dry unit weight in  
35 accordance with. Compact each fill course in a similar manner and continue until entire  
36 depth is uniformly compacted to not less than 95% of maximum dry unit weight in  
37 accordance with ASTM D 698.  
38  
39 6. Shape surface to within 0.05' of lines and elevations indicated within two hours and  
40 finish by rolling with a pneumatic tire or other suitable roller.  
41  
42 7. Moisture cure completed subgrade for a minimum of 7 days before placing subsequent  
43 work.  
44  
45 8. When subgrade course treatment has set up sufficiently to prevent objectionable damage  
46 from traffic, such areas may be opened to construction traffic.  
47

48 B. PORTLAND CEMENT APPLICATION:

- 49  
50 1. Apply Portland cement with a distributor (nick by successive passes over a measured  
51 section of subgrade and fill course until required Portland cement content has been  
52 achieved.  
53  
54 2. Thoroughly mix each cement/soil treated subgrade course and fill courses until a  
55 homogeneous, friable mixture free of clods is obtained.  
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3. Aerate or sprinkle mixture to obtain optimum moisture content (- % to +2%).
4. Begin compaction at bottom of treated subgrade course and continue until entire depth is uniformly compacted to not less than 95% of maximum dry unit weight in accordance with ASTM D 698. Compact each fill course in a similar manner and continue until entire depth is uniformly compacted to not less than 95% of maximum dry unit weight in accordance with ASTM D 698.
5. Shape surface to within 0.05' of lines and elevations indicated within two hours and finish by rolling with a pneumatic tire or other suitable roller.
6. Moisture cure completed subgrade for a minimum of 7 days before placing subsequent work.
7. When subgrade course treatment has set up sufficiently to prevent objectionable damage from traffic, such areas may be opened to construction traffic.

C. FLY ASH/LIME SLURRY APPLICATION:

1. Scarify subgrade to 6" depth and provide soil stabilization of the exposed subgrade at the base of excavations to 5' outside building pad and vehicular pavements as follows and each lift of satisfactory excavated material used as fill as follows:
  - a. Fly Ash: 42.1 lbs/sq. yard of treated area, 6" deep; and
  - b. Lime Slurry: 15.8 lbs of lime solids/sq. yard of treated area, 6" deep
2. Apply fly ash with a distributor truck by successive passes over a measured section of subgrade and fill course until required Portland cement content has been achieved.
3. Apply lime slurry with a distributor truck equipped with an agitator that will keep the lime and water in a uniform mixture.
4. Distribute the lime slurry by successive passes over a measured section of subgrade and fill course until required lime content has been achieved.
5. Thoroughly mix the fly ash/lime soil treated subgrade and fill course until a homogeneous, friable mixture free of clods is obtained.
6. Aerate or sprinkle mixture to obtain optimum moisture content (-0% to +3%).
7. Begin compaction at bottom of treated subgrade course and continue until entire depth of course is uniformly compacted to not less than 95% of maximum dry unit weight in accordance with ASTM D 698. Compact each fill course in a similar manner and continue until entire depth is uniformly compacted to not less than 95% of maximum dry unit weight in accordance with ASTM D 698.
8. Shape surface to within 0.05' of lines and elevations indicated within two hours and finish by rolling with a pneumatic tire or other suitable roller.
9. Moisture cure completed subgrade for a minimum of 7 days before placing subsequent work.
10. When subgrade course treatment has set up sufficiently to prevent objectionable damage from traffic, such areas may be opened to construction traffic.

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D. GEOTEXTILE STABILIZATION:

1. Proof-roll prepared subgrade surface to check for unstable areas and verify need for additional compaction. Do not begin installation of geotextile work until such unsatisfactory conditions have been corrected and are ready to receive subsequent construction
2. Excavate anchor trenches approximately 12" wide and 12" deep at the outside edge of pavement aprons, unless otherwise indicated. Place geotextile stabilization fabric in trench along one side, stretching fabric to eliminate looseness and simultaneously placing and compacting backfill in trench to anchor fabric on one side of paving.
3. Stretch one piece of geotextile stabilization fabric across paving subgrade to remove wrinkles and slack areas, and anchor in opposite paving apron trench as previously specified.
4. Place subsequently installed geotextile stabilization fabric overlapping previous fabric 12" at laps.

**END OF SECTION**

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**SECTION 31 63 29**

**DRILLED CONCRETE PIERS**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 GENERAL**

**1.1 REFERENCED DOCUMENTS**

- A. The Drawings, Division 1 Specifications, and General Provisions and General and Supplemental Conditions of the Contract, apply to work of this Section.

**1.2 WORK INCLUDED**

- A. Furnish all labor and materials required to construct drilled concrete piers complete including layout, excavation of shafts, excavation of belled bottoms, temporary steel casings, fabrication and installation of reinforcing steel, furnishing and placing concrete, setting anchor bolts and removal of spoil.

**1.3 RELATED SECTIONS**

- A. Section 01 45 00 - Testing Laboratory Services
- B. Section 03 20 00 - Concrete Reinforcement
- C. Section 03 30 00 - Cast-In-Place Concrete

**1.4 REFERENCES**

- A. ACI 336.1 - Standard Specification for the Construction of Drilled Piers.

**1.5 SUBMITTALS**

- A. Submit in accordance with Section 01 33 00.
- B. Submittals for Review:
  - 1. Shop Drawings: Indicate dimensioned plan layout, dowel and anchor bolt setting plans including templates, drilled pier shaft sizes, casing sizes, bell bottom sizes, and top elevation, and details of reinforcing steel.
- C. Submittals for Information:
  - 1. Pier Drilling Log: Report of drilled concrete pier construction including actual elevations of top and bottom of each pier, elevation of bearing stratum, penetration into bearing stratum, deviations of pier centerline and plumbness, shaft size, bell size, presence of water, use of temporary casing, placement of concrete, and time of start and finish of excavation.

**1.6 QUALITY ASSURANCE**

- A. Refer to Section 01 45 00 for Testing Laboratory Services.



- 1  
2 B. The laboratory representative shall monitor all pier drilling operations. Contractor shall give a  
3 minimum two days notice to the laboratory for services in conjunction with drilled piers.  
4  
5 C. Installer: Company specializing in performing the work of this Section with minimum three  
6 projects in similar soil and rock conditions, and with similar shaft sizes, depths, and quantities.  
7

8 **1.7 UNIT PRICES**  
9

- 10 A. Contract price shall be based on base lengths of piers shown on the Drawings. Unit prices shall be  
11 as follows:  
12  
13 1. Unit prices per linear foot for piers longer or shorter than base lengths.  
14  
15 B. The cost of casings shall not be included in the base price for piers. If casings are used, the  
16 Contract shall be adjusted based on the unit price.  
17  
18 C. Unit prices shall include all labor and materials including overhead and fees for drilled concrete  
19 piers. Adjustments to the Contract shall be based on total linear feet greater than or less than the  
20 sum of the base lengths of each pier size. Additional penetration in the bearing stratum greater  
21 than the specified penetration shall not be included in determination of increases or decreases of  
22 pier lengths related to adjustments in the Contract.  
23

24 **1.8 JOB CONDITIONS**  
25

- 26 A. Site Information:  
27  
28 1. Refer to Division 1 of the specifications.  
29  
30 2. Information regarding site conditions is provided for the convenience of the Contractor  
31 and is not a warranty that the information represents site conditions that may be  
32 encountered. The Owner shall not be responsible for interpretations or conclusions drawn  
33 from the information provided by the Contractor.  
34  
35 3. Additional borings or other exploratory work may be conducted by the Contractor at no  
36 cost to the Owner.  
37  
38 B. Utilities:  
39  
40 1. Locate existing utilities prior to the commencement of drilled concrete pier operations.  
41 Provide protection of utilities during construction.  
42  
43 2. Do not interrupt utilities serving existing facilities unless permitted in writing by the  
44 Architect. Provide temporary utility services to replace interrupted utilities.  
45

46 **PART 2 PRODUCTS**  
47

48 **2.1 MATERIALS**  
49

- 50 A. Reinforcement: Refer to Section 03 20 00.  
51  
52 B. Concrete: Refer to Section 03 30 00.  
53  
54 C. Anchor Bolts: Refer to Section of trade requiring anchor bolts.  
55

1 D. Bar Supports: Furnish spacers to maintain required concrete cover to sides and bottom of  
2 excavation.

3  
4 1. Shaftspacer Systems, Foundation Technologies, Inc., Tucker, Georgia.

5  
6 2. "Centraligner" and "Hijacker", Pieresearch, Arlington, Texas.  
7

8 **PART 3 EXECUTION**

9  
10 **3.1 INSTALLATION**

11  
12 A. Drill pier shafts to diameters and depths indicated.

13  
14 B. Clean shaft and bottom of loose material. Maintain shafts free of water. If flowing water or  
15 caving soil is encountered, provide temporary steel casing to a sufficient depth to prevent caving  
16 soil and to ensure a watertight seal. Temporary steel casing may be left in place or removed during  
17 concrete placement at the Contractor's option. Required penetration in the bearing strata shall be  
18 below the bottom of any temporary casing.

19  
20 C. Allow inspection of shaft prior to placement of reinforcement and concrete.

21  
22 D. Place reinforcing steel in accordance with Section 03 20 00.

23  
24 E. Place concrete in accordance with Section 03 30 00.

25  
26 1. Concrete shall be placed within the time limit stated on the Drawings.

27  
28 2. Placing equipment shall be designed for vertical placement of concrete. Use tremies  
29 where a drop of more than 25'-0" is required.

30  
31 3. Provide mechanical vibration for consolidation for the upper 5'-0" of each shaft.

32  
33 4. If casing is utilized, maintain a sufficient head of concrete to prevent reduction in pier  
34 shaft diameter by earth pressure and to prevent deleterious material from mixing with the  
35 concrete.  
36

37 F. Form top of shafts if cut off elevation is above ground elevation.

38  
39 G. Remove excess concrete at the top of piers beyond the limits of the pier shaft diameter. Top of  
40 shaft shall be of the same diameter as shaft below.

41  
42 H. Excavated material shall be removed and disposed off site.  
43

44 **3.2 TOLERANCES**

45  
46 A. Maximum Variation From Vertical: One percent of length.

47  
48 B. Maximum Variation From Design Top Elevation: Plus 1 inch to minus 3 inches.

49  
50 C. Maximum Out-of-Position: One twenty-fourth of the shaft diameter or 3 inches, whichever is less.  
51

52  
53 **END OF SECTION**

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**SECTION 32 13 13**

**CONCRETE PAVING AND FLATWORK**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work: Provide all exterior concrete paving, as indicated on the drawings; including, but not necessarily limited to:
  - 01 Concrete parking areas, driveways and curbs.
  - 02 Concrete sidewalks.
  - 03 Ramps and steps.
  - 04 Site light bases.
  - 05 Drainage structures.
  - 06 Other concrete flatwork as indicated on the Drawings.
  
- B. Related Work:
  - 01 Section 01 45 23 – Testing and Inspection Services.
  - 02 Section 03 30 00 – Cast-In-Place Concrete.
  - 03 Section 07 92 00 – Joint Sealants
  - 04 Section 31 20 00 – Earth Moving.
  - 05 Section 31 22 19 – Finish Grading.
  - 06 Section 31 32 13.19 – Lime Soil Stabilization.

**1.2 SUBMITTALS**

- A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
  
- B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.
  
- C. Proposed mix designs, including adequate historical documentation to substantiate performance and strengths.
  
- D. Shop Drawings:
  - 01 Shop drawings for all reinforcing steel. Show bending diagrams, splicing and laps of rods, shapes, dimension and details of bar reinforcement and accessories.
  - 02 Shop drawings showing location of all proposed construction and control joints, keying / keyways, water stops, openings, depressions, trenches, sleeves, inserts, and other items affecting reinforcement and placement of concrete.
  - 03 Placement sequence schedule (may be combined with Item 02).
  - 04 Unless shown on the Site Plan, submit proposed layout for all expansion joints in paving, flatwork and sidewalks.
  
- E. Installation Instructions: Submit manufacturer’s complete installation instructions, including fastening, for all products and / or assemblies proposed to be furnished.
  - 01 Installation details submitted for review shall be specific to the work of this contract and accurately depict interface within the assembly(s) indicated on the Drawings.
  - 02 Generic details that do not depict actual conditions shall not be acceptable.

- 1 F. Maintenance Instructions: Submit manufacturer's complete maintenance instructions  
 2 and recommendations for all products and / or assemblies proposed to be furnished.  
 3 01 Include recommended cleaning products and instructions for use.  
 4 02 Where applicable, provide recommended maintenance schedules and  
 5 procedures.  
 6  
 7 G. Samples of Proposed Materials: Provide two (2) actual samples of the following  
 8 products:  
 9 01 Plastic chair rebar supports.  
 10 02 Slab membrane(s) and tape(s); 8" x 10" minimum membrane and 12"  
 11 minimum tape.  
 12 03 Water stops; minimum 6" length.  
 13 04 Stains: full range of manufacturer's available colors selections for colored  
 14 concrete.  
 15 a. May begin with digital images.  
 16 b. Architect shall select up to four (4) colors for contractor to submit  
 17 actual samples of.  
 18  
 19 H. Tests and Certifications:  
 20 01 Before starting any work under this section, make all required arrangements  
 21 with the testing agency. The testing laboratory shall test and furnish certified  
 22 reports on proposed cements, aggregates, mixing water and admixtures.  
 23 02 Submit proposed design mixes for each type of concrete using previously  
 24 tested and approved materials.  
 25 03 Furnish certified reports of each proposed mix for each type of concrete.  
 26 04 Proportion mixes by laboratory trial batch or field experience methods, using  
 27 materials to be employed in the work for each class of concrete required, and  
 28 report to the Architect.  
 29 05 Refer to section 01 45 23 – Testing and Inspection Services for on-site  
 30 procedures and testing requirements.  
 31 06 Furnish ready mix delivery tickets.  
 32

### 33 1.3 REFERENCES

- 34  
 35 A. Refer to Section 03 30 00 – Cast-In-Place Concrete.  
 36  
 37 B. The current editions of the following documents govern the work, except where more  
 38 restrictive items are specified.  
 39 01 Standard Specifications for Construction of Highways, Streets, and Bridges by  
 40 Texas Highway Department.  
 41 02 Texas Department of Transportation.  
 42

## 43 PART 2 - PRODUCTS

### 44 2.1 PAVING / CONCRETE MATERIALS

- 45  
 46  
 47 A. Compacted Sub-Base: as specified in Section 31 20 00 – Earth Moving and 31 32 13.19  
 48 – Lime Soil Stabilization.  
 49  
 50 B. Concrete Material:  
 51 01 Refer to Section 03 30 00 – Cast-In-Place Concrete for general provisions of  
 52 concrete material.  
 53 02 Aggregate shall be limestone at paving.  
 54 03 All concrete used for paving shall have a minimum compressive strength of  
 55 3000 PSI unless a higher strength is identified in the soil investigation /  
 56 geotech report or on Paving plans.

- 1                   04       All concrete used for sidewalks and concrete flatwork shall have a minimum  
2                   compressive strength of 3000 PSI.
- 3                   05       All joints in sidewalks shall be either Expansion joints using a load transfer  
4                   unit or Control Joints as specified below.
- 5
- 6           C.       Forms: steel, wood, or other suitable material(s) of size and strength to resist  
7                   movement during concrete placement and to retain horizontal and vertical alignment  
8                   until removal.
- 9                   01       Use straight forms free from distortion and defects. Use flexible spring steel  
10                   forms or laminated boards to conform to radius bends as required.
- 11                  02       Form Coating: a non-staining form release agent that will not discolor or  
12                   deface surface of concrete.
- 13
- 14           D.       Reinforcing Bars: deformed billet steel bars.
- 15                  01       Comply with provisions of Section 03 30 00 – Cast-In-Place Concrete.
- 16
- 17           E.       Rebar Chairs and Spacers:
- 18                  01       OCM, Inc. – “Plastic Cradle Chair”.
- 19                  02       Aztec “Castle Chair”.
- 20                  03       Heavy-duty plastic-type sized to support all slab steel at proper height.
- 21                  04       Use type with sand cushion pads where concrete is on grade.
- 22
- 23           F.       Construction Joints:
- 24                  01       Metal Keyway: tongue and groove joint, 5" wide, 24 gauge, galvanized with  
25                   18 gauge stake pins; Heckman Building Products, Model 95-50; or approved  
26                   equal.
- 27
- 28           G.       Flexible Expansion Joints:
- 29                  01       Expansion Joints - Flexible: Asphalt impregnated fiberboard, ¾" wide in sizes  
30                   required. Equal to W.R Meadows “Asphalt Expansion Joint”. All joints shall  
31                   be sealed continuous with an approved paving joint sealant as specified in  
32                   Section 07 92 00.
- 33                  02       To be installed continuously at all flatwork-to-building conditions.
- 34
- 35           H.       Load Transfer Units:
- 36                  01       Sidewalks: 3/4 inch thick redwood form with 1/4 inch deep removable top  
37                   strip, 1/2" x 10" steel reinforcing bars at 15 inches O.C. +/- with bond breaker  
38                   sleeve on one side.
- 39                  02       Paving: 3/4 inch thick redwood form with ½" deep removable top strip equal  
40                   to W.R. Meadows “Snap Cap”, 3/4" x 12" steel reinforcing bars at 12 inches  
41                   O.C. +/- with bond breaker sleeve on one side.
- 42                  03       Provide custom size as required for full depth of paving and sealant depth as  
43                   required by sealant manufacturer.
- 44
- 45           I.       Control Joints: Tooled Joint:
- 46                  01       Scored Joints: Tool edged joints, 3/16" to 1/4" wide; depth shall be 1/4 the  
47                   thickness of the concrete in depth. Score as soon as practical after initial  
48                   concrete placement.
- 49                  02       Saw-Cut Joints: Machine cut saw joints shall be 1/4 the thickness of the  
50                   concrete paving. Installation with hand held saw is not permitted. Saw cut  
51                   joints as soon as practical (4 to 8 hours after placement) for cut edge to not  
52                   chip or spall.
- 53                  03       Zip Joints: Not permitted.
- 54
- 55           J.       Concrete Materials: Comply with the requirements of Section 03 30 00 – Cast-In-Place  
56                   Concrete for concrete materials, admixtures, curing materials, and others as required.

- 1  
2  
3 K. Curing Compound: Water based, dissipating curing compound for freshly placed  
4 concrete.  
5 01 Comply with ASTM C309 Type 1.  
6 02 Minimum 18% solids.  
7 03 Meets all VOC emission requirements.  
8 04 Non-clear for visual verification of adequate coverage.  
9

10 **2.2 TACTILE WARNING SURFACE MATERIALS**

- 11  
12 A. Tactile warning surface is required at the base of all accessibility ramp connecting to  
13 vehicular traffic areas. Refer to drawings. Grooves shall be placed in concrete during  
14 finishing. Ramps shall be painted the SJC standard "Blue" color to match other ramps  
15 on site.  
16

17 **PART 3 - EXECUTION**

18  
19 **3.1 SITE CONDITIONS**

- 20  
21 A. Prior to all work of this Section, carefully inspect the installed work of all other trades,  
22 and verify all such work is complete to the point where this installation may properly  
23 commence. In the event of discrepancy, immediately notify the Architect. Do not  
24 proceed with installation in areas of discrepancy until all such discrepancies have been  
25 fully resolved.  
26  
27 B. Remove all loose material from compacted sub-base immediately prior to placing  
28 concrete.  
29  
30 C. Verify that forms have been set to the grades and lines required and that they are rigidly  
31 braced and secured.  
32

33 **3.2 ENVIRONMENTAL CONDITIONS**

- 34  
35 A. Temperature:  
36 01 Do not place concrete in contact with frozen earth.  
37 02 Do not commence concrete placement unless temperature is at least 35°F  
38 (2°C) and rising, or slabs until the temperature rises above 40°F.  
39 03 Discontinue concrete placement when air temperatures exceed 95°F.  
40  
41 B. Do not place concrete during rain unless adequate protection is provided.  
42

43 **3.3 INSTALLATION – PAVING / FLATWORK JOINTS**

- 44  
45 A. General:  
46 01 Construct all joints true-to-line with face perpendicular to surface of concrete.  
47 02 Do not install joints which create acute angle shaped edges at the perimeter of  
48 the pavement sections. Minimum angle allowed shall be 60 degrees.  
49  
50 B. Load Transfer Joints: Unless specifically shown on the Drawings, the Contractor shall  
51 locate load transfer joints in accordance with the following schedule:  
52 01 Sidewalks: maximum distance between load transfer joints shall be 4 times  
53 the sidewalk width. Provide scored control joints in between expansion joints  
54 in equal intervals +/- the width of the sidewalk.  
55 02 Pavement Areas: load transfer joints shall be placed in each direction, in  
56 regular and evenly spaced intervals, to create pavement sections not to exceed

- 1 625 sq. ft. in a maximum size ratio of 1:1.5. Layout of proposed joint pattern  
 2 must be approved by the Architect prior to installation.  
 3 03 Seal all load transfer joints, continuous.  
 4  
 5 C. Redwood Expansion Joints:  
 6 01 Isolate all catch basin and inlet grates with redwood expansion joints set in a  
 7 diamond shape approximately 12” beyond the edge of the grate frame. Points  
 8 of the diamond should correspond to load transfer joints.  
 9 02 Install redwood expansion joints with removable cap strip at all sidewalk and  
 10 flatwork joints that are not otherwise load-transfer joints.  
 11 03 Seal all redwood joints, continuous.  
 12  
 13 D. Construction joints: obtain approval of Architect for locations and types of all proposed  
 14 construction joints.  
 15  
 16 E. Flexible Expansion Joints:  
 17 01 Isolate all catch basin and inlet grates with flexible expansion joints set in a  
 18 diamond shape approximately 12” beyond the edge of the grate frame. Points  
 19 of the diamond should correspond to load transfer joints.  
 20 02 Install flexible expansion joints at all locations where flatwork or pavement is  
 21 poured against a building foundation or other structural footing / beam.  
 22 03 Seal all flexible expansion joints, continuous.  
 23 04 Wherever possible, align sidewalk expansion joints with the expansion joints  
 24 in the vehicular pavement.  
 25  
 26 F. Curing Compound:  
 27 01 Apply at all exterior concrete surfaces.  
 28 02 Apply complete covering of curing compound as soon as concrete is finished  
 29 in strict accordance with manufacturer's standards and recommendations.  
 30 03 Coordinate with other trades as required to assure compatibility with any  
 31 finishes to be applied over concrete surfaces.  
 32

33 **3.4 INSTALLATION – PAVING / FLATWORK**

- 34  
 35 A. Concrete Placement:  
 36 01 General: Comply with the provisions as specified in Section 03 30 00 – Cast-  
 37 In-Place Concrete.  
 38 02 Deposit and spread concrete in a continuous operation. If interrupted for more  
 39 than 45 minutes, place a construction joint.  
 40  
 41 B. Finishing:  
 42 01 All concrete flatwork and sidewalks shall receive a light broom finish,  
 43 perpendicular to the run of the sidewalk.  
 44 02 Provide 3” wide smooth troweled “Picture Frame” at each panel, along each  
 45 side in all sidewalks.  
 46 03 All concrete pavement shall receive a medium broom finish, parallel to the  
 47 direction of drainage.  
 48  
 49 C. Curing Compound:  
 50 01 Apply at all exterior concrete surfaces.  
 51 02 Apply complete covering of curing compound as soon as concrete is finished  
 52 in strict accordance with manufacturer's standards and recommendations.  
 53 03 Coordinate with other trades as required to assure compatibility with any  
 54 finishes to be applied over concrete surfaces.  
 55  
 56

- 1 D. Repairs and Protection:  
2 01 After form removal, clean ends of joints and point up any minor honey  
3 combed areas. Repair or replace broken or defective concrete, as directed by  
4 the Architect.  
5 02 Protect concrete from damage until acceptance of Work. Exclude traffic from  
6 pavement for at least 7 days after placement. When construction traffic is  
7 permitted, maintain pavement as clean as possible by removing surface stains  
8 and spillage of materials.  
9 03 Sweep all concrete pavement and wash free of stains, discolorations, dirt, and  
10 all other foreign materials just prior to final inspection.  
11

12 **3.5 CLEANING AND PROTECTING - CONCRETE**  
13

- 14 A. Protect concrete paving and flatwork from damage during construction period. In the  
15 event of damage, make all necessary repairs and / or replacements required.  
16  
17 B. Clean and prep concrete paving and curbs prior to striping and painting. Adhere to paint  
18 manufacturer's specifications and recommendations.  
19  
20 C. Prior to final acceptance, thoroughly clean all paving and concrete work. Remove all  
21 tire tracks, rust stains, oil stains, dirt, excessive sealant, and other debris from the  
22 finished surface.  
23

24 **3.6 CLEANING AND PROTECTING – TACTILE WARNING SURFACE**  
25

- 26 A. During and after the tactile warning surface unit installation and the concrete curing  
27 stage, it is imperative that there are no walking, leaning or external forces placed on the  
28 tactile warning surface unit to rock the tactile warning surface unit, causing a void  
29 between the underside of the tactile warning surface unit and the concrete.  
30  
31 B. As necessary, while the Project remains under construction, protect tactile warning  
32 surface units against damage from rolling loads following installation by covering with  
33 plywood or hardwood.  
34  
35 C. Clean tactile warning surface units not more than four (4) days prior to date scheduled  
36 for inspection intended to establish date of substantial completion in each area of  
37 project. Clean tactile warning surface unit by method specified by tactile warning  
38 surface manufacturer.  
39  
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41  
42

**END OF SECTION**



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**SECTION 32 31 13**

**CHAIN LINK FENCES AND GATES**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
  - 01 Provide chain link fencing in heights and at locations / configurations as indicated on the Drawings.
  - 02 Provide single and double chain link gates where indicated on the Drawings.
- B. Related Work:
  - 01 Section 03 30 00 – Cast-In-Place Concrete.

**1.2 SUBMITTALS**

- A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting information for all products proposed to be furnished, as necessary to demonstrate compliance with the specified requirements.
- C. Shop Drawings: Submit complete shop drawings consisting of design, fabrication and erection / installation of proposed assemblies.
  - 01 Show profiles, sizes, spacing and locations of assembled components.
  - 02 Show details of shop fabrications, connections and details.
  - 03 Show details of field fabrications, connections and details.
- D. Site Plan Drawings:
  - 01 Site plan (and more detailed plan where necessary) showing layout of all proposed chain link fencing and gates.
  - 02 Indicate height, size, material, and finish.
  - 03 Include details of post anchoring / footings, joints, attachments and clearances of all components.
- E. Installation Instructions: Submit manufacturer’s complete installation instructions, including fastening, for all products and / or assemblies proposed to be furnished.
  - 01 Installation details submitted for review shall be specific to the work of this contract and accurately depict interface within the assembly(s) indicated on the Drawings.
  - 02 Generic details that do not depict actual conditions shall not be acceptable.
- F. Maintenance Instructions: Submit manufacturer’s complete maintenance instructions and recommendations for all products and / or assemblies proposed to be furnished.
  - 01 Include recommended cleaning products and instructions for use.
  - 02 Where applicable, provide recommended maintenance schedules and procedures.
- G. Color / Finish Samples:
  - 01 Provide two (2) samples of each finish for selection by the Architect.

- 1           02       Finish samples shall be provided of / on actual material; paper or digital samples  
2                   shall not be accepted.  
3           03       Minimum size shall be 3" x 3" but must be large enough to convey attributes of  
4                   the proposed product.  
5

### 6   **1.3    REFERENCES**

- 7  
8    A.       American Society for Testing Materials:  
9           01       ASTM A90 – Standard Test Method for Weight [Mass] of Coating on Iron and  
10                   Steel Articles with Zinc or Zinc-Alloy Coatings.  
11           02       ASTM A153 / A153M-16 - Standard Specification for Zinc Coating (Hot-Dip)  
12                   on Iron and Steel Hardware.  
13           03       ASTM A653 / A653M - Standard Specification for Steel Sheet, Zinc-Coated  
14                   (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip  
15                   Process.  
16           04       ASTM A924 / A924M - Standard Specification for General Requirements for  
17                   Steel Sheet, Metallic-Coated by the Hot-Dip Process.  
18           05       ASTM F668 – Polyvinyl Chloride (PVC)-Coated Steel Chain Link Fence Fabric  
19           06       ASTM F900 - Standard Specification for Industrial and Commercial Swing  
20                   Gates.  
21           07       ASTM F1043 - Specification for Strength and Protective Coatings on Metal  
22                   Industrial Chain Link Fence Framework.  
23           08       ASTM F1664 - Standard Specification for Polyvinyl Chloride (PVC)-Coated  
24                   Steel Tension Wire Used with Chain Link-Fence.  
25  
26    B.       Chain Link Fence Manufacturers Institute "Industrial Steel Specifications for Fence  
27                   Posts, Gates and Accessories".  
28

## 29   **PART 2 - PRODUCTS**

### 30   **2.1    MATERIALS**

- 31    A.       Chain Link Fabric:  
32           01       Diamond mesh (2 inch), helically-woven and inter-woven.  
33           02       Class 2A – Extruded and bonded.  
34           03       Wire Size: Minimum 9 gauge copper bearing steel wire, hot dip galvanized.  
35           04       Wire Tensile Strength: 70,000 PSI.  
36           05       Twisted and barbed (double knuckle) finished at top and bottom selvages (no  
37                   exposed barbs).  
38           06       Attach chain link fabric with 9 gauge galvanized tie wire to all rails at 18" O.C.  
39                   maximum intervals.  
40  
41  
42    B.       Framing:  
43           01       All pipe components shall be fabricated from schedule 40 steel pipe; unless  
44                   noted otherwise.  
45           02       All components shall be hot dip galvanized.  
46           03       All rails shall be located toward the inside of the storage enclosure.  
47  
48  
49    C.       Fence Posts:  
50           01       Posts for fences 7'-0" or less:  
51                   a.       Line: 2-3/8" O.D.  
52                   b.       Terminal / End / Corner: 2-7/8" O.D.  
53           02       Posts for fences 7'-1" to 10'-0":  
54                   a.       Line: 2-7/8" O.D.  
55                   b.       Terminal / End / Corner: 3-1/2" O.D.  
56           03       Line posts for fences 10'-1" or greater:

- 1 a. Line: 2-7/8" O.D.  
2 b. Terminal / End / Corner: 4" O.D.  
3 04 Provide conical tops at all posts, firmly secured in place.  
4  
5 D. Top and Bottom Rail:  
6 01 Continuous top rail: 1-5/8" O.D. minimum.  
7 02 Continuous bottom rail: 1-5/8" O.D. minimum. Provide at all fences taller than  
8 6'-0".  
9 03 At fences without bottom rail, stretch minimum 9 gauge bottom tension wire  
10 taut between terminal posts. Securely anchor to each intermediate post 6 inches  
11 above grade and secure to fence fabric with hog rings at 24" O.C.  
12  
13 E. Mid Rails and Truss Braces:  
14 01 Continuous mid rail: 1-5/8" O.D. minimum. Provide at all fences 8'-0" tall or  
15 taller.  
16 02 Provide 5/16" truss rod and turnbuckle between terminal posts and adjacent  
17 posts.  
18 03 Where required for stability and rigidity, provide 1-5/8" O.D. diagonal truss  
19 members between terminal posts and line posts.  
20  
21 F. Tension Bars and Wire:  
22 01 Tension bars shall be minimum 5/8" flat bar. Connect chain link fabric to  
23 terminal posts with tension bands; 12" O.C. maximum spacing.  
24  
25 G. Swing Gates - ASTM F900:  
26 01 General: Gate frames shall be constructed of 2" round steel tubing of the sizes  
27 listed below.  
28 02 Person swing gates shall be joined at the corners by arc welding to form a rigid,  
29 one piece unit and filled with specified chain link fabric to match the fence.  
30 Hot-dip galvanize after fabrication.  
31 03 Fasten fabric to the frame on all four sides by means of adjustable hook bolts  
32 and tension rods. Equip all gates with galvanized steel hinges and latch.  
33 04 Gate leaf width 3'-0" to 5'-0": 2-1/4" O.D. 4.1 PLF, ASTM A120, galvanized  
34 schedule 50 pipe or 2-1/2 inch X 2-1/2 inch roll section, ASTM A501, hot  
35 dipped galvanized.  
36 05 Gate leaf width 8'-0" to 11'-0": 4" O.D. 9.11 pounds per foot, ASTM A120,  
37 galvanized schedule 50 pipe or 3" x 3" roll section, ASTM A501.  
38 06 At double leaf gates, provide a crane bolt drop rod to secure one leaf. Provide a  
39 receiver in ground for drop rod. Imbed receiver in concrete minimum of 6"  
40 diameter by 12" deep. Provide a clip to secure the drop rod in the raised position  
41 when the leaf is open.  
42  
43 H. Swing Gate Hardware:  
44 01 Hinges: Provide male / female post type hinges.  
45 a. Two (2) per gate up to 72".  
46 b. Three (3) hinges per gate 72" (+).  
47 c. Where designated, provide self-closing spring hinge(s).  
48 02 Standard Latches: Fork type latch capable of accepting (owner furnished) pad  
49 lock.  
50 03 Self-Closing Gate Latches: Provide self-latching latch capable of accepting  
51 (owner furnished) pad lock.  
52 04 Double Leaf Gate Latches: Provide 2-piece, heavy duty double-fork latch with  
53 6" legs and slotted receiver; capable of accepting (owner furnished) pad lock.  
54 05 Crane Bolts / Drop Rods: At double leaf gates, provide a crane bolt drop rod to  
55 secure one leaf.

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- a. Provide a receiver in ground for drop rod. Imbed received in concrete minimum of 6" diameter by 12" deep.
- b. Provide a clip to secure the drop rod in the raised position when the leaf is open.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Spacing:
  - 01 Space line posts at 8'-0" O.C. maximum.
  - 02 Space pull posts where grade changes more than 30 degree slope.
- B. Install all chain link fencing and gates in strict accordance with Chain Link Manufacturers Institute recommendations.
  - 01 Stretch fabric to proper tension between terminal posts and securely fasten to frame. Bottom of fabric shall be held as uniformly as practical to the finished grade.
  - 02 Fasten chain link fabric securely to terminal posts with 3/16" x 3/4" tension bars and 11 gauge tie wires, spacing not to exceed 14 inches apart.
  - 03 Tie fabric to rails with 9 gauge tie wires, spacing not to exceed 18" O.C.
- C. Gates (Swing): Install plumb and level. Adjust hardware for smooth operation.

**END OF SECTION**

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**SECTION 32 84 23**

**UNDERGROUND SPRINKLERS**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
- 01 Provide a complete underground sprinkler irrigation system in designated areas as indicated on the Drawings.
  - 02 Tie-into existing underground sprinkler system and install new zones as needed. Backflow preventers, vacuum breakers and controller are in place from previous facility.
  - 03 In general, the sprinkler system will be installed for trees and shrubs only, not lawns or hydroseed, unless otherwise indicated.
  - 04 The Landscape Contractor shall carry a \$10,000 Sprinkler System Allowance to design, purchase and install the sprinkler system.
  - 05 Coordinate with electrical contractor for power and connection to irrigation controllers.
  - 06 System shall be complete, including, but not limited to the following:
    - a. Piping.
    - b. Manual valves.
    - c. Automatic control valves.
    - d. Automatic drain valves.
    - e. Sprinklers.
    - f. Quick couplers.
    - g. Controllers.
    - h. Boxes for automatic control valves.
- B. Related Work:
- 01 Section 31 20 00 – Earth Moving.
  - 02 Section 31 22 19 – Finish Grading.
  - 03 Section 21 23 33 – Trenching and Backfill.
  - 04 Section 32 92 00 – Sodding.
  - 05 Section 32 93 00 – Landscaping.

**1.2 PERFORMANCE REQUIREMENTS**

- A. Irrigation zone control shall be automatic operation with controller and automatic control valves.
- B. Intent of Drawings: Sprinkler lines shown on the Drawings are diagrammatic. Locations of all sprinkler heads, valves, piping, wiring, etc. shall be established by the Contractor at the time of construction. Spacing of sprinkler heads and quick coupling valves are shown on the Drawings and shall be exceeded only with the permission of the Landscape Architect or the Owner's authorized representative.
- C. Keep all areas of work clean, neat, and orderly at all times. Keep paved areas clean during installation operations.

1 **1.3 SUBMITTALS**

- 2
- 3 A. Review and comply with all provisions of section 01 33 00 – Submittal Procedures.
- 4
- 5 B. Product Data: Submit manufacturer’s literature, product data, certifications and supporting
- 6 information for all products proposed to be furnished, as necessary to demonstrate compli-
- 7 ance with the specified requirements.
- 8
- 9 C. Shop Drawings: Submit complete shop drawings consisting of design, fabrication and erection
- 10 / installation of proposed assemblies.
- 11 01 Show details of field fabrications, connections and details.
- 12 02 Site plan drawing showing complete layout of underground sprinkler system, in-
- 13 cluding all piping, heads (including type), valves, controllers, electrical wiring
- 14 and connections.
- 15 03 System shall be designed by a licensed irrigation designer and all shop drawings
- 16 shall be sealed and signed by the licensed designer.
- 17
- 18 D. Zoning Chart: Show each irrigation zone and its control valve.
- 19
- 20 E. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.
- 21
- 22 F. Installation Instructions: Submit manufacturer’s complete installation instructions, includ-
- 23 ing fastening, for all products and / or assemblies proposed to be furnished.
- 24 01 Installation details submitted for review shall be specific to the work of this con-
- 25 tract and accurately depict interface within the assembly(s) indicated on the Draw-
- 26 ings.
- 27 02 Generic details that do not depict actual conditions shall not be acceptable.
- 28
- 29 G. Maintenance Instructions: Submit manufacturer’s complete maintenance instructions and
- 30 recommendations for all products and / or assemblies proposed to be furnished.
- 31 01 Include recommended cleaning products and instructions for use.
- 32 02 Where applicable, provide recommended maintenance schedules and procedures.
- 33
- 34 H. Delegated-Design Submittal: For irrigation systems indicated to comply with performance
- 35 requirements and design criteria, including analysis data signed and sealed by the qualified
- 36 professional engineer responsible for their preparation.
- 37
- 38 I. Operation and Maintenance (O&M) Manuals prior to Substantial Completion; required for
- 39 Owner training and demonstrations:
- 40 01 Irrigation controller.
- 41 02 Valves and gate valves.
- 42 03 Pipe and fittings.
- 43 04 Valve boxes.
- 44 05 Quick coupling valves.
- 45 06 Low voltage wire and connections.
- 46
- 47 J. Record Irrigation Drawings:
- 48 01 Furnish Record Drawings of complete irrigation system in accordance with the
- 49 General and Special Conditions.
- 50 02 Procure full size set of Contract Drawings or electronic version of landscape plans
- 51 from Landscape Architect.
- 52 03 Construction Drawings shall be on-site at all times while irrigation system is under
- 53 construction.
- 54 04 Make daily record of all work installed each day either electronically or on the
- 55 hard copy Drawing sheets or both.

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- 05 Actual location of valves and quick couplers and all irrigation and drainage piping shall be shown on prints by dimensions from easily identifiable permanent features, such as buildings, curbs, fences, walks, or property lines.
- 06 Drawings shall show approved substitutions of material. Include material, manufacturer's name, and catalogue number.
- 07 Drawings shall be to scale and all indications shall be easily understandable, legible, and neat.

**1.4 QUALITY ASSURANCE**

- A. Requirement of Regulatory Agencies:
  - 01 All work and materials shall be in full accordance with the latest rules and regulations of safety orders of Division of Industrial Safety; the Uniform Plumbing Code, the TCEQ and other applicable laws or regulations, including those of the city in which construction is to take place.
  - 02 Nothing in Drawings are to be construed to permit work not conforming to these codes. Should the Contract Documents be at variance with the aforementioned rules and regulations, notify Landscape Architect and get instructions before proceeding with the work.
- B. Testing:
  - 01 Preliminary review of completed installation will be made by the Landscape Architect prior to backfilling trenches and during hydrostatic testing.
  - 02 Final review shall be made in conjunction with the groundcover, shrubs, and tree planting.
- C. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

**1.5 FINAL ACCEPTANCE**

- A. Work under this Section will be accepted by Landscape Architect upon satisfactory completion of all work.
- B. Upon final acceptance, Owner will assume responsibility for maintenance of the work. Said assumption does not relieve Contractor of obligations under Warranty.

**1.6 WARRANTY**

- A. In addition to the manufacturer's guarantees or warranties, all work shall be warranted for one year from the date of Final Acceptance against defects, material, equipment and workmanship by the Contractor. Warranty shall also cover repair of damage to any part of the premises resulting from leaks or other defect in materials, equipment, and workmanship to the satisfaction of the Owner.
- B. Contractor shall not be held responsible for failures due to neglect by the Owner, vandalism, etc., during the Warranty period. Report such conditions to the Landscape Architect in writing.

**1.7 SYSTEM REQUIREMENTS**

- A. The underground sprinkler system shall be a complete system, including all piping, fittings, sprinkler heads, drip hoses, valves, controllers and wiring required for a complete operating system.

- 1 B. The underground sprinkler system shall accommodate 24/7/365 control of the irrigation
- 2 zones indicated on the Drawings.
- 3 01 If none are indicated, provide system capable of individual control of up to twelve
- 4 (12) separate zones.
- 5
- 6 C. All controllers and major components shall be commercial grade.
- 7

8 **PART 2 - PRODUCTS**

9

10 **2.1 MANUFACTURERS**

- 11 A. Design of underground sprinklers is based on products manufactured by Rain Bird Corpo-
- 12 ration.
- 13
- 14 B. Acceptable Manufacturers: The following manufacturers are acceptable to provide prod-
- 15 ucts of this section, provide all proposed products meet or exceed the specified require-
- 16 ments.
- 17
- 18 01 Weathermatic.
- 19 02 Hunter Industries.
- 20 03 Toro Company.
- 21

22 **2.2 MATERIALS**

- 23
- 24 A. Materials throughout the system shall be as specified and noted on the Drawings or within
- 25 these Specifications, new and in perfect condition.
- 26
- 27 B. Gate Valves: Two inches (2") in size and under, 125 pound bronze construction, non-
- 28 rising stem type, sized to line. NIBCO #T113 or approved equal.
- 29
- 30 C. Sleeves: Control wire and water line sleeves shall be PVC 1120-1220, Schedule 40 pipe.
- 31 01 Coordinate with Contractor and other trades as required for installation of all be-
- 32 low pavement sleeves required for a complete installation; whether shown on the
- 33 Drawings or not.
- 34
- 35 D. Irrigation Controllers: As shown or scheduled on the Drawings.
- 36
- 37 E. Control Wiring: Solid copper, UL approved for direct burial in ground. Minimum gage#14
- 38 UF (#12 UF for runs over 1,000 LF, contractor shall measure to confirm). Common ground
- 39 wire shall be white. Extra Wires shall be run to the farthest valve location from the
- 40 Controller, one white and two Yellow wires total, verify location with Landscape Architect.
- 41
- 42 F. Valve Boxes: Injection molded of polymers and fibrous inorganic temperature resistant
- 43 components. Box shall provide adequate clearance to operate and service valve. Box and
- 44 lid shall be black.
- 45 01 Acceptable Manufacturers: Amtek, Christy, Carson, or approved equal.
- 46 02 Valve boxes for remote control valves shall be rectangular, approximately 10-inch
- 47 x 14-inch inside dimensions by 15 inches deep. Boxes shall be black with locka-
- 48 ble lids and have painted on lid with 1-inch high white letters "RC".
- 49 03 Valve boxes for gate valves and quick couplers, shall be round, approximately 9-
- 50 inch inside diameter by 10-inch deep. Boxes shall be green with lockable lids and
- 51 have painted on lid with 1-inch high white letters "QC".
- 52
- 53 G. Quick Couplers (if indicated on Drawings): (N/A)
- 54 01 Valve and keys as specified on Drawings.
- 55 02 Furnish two valve keys fitted with 3/4-inch swivel hose ells.
- 56



- 1 H. Sprinkler Heads: As shown or scheduled on the Drawings.  
2  
3 I. Conduit: All conduit for low voltage irrigation control wires shall be 2-inch Schedule 40  
4 PVC. Control wiring may be placed in common sleeve with lateral or main lines under  
5 paving when sleeves are larger than 4-inches. Use galvanized steel pipe only under public  
6 roads or for high voltage power conductors.  
7

8 **2.3 PIPING**  
9

- 10 A. Piping on pressure and nonpressure side of irrigation control valves:  
11 01 Two and one-half inch diameter and smaller – ASTM D1785, PVC 1120-1220  
12 compound, schedule 40.  
13  
14 B. Identification: Continuously and permanently marked with manufacturer's name or  
15 trademark, size, schedule and type of pipe, working pressure at 73 degrees F., and National  
16 Sanitation Foundation (NSF) approval.  
17

18 **2.4 FITTINGS**  
19

- 20 A. Fittings for Solvent- Welded Pipe:  
21 01 Schedule 40, polyvinyl chloride, standard weight, as manufactured by "Sloane",  
22 "Lasco", or approved equal, to meet ASTM D2466-73 and D-2467-73.  
23 02 Threaded PVC nipples - Schedule 80 PVC.  
24  
25 B. Fittings for Polyethylene Pipe:  
26 01 Polyallomer as manufactured by "Flintkote" or approved equal.  
27 02 Compression type of CPVC as manufactured by "Pepco".  
28  
29 C. Fittings for Swing Joints:  
30 01 Supply three (3) Schedule 40 "Marlex" elbows.  
31 02 Threaded PVC Nipples - Schedule 80 PVC.  
32

33 **2.5 PIPING JOINING MATERIALS**  
34

- 35 A. Solvent Cements for Joining PVC Piping: ASTM D2564. Include primer according to  
36 ASTM F656.  
37  
38 B. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping  
39 system manufacturer unless otherwise indicated.  
40

41 **2.6 METERING AND BACKFLOW PREVENTORS**  
42

- 43 A. Where a separate, dedicated meter is shown for the irrigation system(s), coordinate with  
44 Contractor and other trades as required for proper interface with irrigation system piping.  
45  
46 B. Coordinate with Contractor and other trades as required for proper interface of irrigation  
47 system with primary backflow preventer.  
48  
49 C. Verify all requirements and provide all required backflow preventers, vacuum breakers and  
50 similar devices required by authorities having jurisdiction (AHJ).  
51

52 **PART 3 - EXECUTION**  
53

54 **3.1 EXAMINATION**  
55

- 56 A. Site Verification of Conditions:

- 1 01 Contractor shall be acquainted with all site conditions. Should utilities or other  
2 work not shown on the plans be found during excavations, Contractor shall  
3 promptly notify Landscape Architect for instructions as to further action. Failure  
4 to do so will make Contractor liable for any and all damage arising from opera-  
5 tions subsequent to discovery of such utilities not shown on plans.  
6 02 Contractor shall take necessary precautions to protect site conditions. Should  
7 damage be incurred, Contractor shall repair damage to its original condition or  
8 furnish and install an equal replacement.  
9

10 **3.2 LAYOUT**

- 11 A. Consideration will not be given to design changes until after award of contract.  
12  
13 B. Lay out work as closely to that shown on the Contract Drawings as possible. Contract  
14 Drawings are diagrammatic in nature. Adjust layout as necessary to accommodate actual  
15 site conditions. Locate pipe and valves shown under paving in adjacent planting area.  
16  
17 C. Full and complete coverage is required. Contractor shall make minor adjustments to layout  
18 as required to assure full and complete coverage. When such adjustments require  
19 exceeding radius limitations shown on irrigation legend, contact Landscape Architect for  
20 direction.  
21  
22 D. Substitutions for smaller pipe sizes will be not be accepted.  
23  
24

25 **3.3 EARTHWORK**

- 26 A. Perform excavation as required for installation of work included under this Section,  
27 including shoring of earth banks if necessary. Restore all surfaces, existing underground  
28 installations, etc., damaged or cut as a result of excavations, to their original condition.  
29  
30 B. Should utilities not shown on the plans be found during excavation, promptly notify  
31 Landscape Architect for instructions as to further action. Failure to do so will make  
32 Contractor liable for any subsequent discovery of such utilities. Indicate such utility  
33 crossings on the Record Drawings promptly.  
34  
35 C. Dig trenches wide enough to allow a minimum of 4-inches between parallel pipe lines.  
36 Trenches shall be of sufficient depth for approved minimum cover from finish grade as  
37 follows:  
38 01 Over pipe on pressure side of irrigation control valve, control wires and quick  
39 coupling valves: 18 inches.  
40 02 Over pipe on non-pressure side of irrigation control valve: 12 inches.  
41  
42 D. Trenching within the drip-line of existing trees shall not employ the use of mechanical  
43 trenching devices. Hand dig without severing roots which exceed 1-1/2' in diameter. Notify  
44 the Landscape Architect immediately if site conditions prohibit such action.  
45  
46

47 **3.4 PIPING INSTALLATION**

- 48 A. General:  
49 01 Location and Arrangement: Drawings indicate approximate location and arrange-  
50 ment of piping systems. Install piping as indicated unless deviations are approved  
51 on Coordination Drawings.  
52 02 Clean all pipes and fittings of dirt and moisture before assembly.  
53 03 Install piping free of sags and bends.  
54 04 Install groups of pipes parallel to each other, spaced to permit valve servicing.  
55 05 Install fittings for changes in direction and branch connections.  
56

- 1                   06       Install unions adjacent to valves and to final connections to other components with  
2                   NPS 2 (DN 50) or smaller pipe connection.
- 3                   07       Install flanges adjacent to valves and to final connections to other components  
4                   with NPS 2-1/2 (DN 65) or larger pipe connection.
- 5                   08       Install expansion loops in control-valve boxes for plastic piping.
- 6                   09       Lay piping on solid sub-base, uniformly sloped without humps or depressions.
- 7                   10       Install PVC piping in dry weather when temperature is above 40 deg F. Allow  
8                   joints to cure at least 24 hours at temperatures above 40 deg F before testing.
- 9
- 10                B.       Solvent-Welded Joints for PVC Pipes:
- 11                   01       Use solvents and methods recommended or required by pipe manufacturer.
- 12                   02       Cure joint a minimum of one hour before applying any external stress on the pip-  
13                   ing and at least twenty four (24) hours before placing the joint under water pres-  
14                   sure.
- 15
- 16                C.       Threaded Joints for Plastic Pipes:
- 17                   01       Use Teflon tape on the threaded PVC fittings except where Marlex fittings are  
18                   used.
- 19                   02       Use strap-type friction wrench only. Do not use metal-jawed wrench.
- 20                   03       When connection is plastic to metal, male adaptors shall be used. The male adap-  
21                   tor shall be hand tightened, plus one turn with a strap wrench. Joint compound  
22                   shall be Teflon tape or approved equal.
- 23
- 24                D.       Joints for Polyethylene Pipes:
- 25                   01       Double-clamp all connections 1-1/4-inch diameter and greater.
- 26                   02       Make all connections between polyethylene pipes and metal valves or pipes with  
27                   threaded fittings using male adaptors.
- 28
- 29                E.       Laying of Pipe:
- 30                   01       Pipes shall be bedded in at least 2-inches of finely divided material with no rocks  
31                   or clods over 1-inch diameter to provide a uniform bearing.
- 32                   02       Pipe shall "snake" from side to side of trench bottom to allow for expansion and  
33                   contraction. One additional foot per 100 feet of pipe is the minimum allowance  
34                   for snaking. Or install plastic pipe in a manner to provide for expansion and con-  
35                   traction as recommended by the manufacturer.
- 36                   03       Do not lay PVC pipe when there is water in the trench.
- 37                   04       Cut plastic pipe with PVC pipe cutters or hacksaw to ensure a square cut. Remove  
38                   burrs at cut ends prior to installation to ensure that a smooth unobstructed flow  
39                   will be obtained and not clog the diaphragm of the valves.
- 40                   05       All plastic to plastic joints shall be solvent-weld joints or slip seal joints. Only  
41                   solvent recommended by the pipe manufacturer shall be used. Install plastic pipe  
42                   and fittings as outlined and instructed by pipe manufacturer. It shall be the Con-  
43                   tractor's responsibility to make arrangements with the pipe manufacturer for any  
44                   field assistance that may be necessary. Contractor shall assume full responsibility  
45                   for the correct installation.
- 46

### 47   3.5   EQUIPMENT INSTALLATION

48

- 49                A.       Gate Valves: Group valves together and locate in planted areas where possible. Box shall  
50                   be flush with finish grade.
- 51
- 52                B.       Irrigation Control Valves: Install control valves in valve boxes where shown and group  
53                   together where practical. Place no closer than 12-inches to walk edges, buildings, and  
54                   walls. Valve boxes shall be flush with finish grade.
- 55
- 56                C.       Sprinkler Heads:

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- 01 Place all rotary pop-up sprinkler heads in lawn areas on swing joints as Detailed on Drawings with top of heads 1-inch above finish grade. Place part-circle rotary pop-up sprinkler heads 8-inches from edge of and flush with top of adjacent walks, header boards, curbs, mowing bands, or paved areas at time of installation.
- 02 Install spray heads and bubbler heads on a swing joint assembly as detailed on the Drawings.

D. Quick Coupling Valves: Install any required quick coupling valves on a swing joint assembly as detailed on the Drawings.

E. Automatic Controller:

- 01 Install per local code and manufacturer's latest printed instructions.
- 02 Connect remote control valves to controller in clockwise sequence to correspond with station setting beginning with Stations 1, 2, 3, etc.
- 03 Affix controller name (i.e. "Controller A") on inside of controller cabinet door with letters minimum of 1-inch high.
- 04 Affix a non-fading copy of irrigation diagram to cabinet door below controller name. Seal irrigation diagram between two sheets of 20 mil (minimum) plastic.
- 05 Irrigation diagram shall be a reduced copy of the as-built drawing and shall show clearly all valves operated by the controller, showing station number, valve size, and the type of plants being irrigated.

F. Control Wiring:

- 01 Install control wires with sprinkler mains and laterals in common trenches wherever possible. Lay to the side of pipe line. Provide looped slack at valves and snake wires in trench to allow for contraction of wires. Tie wires in bundles at ten (10') foot intervals.
- 02 Crimp and seal control wire splices at remote control valves with specified splicing materials. Line splices will be allowed only on runs of more than 500 feet. Line splices to be Scotchlok and sealed with Scotchkote sealer.
- 03 Install a minimum of two (2) extra control wires to the control valve located the greatest distance from the controller, one in both directions, (confirm location with Landscape Architect), and label each end blank or as shown on drawings.

G. Closing of Pipe and Flushing of Lines:

- 01 Cap or plug all openings as soon as lines have been installed to prevent entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.
- 02 Thoroughly flush out all water lines before installing heads, valves and other hydrants.
- 03 Test as specified.
- 04 Upon completion of testing, complete assembly and adjust sprinkler heads for proper distribution.
- 05 All sprinkler heads and quick coupling valves shall be set perpendicular to finished grades unless otherwise designated on the Drawings, or otherwise specified.
  - a. Sprinkler heads adjacent to existing walls, curbs and other paved areas, shall be set to grade.
  - b. Sprinkler heads which are to be installed in lawn areas where the turf has not yet been established shall be set 1-inch above the proposed finish grade. Heads installed in this manner will be lowered to grade when the turf is sufficiently established to allow walking on it without appreciable destruction. Such lowering of heads shall be done by Contractor as part of the original contract with no additional cost to the Owner.

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**3.6 BACKFILL AND COMPACTING**

- A. After system is operating and required tests and inspections have been made, backfill excavations and trenches with clean soil free of debris.
- B. Backfill for all trenches, regardless of the type of pipe covered, shall be compacted to minimum 95 percent density under pavements, and 85 percent under planted areas. Backfill shall not be more than 50% complete before water is added (jetted) allowing all air pockets and settling to occur. Then the balance of the soil shall be added.
- C. Compact trenches in areas to be planted by thoroughly flooding backfill. Jetting process may be used in those areas.
- D. Dress off all areas to finish grades.

**3.7 CLEAN UP**

- A. Clean up and remove all debris from the entire work area prior to Final Acceptance to satisfaction of Landscape Architect.

**3.8 FIELD QUALITY CONTROL**

- A. Perform tests and/or call for inspections per local code requirements.
- B. Perform hydrostatic tests when welded PVC joints have cured per manufacturer's instructions.
  - 01 Pressurized Mains:
    - a. Completely install mains, gate valves, and control valves. Do not install laterals.
    - b. Fill all lines with water.
    - c. Contact Landscape Architect:
      - 1) Contractor shall notify Landscape Architect 24 hours before pressure test is begun.
      - 2) Inform Landscape Architect of the results of the test the following day.
    - d. Pressurize the main with air to 70 psi. Monitor gauge for pressure loss for four (4) hours. Maximum allowable loss over four (24) hour period - 3 psi.
    - e. Leave lines and fittings exposed throughout testing period.
    - f. Leaks resulting from tests shall be repaired and tests repeated until the system passes.
    - g. Test all gate valves for leakage.
  - 02 Non-Pressure Laterals:
    - a. Test piping after laterals and risers are installed and system is fully operational.
    - b. Leave trenches open to detect possible leaks.
- C. Submit written requests for inspections to the Landscape Architect at least forty-eight (48) hours prior to anticipated inspection date.
- D. Systems Tests:
  - 01 Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 02 Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.

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03 Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

- E. Any irrigation product will be considered defective if it does not pass tests and inspections.
- F. Prepare and submit test and inspection reports.

**3.9 ADJUSTING**

- A. Adjust settings of all nozzles and controllers, minimizing overspray on walks and parking areas.
- B. Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.
- C. Adjust sprinklers and devices, except those intended to be mounted aboveground, so they will be flush with, or not more than 1/2 inch above, finish grade.

**END OF SECTION**

## **SECTION 32 91 10**

### **PLANTING MEDIA**

#### **1.00 GENERAL**

#### **1.01 WORK INCLUDED**

- A. Provide materials, testing, equipment and labor required to prepare amended plant mediums for:
  - 1. Planting mix
  - 2. Tree pit backfill mix

#### **1.02 RELATED SECTION**

- A. Planting: Section 32 93 00

#### **1.03 QUALITY ASSURANCE**

- A. If requested by owner, contractor shall submit soil components to local or state testing laboratory for conformity to the specifications:
  - 1. Contractor to submit proposed laboratory name, address, and telephone numbers.
- B. For delivered material, test one grab sample for each 100 c.y. of bulk material delivered to the site.
- C. Excavated material from tree pits and shrub beds shall not be used for preparation of backfill mix.

#### **1.04 INSPECTIONS**

- A. Testing will be at the expense of the owner.

#### **1.05 SUBMITTALS**

- A. Furnish required copies of manufacturers literature, samples, certifications, or laboratory analytical data for the following items:
  - 1. Planting mix (sample bag)
  - 2. Mulch (sample bag)
  - 3. Top soil (sample bag)

#### **1.06 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver material to site when only when project is ready for related work.

#### **2.00 MATERIALS**

#### **2.01 ON SITE MATERIALS**

- A. Specified backfill mixes shall consist of like material to that used for landscape grading.

#### **2.02 SOIL AMENDMENTS**

- A. Wood Residuals
  - 1. Source

- a. Shall be naturally composted stockpiled, and not have been chemically treated.

2. Physical Properties

- a. Grading:

<u>U.S. Sieve</u>	<u>Dry Weight Percent Passing</u>
3/8	100
1/4"	90-100
No. 8	70-100
No. 35	0-30

- b. Organic Content by Ash Analysis: 90-100% Dry Weight

- c. Chemistry

- 1. Saturation Extract Conductivity (EDc): Nil-3.5
- 2. Reaction (pH): 3.0-5.5

- d. Salinity

- 1. Maximum saturation extracts conductivity 1.0 milliohms per cm at 25 degrees centigrade.

B. Sand

1. Physical Properties

- a. Grading:

<u>U.S. Sieve</u>	<u>Percent Passing</u>
No. 4	100
No. 10	95-100
No. 18	90-100
No. 35	65-100
No. 60	0-50
No. 140	0-20
No. 270	0-7

- b. Chemistry:

Saturation Extract Conductivity (EDC): Nil-3.0



Sodium Absorption Ratio (SAR):	Nil-6.0
Boron-ppm in saturation extract sltn.:	Nil-1.0
Reaction (pH):	6.0-7.5
Available calcium-sodium acetate extractable-ppm dry weight:	Nil-2000

- c. Iron Sulfate (Ferric or Ferrous)
  - 1. Shall contain 30 to 35% iron, 35-40% sulphur and be supplied by a commercial fertilizer supplier.
- d. Treble Superphosphate
  - 1. Commercial product containing 19 to 20% available phosphoric acid.
- e. Urea Formaldehyde
  - 1. Commercial product containing 38% Nitrogen
- f. Soil Sulphur
  - 1. Agricultural grade sulphur containing a minimum of 96% sulphur.
- g. Ammonium Sulfate
  - 1. Commercial product containing approximately 21% ammonia.

**2.03 PLANTING MIX**

- A. Shall be thoroughly mixed in the following proportions:
  - 1. Tree Planting, Shrub Bed, and Planter Backfill mixes:
    - a. Contain sandy loam topsoil
    - b. Double ground aged rice hull compost
    - c. #1 bank sand
    - d. Growers grade pine bark
    - e. Forest floor mulch (Black Humus)
    - f. All material are screened to provide 99% 1” minus sizing then blended to provide a uniform mixture. A minimum of 40% composted organic are utilized to add natural nutrients, provide aeration and optimum moisture retention capacities.
- B. Actual mixes and additive may vary depending on samples extracted from actual plant sources.
- C. Prepared backfill mixes shall come from the following source, unless otherwise specifically approved:
  - 1. Living Earth Technology, Houston, Texas (713) 466-7360
  - 2. Nature’s Way Resources, Conroe, Texas (936) 321-1200

- C. Contractor may select his own sources, as long as the sources are reputable. Samples and product data must be submitted for approval to show products are meeting the specification requirements planting bed preparation.

### **3.00 EXECUTION**

#### **3.01 MIXING**

- A. Mix soil base, amendments and chemical additives by mechanical means. Do not mix additives with excavated material at the plant pit site.
- B. Thoroughly mix all amendments with soil by mechanical means.
- C. Soil and sand bases shall be completely pulverized and free of lumps or aggregated material. Moisture content of base materials shall not be such that chemical, granular or pelletized additives become dissolved during the mixing process.
- D. Mix media in quantities of not less than 50 cubic yards or mix total quantity required, if less than 100 cubic yards. The Contractor shall be responsible for continuity between batches.

**END OF SECTION**

1 **SECTION 32 92 00**

2 **TURF AND GRASSES**

3 CONDITIONS OF THE CONTRACT, SECTIONS DIVISION 00 AND 01 APPLY TO THIS SECTION.

4  
5 **1.1 GENERAL**

6  
7 **1.2** Work covered in this section shall include all materials, labor, equipment and supervision required for  
8 the installation of turf grass where and as described on the Drawings and in the Specifications. This  
9 work includes, but is not limited to the following:

- 10  
11 A. Installation of turf by the hydroseed method.  
12  
13 B. Establishment of turf by sodding.  
14  
15 C. Site clean up.  
16  
17 D. Maintenance and guarantee.

18  
19 **1.3 RELATED SECTIONS**

- 20  
21 A. Fine Grading: 312216  
22  
23 B. Planting: 329300

24  
25 **1.4 QUALITY ASSURANCE**

- 26  
27 A. Sod: Shall be subject to inspection and approval by Owner's representative at the site upon  
28 delivery for conformity to Specifications. Such approval shall not impair the right of inspection  
29 and rejection during progress of the work. Owner's representative reserve the right to refuse  
30 inspection at this time is in his judgment, a sufficient quantity of sod is not available for  
31 inspection.  
32  
33 B. Seed: The Owner's representative shall be furnished a signed copy of statement from vendor,  
34 certifying that each container or bag of seed delivered is labeled in accordance with the Federal  
35 Seed Act and is at least equal to requirement previously specified. Seed analysis shall be  
36 furnished prior to commencement of planting operations. Each lot of seed may be re-sampled  
37 and retested in accordance with latest Rules and Regulations under the Federal Seed Act at the  
38 discretion of the Owner's representative. If these tests reveal the seed to be below the specified  
39 pure live seed content, the Contractor shall be required to plant additional seed to compensate for  
40 the deficiency at no cost to the Owner.  
41  
42 C. The Owner reserves the right to take or request samples of materials for conformity to spec-  
43 ifications at any time. Contractor shall furnish samples upon request. Rejected materials shall be  
44 immediately removed from the site at Contractor's expense. Cost of replacement of materials not  
45 meeting specifications shall be paid by Contractor.

46  
47 **1.5 INSPECTIONS**

- 48  
49 A. Make written request for inspection after seeding of sodding operation have been completed.  
50 Such inspection is for the purpose of establishing maintenance period.  
51  
52 B. Submit written requests for inspection to the Owner's representative at least 7 days prior to  
53 anticipated inspection date.

54  
55 **2.1 SUBMITTAL**

- 56 A. Furnish required copies of manufacturers' literature, certifications, or laboratory analytical data  
57 for the following items:

1. Sod and seed source (certification)
2. Fiber mulch (laboratory analytical data)
3. Tank mix fertilizer (certification or laboratory analytical data)
4. Topdress fertilizer (certification)

**3.1 SEED**

- A. All seed used shall be labeled in accordance with U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act in effect on the date of Invitation for Bids. All seed shall be furnished in sealed standard containers, unless exception is granted in writing by the Owner’s representative. Seed which has become wet, moldy, or otherwise damaged in transit or in storage will not be acceptable.
- B. The minimum percentage by weight of pure live seed in each lot of seed shall be as follows and seed shall be planted at the rate per acre indicated under pure live seed required per acre

<u>Kind of Seed</u>	<u>Minimum % Pure Live Seed Required</u>	<u>Pounds Pure Live Seed Required Per Acre</u>
(Summer Mix)		
Common Bermuda Grass (Hulled)	85	65
Apply between September-November and/or March-May		
(Winter Mix)		
Common Bermuda Grass (Un-Hulled)	85	65
Winter Rye	90	200

Apply between October-December only.

Note: % Pure Live Seed = % Purity X % Germination = 100

Weed seed shall not exceed ten percent (10%) by weight of the total of pure live seed and other material in the mixture. Johnson grass, nut grass, or other noxious weak seed will not be allowed.

**3.2 FERTILIZER FOR TANK MIX**

- A. The additives shall be delivered to the site in bags or other convenient containers, each fully labeled, conforming to the applicable state fertilizer laws, and bearing the name or trademark and warranty of the producer. Fertilizer to conform to following for 1,000 S.F.

20 lbs. (3-13-13) NPK for Turf

**3.3 WOOD CELLULOSE FIBER MULCH**

A. Wood cellulose fiber mulch, for use with the hydraulic application of grass seed and fertilizer, shall consist of specially prepared wood cellulose fiber. It shall be processed in such a manner that it will not contain germination or growth-inhibiting factors. It shall be dyed an appropriate color to allow visual metering of its application. The wood cellulose fibers shall have the property of becoming evenly dispersed and suspended when agitated in water. When sprayed uniformly on the surface of the soil, the fibers shall form a blotter-like groundcover which readily absorbs water and allows infiltration to the underlying soil. Weight specifications from suppliers for all applications shall refer only to air dry weight of the fiber, a standard equivalent to 18% moisture. The mulch material shall be supplied in packages having a gross weight not in excess of 100 lbs. and be marked by the manufacturer to show the dry weight content. Suppliers shall be prepared to certify that laboratory and field testing of their product has been accomplished and that it meets all of the foregoing requirements.

1       **3.4 WATER**

2  
3       Shall be free from oil, acid, alkali, salt, and other substances harmful to growth of grass. The water  
4       source shall be subject to approval prior to use.  
5

6       **3.5 SLURRY MIX COMPONENTS PER ACRE**

7  
8       Wood Cellulose Fiber Mulch . . . . . 2,000 pounds  
9       Grass Seed . . . . . (as specified)  
10       Fertilizer (13-13-13). . . . . 800 pound  
11

12       **3.6 TOP DRESS AND LAWN FERTILIZER FOR EXISTING LAWN (Delayed Application)**

13  
14       Complete fertilizer, fifty percent (50%) of the nitrogen to be derived from natural organic sources or  
15       urea-form. Available phosphoric acid shall be from superphosphate, bone, or tankage. Potash shall  
16       be derived from muriate of potash containing sixty percent (60%) potash with elemental 20% iron  
17       sulfate equivalent to 400 lbs/acre:  
18

- 19               16% Nitrogen
- 20               6% Phosphoric Acid
- 21               8% Potash

22  
23       **3.7 SOD (FOR REFERENCE ONLY)**

- 24
- 25       A. Sod shall be one (1) year old **Tifway 419 Bermuda grass**. Sod shall be dense with grass having  
26       been mowed at one and one inch (1") height before lifting from field. All sod delivered to the site  
27       for the duration of the project shall be uniformly cut by the same sod cutter or multiple machines  
28       adjusted to cut the same thickness of sod root/soil mass.  
29
- 30       B. Sod shall be in vigorous condition, dark green in color, free of disease and harmful insects and  
31       grown on fumigated soil.  
32
- 33       C. Do not stack for more than 24 hours between time of cutting and time of delivery.  
34
- 35       D. The Landscape Architect reserves the right to reject any sod deemed unacceptable for installation.  
36

37       **4.1 HYDROMULCH SEEDING ON PREPARED FINISHED GRADE**

- 38
- 39       A. Bed Preparation: Spread topsoil to a 3" minimum depth required and feather smoothly into fin-  
40       ished grade at edge so as to blend with adjacent ground shapes. Immediately after finished  
41       grade has been approved, begin hydroseeding operation to reduce excessive weed growth.  
42
- 43       B. The Contractor shall apply seed, fertilizer and mulch by spraying them on the previously prepared  
44       seedbed in the form of an aqueous mixture and by using the methods and equipment described  
45       herein. The rates of application shall be as specified above.  
46
- 47       C. Spraying Equipment: The spraying equipment shall have a container or water tank equipped with  
48       a liquid level gauge calibrated to read in increments not larger than 50 gallons over the entire  
49       range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or  
50       tank shall also be equipped with a mechanical power driven agitator capable of keeping all the  
51       solids in the mixture in complete suspension at all times until used.  
52

53       The unit shall also be equipped with a pressure pump capable of delivering 100 gallons per minute  
54       at a pressure of 100 pounds per square inch. The pump shall be mounted in a line which will  
55       recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All  
56       pump passages and pipelines shall be capable of providing clearance for 5/8 inch solids. The  
57       power unit for the pump and agitator shall have controls mounted so as to be accessible to the  
58       nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately  
59       at the back of the nozzle.

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D. Homogeneously mix a slurry containing up to forty (40) pounds of fiber plus a combined total of seventy (70) pounds of fertilizer solids for each one hundred (100) gallons of water.

The slurry distribution lines shall be large enough to prevent stoppage. The discharge line shall be equipped with a set of hydraulic spray nozzles which provide even distribution of the slurry on the slopes to be seeded. Nozzles or spray shall never be directed toward the ground in such a manner as might produce erosion or runoff. The slurry tank shall have a minimum capacity of eight hundred (800) gallons and shall self-propelled or drawn with a separate unit which will place the slurry tank and spray nozzles within sufficient proximity to the areas to be seeded so as to provide uniform distribution without waste. The Landscape Architect may authorize equipment with smaller tank capacity provided that the equipment has the necessary agitation system and sufficient pump capacity to spray the slurry in a uniform coat.

E. Particular care shall be exercised to insure that the application is made uniformly and at the prescribed rate and to guard against miss and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area. Check on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets or paper or pans over the area at intervals and observing the quantity of material deposited thereon.

F. Operators of hydromulching equipment shall be thoroughly experienced in this type of application. Apply specified slurry mix in a motion to form a uniform mat at specified rate.

G. Keep hydromulch within areas designated and keep from contact with other plant material.

H. Slurry mixture which has not been applied within four (4) hours of mixing shall not be used and shall be removed from the site.

I. After application, the Contractor shall not operate any equipment over the covered area.

J. Immediately after application, thoroughly wash off any plant material, planting areas, or paved areas not intended to receive slurry mix. Keep all paved and planting areas clean during maintenance operations.

K. The Contractor shall guarantee a good healthy stand of grass. Areas which fail to germinate within a reasonable period of time shall be reseeded until a healthy stand of grass is attained.

**4.2 TOP DRESS FERTILIZER**

A. Apply top dress fertilizer at the rate of six (6) pounds per 1,000 square feet at 25 days after seeding or sodding.

**4.3 SODDING ON PREPARED FINISHED GRADE :**

A. Do not commence sodding operation until irrigation system is certified complete by the Landscape Architect and Owner.

B. Bed Preparation:

1. Remove any weed or other volunteer plant growth from lawn areas by excavation and / or herbicides. Fine grade all lawn areas with a minimum application of 3” top soil. Spread topsoil by hand raking, breaking up lumps and providing a smooth even friable bed. Fine grade topsoil so finish grade is 1” below adjacent tops of edging, curbs and walks. Limit fine grading to areas which can be planted immediately after grading. Where proposed lawn meet existing lawn cut grade at limit so top of new sod is even with existing grade.

- 1 2. Immediately after the finished grade has been approved, begin sodding operations to reduce  
2 excessive weed growth. If soil is dry immediately prior to sod installation, dampen surface  
3 with a fine mist of water.  
4

5 C. Installation:  
6

- 7 1. Lay sod so that adjacent strips butt tightly with no spaces between strips. Sod joints shall  
8 butt evenly with no overlap. Discard sod with irregular edges, discolored, uneven thickness  
9 or insufficient topsoil. Lay sod on mounds and slopes with strips parallel to contours.  
10 Stagger joints. Sodded areas shall be flush with adjoining seeded areas.  
11  
12 2. Peg sod on slopes three to one or steeper with pegs driven through sod into soil until pegs are  
13 flush with turf. Space pegs 18 inches on center. Pegs to be one inch (1") square by six inches  
14 (6") long pine or six inch (6") lengths of lath or similar approved device.  
15  
16 3. Roll sod to eliminate any undulation or unevenness of finished grade.  
17  
18 4. Sod joint shall be top dressed with sharp sand. Roll again to achieve an even uniform lawn.  
19  
20 5. Water sod thoroughly within 45 minutes of laying with water truck, firehouse or similar  
21 method to deliver quick application of water.  
22  
23 6. Trim all sod edges and planting bed edges by the end of the same day as adjacent sod is laid.  
24 Hand water trim pieces as above.  
25  
26 7. Immediately after installation of the sod, remove sod clumps and soil. Keep all areas clean  
27 during the maintenance period.  
28

29 **4.4 REPAIR OF EXISTING TURF**

- 30 A. All areas within this contract not disturbed by construction or where repair of grade is not  
31 required shall be overseeded with a cyclone or equivalent type machine at one half the rate of  
32 the specified hydroseed mix.  
33  
34 B. Apply full rate of post seeding fertilizer as specified above.  
35  
36

37 **4.5 MAINTENANCE BY THE CONTRACTOR**

- 38 A. Maintenance under this contract shall commence immediately and include the care and periodical  
39 mowing as required to keep the site clean and presentable.  
40  
41 B. The Contractor's maintenance period shall begin upon issuance of the Notice to Proceed and shall  
42 not be complete until final acceptance by the Owner or Owner's representative.  
43  
44 C. The Contractor's maintenance of new turf planting shall consist of watering, weeding, repair of all  
45 erosion and resodding as necessary to establish a uniform stand of specified grasses. Contractor  
46 shall guarantee growth and coverage of planting under this contract to the effect that all turf areas  
47 will be covered with specified planting after sixty (60) days with no bare spots greater than four  
48 (4) square feet. Any sod panels that are dead or dying shall be replaced.  
49  
50 D. Mowing shall be performed by the Owner.  
51  
52 E. The Contractor shall not be held responsible for failures due to neglect by the Owner, vandalism,  
53 etc., during the Guarantee Period. Report such conditions to the Landscape Architect in writing.  
54  
55

56 **4.6 FINAL ACCEPTANCE (END OF MAINTENANCE PERIOD)**

57 Work under this section will be accepted by Landscape Architect upon satisfactory completion of all  
58 work, but exclusive of re-application under the Guarantee Period. Final Acceptance of lawn estab-  
59 lishment shall be as follows:

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Full coverage of all areas hydroseeded with full even coat of hydroseed mulch. Thin areas shall be reapplied. Schedule overseeding operations with Owner or Landscape Architect for observation of method and confirmation of application and conformity to rates specified.

**4.7 CLEAN UP**

Keep all areas of work clean, neat, and orderly at all times. Keep all paved areas clean during lawn installation operations. Clean up and remove all deleterious materials and debris from the entire work area prior to Final Acceptance to the satisfaction of Landscape Architect.

**END OF SECTION**



## SECTION 32 93 00

### PLANTS

CONDITIONS OF THE CONTRACT, SECTIONS AA THROUGH CB AND DIVISION 1 APPLY TO THIS SECTION.

#### 1.1 GENERAL

#### 1.2 WORK INCLUDED

- A. This Section includes specifications for furnishing and installing planting materials including:
  - 1. Organic and chemical fertilizer
  - 2. Mulch
  - 3. Planting accessories
  - 4. Inspecting material

#### 1.3 RELATED SECTIONS

- A. Planting Media: Section 32 91 10

#### 1.4 STANDARDS

- A. American National Standards Institute (ANSI)/American Association of Nurserymen (AAN): ANSI Z60.1 1-069 "Nursery Stock".
- B. "Grades and Standards", latest edition of Texas Association of Nurserymen Specifications, Austin, Texas 78704.
- C. Perform work in accordance with all applicable laws, codes, and regulations required by authorities having jurisdiction over such work and provide for all inspections and permits required by Federal, State, and local authorities in furnishing, transporting, and installing materials.

#### 1.5 QUALITY ASSURANCE

- A. Installer: Installation of planting work shall be performed by a single firm specializing in landscape and planting work. Contractor shall be licensed by the Texas Association of Nurserymen, shall possess an agricultural certificate, shall be a licensed pest applicator, and shall have not less than 5 years of experience in this type of work.
- B. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
  - 1. Pesticide Applicator: State licensed, commercial.
- C. Compliance: Ship planting materials with Certificates of Inspection as required by governing authorities. Comply with all applicable local, state, and federal requirements regarding materials, methods of work, and disposal of excess and waste materials.
- D. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1. Provide healthy, vigorous stock, grown in recognized nursery in accordance with good horticultural practice and free of disease, insects, eggs, larvae and defects such as knots, sun-scald, injuries, abrasions or disfigurement.
- E. Analysis and Standards: All packaged products shall be delivered in original manufacturer's sealed containers. For unpackaged materials, submit analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

## 1.6 MATERIAL INSPECTIONS

- A. Plants shall be subject to inspection and approval by landscape architect upon delivery for conformity to specifications. Landscape architect may reject plant material that in his opinion does not conform to specifications. Submit a written or verbal request for inspection of plant material to landscape architect at least five (5) days prior to preferred date. The landscape architect reserves the right to refuse inspection at this time if, in his judgment, a sufficient quantity of plants is not available for inspection. The contractor shall submit alternate source for material if primary source of material deem unsatisfactory to meet specifications.
- B. Substitutions of plant materials will not be permitted unless authorized in writing by landscape architect. If proof is submitted that any plant specified is not obtainable, a proposal will be considered for use of the nearest equivalent size or variety with corresponding adjustment of contract price. Such proof shall be substantiated and submitted in writing to landscape architect at least thirty (30) days prior to start of work under this Section. These provisions shall not relieve contractor of the responsibility of obtaining specified materials in advance if special growing conditions or other arrangements must be made in order to supply specified materials.
- C. Inspection: Make written request for inspection after planting operation have been completed. Such inspection is for the purpose of establishing the maintenance period.
- D. Submit written request for inspections to the landscape architect 5 working days prior to anticipate inspection date.

## 1.7 SUBMITTALS

- A. Furnish required copies of manufacturers literature, samples, certifications, or laboratory analytical data for the following items:
  - 1. Tree, shrubs and groundcovers (Samples and / or photographs)
  - 2. Planting backfill mix (sample bag)
  - 3. Mulch (manufacturer's literature and samples)
  - 4. Tree and shrub planting fertilizer (certification or laboratory analytical data)
  - 5. Tree paint (manufacturer's, literature)
  - 6. Subdrainage materials (pipes, gravel, soil separator) *if applicable*
  - 7. Geotextile Fabric

## 1.8 PLANT MATERIAL DELIVERY, STORAGE AND HANDLING

- A. The following considerations for product handling shall be evaluated:
  - 1. During hot weather and when practical, the contractor may be required to transport plant materials between sunset and sunrise if transported in an open trailer or unrefrigerated van.
  - 2. Dug material should be maintained and watered as required at the nursery to guarantee their vitality and health until shipping.
  - 3. Protect from all damage trunks, stems, branches and root balls during tree tying, wrapping and loading operations.
  - 4. Load containers onto transport vehicle and secure in a manner that protects the structural integrity of the root balls and branches.
  - 5. The contractor shall be solely responsible for the safe transportation of plants to the site and their condition upon arrival. Trees damaged, dehydrated or abused during transit and storage will be rejected.

6. Plant materials should not be stored on concrete or left exposed to extremes of climate without adequate protection.
  7. Protect the root balls and water regularly until planting. If trees are left in storage over the weekend or holiday provide a means of periodical watering and inspection of container moisture.
  8. B & B material shall be stored and maintained in a manner which affords protection from dehydration and damage of root ball. Balls shall be wrapped and stored in mulch or approved containers.
- B. The landscape architect may inspect any phase of this operation and may reject any plant material improperly handled during any point of this operation.
- C. Nothing in this section shall be interpreted as relieving the contractor of his responsibility to provide healthy, viable plants, nor shall it have any effect upon the terms of the warranty specified herein.

## **1.9 INCIDENTAL REPAIRS**

- A. The landscape contractor shall coordinate repairs of damage to irrigation system incidental to the planting operation by either own forces or by Irrigation Subcontractor. Above repairs shall be made immediately so as to not interfere with the automatic cycling of the irrigation system. All repairs shall be permanent and include all flushing required to clean the lines of debris deposited by such damage.
- B. Incidental damage to work by other subcontractors during landscape installation shall be made immediately and at no extra cost to the owner.

## **1.10 JOB CONDITIONS**

- A. **Work Scheduling:** Proceed with and complete planting work in a timely manner, working within seasonal limitations for each kind of planting work required.
- B. **Planting Time**
1. Correlate planting with specified maintenance periods to provide maintenance from date of substantial completion.
  2. Plant trees, shrubs and groundcover after final grades are established and prior to planting of lawns, unless otherwise directed by landscape architect or owner's representative in writing. If planting occurs after lawn work, protect lawn areas and promptly repair damage to lawns resulting from planting operations.
- C. **Utilities:** Refer to drawings and coordinate with utility contractor for location of utilities. Contractor shall be responsible for damage to existing utilities and structures.
- D. **Security:** The owner will not assume any responsibility for security of any materials, equipment, etc. during construction of the project until project acceptance
- E. **Excavation:** When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions beyond the scope of this contract, or obstructions, notify owner's representative of such conditions, immediately and before planting.
- F. **Pollution Control:** Control dust caused by planting operations. Dampen surfaces as necessary. Comply with pollution control regulations of governing authorities.

## 2.1 MATERIALS

## 2.2 PLANTS

- A. Plants shall be nursery grown in accordance with good horticultural practices under climatic conditions similar to those of project for at least 12 (twelve) months unless specifically otherwise authorized by landscape architect in writing. Unless specifically noted otherwise, all plants shall be heavy, symmetrical, tightly knit, so trained or favored in development and appearance as to be superior in form, number of branches, compactness and symmetry.
- B. Plants shall be sound, healthy and vigorous, well branched and densely foliated when in leaf. They shall be free of disease, insect pests, eggs, or larvae, and shall have healthy, well developed root systems. They shall be free from physical damage or adverse conditions that would prevent thriving growth.
- C. Plants shall be true to species and variety and shall conform to measurements specified except that plants larger than specified may be used if approved by landscape architect. Use of such plants shall not increase contract price. If larger plants are approved, the ball of earth or container size shall be increased as specified under "Applicable Standards" and subject to the approval of the landscape architect.
- D. Plants shall be measured when branches are in their normal position. Height and spread dimensions specified refer to main body of plant and not branch tip to tip. Caliper measurement shall be taken at a point on the trunk six inches (6") above natural ground four inches (4") in caliper and at a point twelve inches (12") above the natural ground line for trees over four inches (4") in caliper. If a range of size is given, no plant shall be less than the minimum size and not less than 40% of the plants shall be as large as the maximum size specified. The measurements specified are the minimum size acceptable and are the measurements after pruning, where pruning is required. Plants that meet the measurements specified, but do not possess a normal balance between height and spread shall be rejected.
- E. Container stock shall have grown in the containers in which delivered for at least six months, but not over two years. Samples must prove no root bound conditions exists. No container plants that have cracked or broken balls or earth when taken from container shall be planned. Container stock shall not be pruned before delivery. Field grown plants recently transplanted into containers will not be accepted.
- F. Balled and burlap trees, when accepted, shall have a root ball size of ten (10X) times the caliper.
  - 1. Nursery grown B&B material shall be first pruned and thinned at the place of growth immediately prior to digging as required for packaging and safe moving. Method or pruning shall be as approved in the field by the landscape architect. Do not remove self-locking tags during this pruning prior to delivery to site. Final pruning shall take place at the site.
- G. Trees which have damaged or crooked leaders, or multiple leaders, unless specified, will be rejected. Trees with abrasions of the bark, sun scalds, disfiguring knots, or fresh cuts of limbs over 3/4" which have not completely callused, will be rejected.
- H. Method of pruning shall be as approved in the field by the landscape architect. Do not remove self-locking tags during this pruning prior to delivery to site. Final pruning shall take place at the site.
- I. Plant Materials
  - 1. Refer to landscape plans for Plant Schedule.

## 2.3 GUYING MATERIALS

- A. The contractor shall use guying materials necessary to meet the requirements herein.
  - 1. Pressure-treated 2" diameter lodge poles, "Wolman" treated, as provided by Bourbow Valley Company or approved equal. Contractor may use T-post only if prior approval by landscape architect by writing.
  - 2. Ties: Flexible strapping / Black rubber tire or other tie, as approved.
  - 3. Tree Guying Material: Galvanized aircraft cable (7 x 19 GAC).
  - 4. 12D Galvanized nails. (*if applicable*)
  - 5. Hardware
    - a. Guying cables: 7 x 19 aircord, size as specified.
    - b. Turnbuckles: galvanized or dip-painted, size as specified.
    - c. 2 hole crimping clamps: galvanized or copper, size as required.
    - d. Plastic guy covers: 3/8 "diameter x 3 'long white plastic tubing.

## 2.4 WATER

- A. Furnished by owner. Transport as required.

## 2.5 PRE-EMERGENCE WEED CONTROL

- A. Landscape areas shall be treated with all organic pre-emergent herbicide whenever possible.
- B. Organic pre-emergent herbicide shall be Corn Gluten Crumbs available at San Jacinto Environmental Supplies, 2221 A West 34th Street, Houston, TX 77018, 713-957-0909  
Corn Gluten Crumbs herbicide shall be applied during spring with an application rates of 20lb/1,000 sq. feet. Contractor may submit alternative organic pre-emergent herbicide for approval.
- C. If applying organic pre-emergent herbicide is not feasible, commercial chemical herbicide may be used with prior approval from landscape architect or owner's representative. Pre-emergent herbicide shall be Team Pro as manufactured by Bonus Corp Fertilizer, Houston, TX, or approved equal. Apply pre-emergent over all planting areas prior to spreading mulch at the rate of 7 lbs/1000 sq. feet.
- D. If necessary, contact herbicide shall be Roundup by Monsanto, 800 N. Lindbergh, St. Louis, MO 63167, 314-694-1000, or approved equal. Apply Roundup only if necessary and if approved by owner or owner's representative. Do not exceed manufacturer's recommended rate of application.

## 2.6 MULCH

- A. Mulch for top dressing: Shall be organic mulch free from deleterious materials, debris and suitable for top dressing of trees, shrubs or plants. Mulch shall be the product of standard stripping of bark from pine, oak, or hardwood for fiber or pulp manufacturing with dark brown in color. Bark shall be shredded in a manner where large pieces are at a minimum.
- B. Compost Mulch: Enriched bark mulch for bed prep shall be as above with additional organic of peat and/or manure.

## **2.7 PIPE FOR WATERING TUBE**

- A. Shall be perforated Polyvinyl Chloride pipe, Type (SDR 35), gray in color.

## **2.8 PLANTING MIX**

- A. See Section 32 9113 Planting Media.

## **2.9 FERTILIZER**

- A. Post planting fertilization for shrubs and groundcover.
  - 1. Fertilizer should be 100% organic such as Microlife or approved equal. Application should be applied per manufacturer's recommendation rate.

## **2.10 STEEL EDGING**

- A. Typical steel edging shall be 3/16" thickness by 4" height with 2.6 lbs/ft. unless indicated in the drawings.
- B. Contract shall submit product data for approval prior to installation.

## **2.11 GEOTEXTILE FABRIC**

- A. Typar #3401 termally spunbonded polypropylene, non woven, weed control fabric, 4.0 oz / lineal yard weight by American Excelsior or approved equal. Needle punched material is not acceptable.
- B. Contract is required to submit samples and product data for approval prior to installation.

## **3.1 EXECUTION**

### **3.2 LAYOUT AND EXCAVATION OF PLANTING AREAS**

- A. Layout plants in locations shown on drawings. Use wire stakes color-coded for each species of plant material. Stake location of each tree and major shrub and outline of shrub and groundcover beds.
- B. The landscape architect will check location of plants in the field and shall adjust to exact position before planting begins.
- C. If underground obstructions are encountered notify the landscape architect as to whether an adjustment or change of location is possible within the design intent. If the contractor is allowed to adjust or change location, rather than remove the obstruction, he shall make the change at no expense to the owner. Backfill and tamp abandoned pits have obstructions which cannot be removed. See contract drawings for further information.

### **3.3 EXCAVATION TO SUBGRADE FOR PLANTING AREA AND VERIFICATION OF FINISHED GRADE**

- A. Excavate all planting areas (pit and beds) to required depth as hereinafter specified and stockpile enough material to prepare planting mix for all plants. Remove excess material from site.
- B. Verify that required grades are within two (2") inches of required subgrade provided under a separate contract, and excavate further as may be required.
- C. Subsoil shall not be worked when moisture content is so great that excessive compaction will occur, nor when it is so dry that clods will not break readily. Water shall be applied, if necessary, to bring soil to an optimum moisture content before tilling and planting.

- D. Do not excavate tree pits more than 24 hours in advance of planting operation. Excavate container grown tree pits to the following dimensions:

<u>Excavation for</u>	<u>Width</u>	<u>Depth</u>
Boxed trees	Box + 24 in.	Ball + 6 in.
Container grown trees	Cont. + 18 in.	Ball + 6 in.
B&B trees	Ball + 12 in.	Ball + 6 in.
Container grown shrubs	Cont. + 12 in.	Ball + 4 in.

1. Excavation for trees pits in areas of select fill (crushed and compacted limestone or similar) shall be twice as wide and twice as deep as given root ball. Fill bottom four inches of tree pit with gravel and cover with soil separator before backfilling pit.

- E. Excavate shrub and ground cover beds to the following depths:

<u>Excavation for</u>	<u>Width</u>	<u>Depth</u>
Shrubs & Groundcover	Entire Bed Entire Bed	Cont. + 4 in., not to be less than Cont. +4 in., not less than 8 in

- F. Rip or cultivates subgrade in pits and beds to a depth of three (3") inches minimum.

### 3.4 DRAINAGE, DETRIMENTAL SOILS AND OBSTRUCTIONS

- A. Test drainage of plant beds and pits by filling with water twice in succession. Conditions permitting the retention of water in planting beds for more than twenty-four (24) hours or percolation of less than one (1") inch per hour shall be brought to the attention of the Landscape Architect.
- B. Notify the landscape architect of all soil or drainage conditions contractor considers detrimental to growth of plant material. (State condition and submit proposal and cost estimate for correcting condition.)
- C. If rock, hardpan, underground construction work, tree roots or other obstructions are encountered in the excavation of plant pits and beds, alternate locations may be selected by landscape architect. Where locations cannot be changed, submit cost required to remove the obstructions to a depth of not less than six (6") inches below the required pit or bed depth. Proceed with work after approval.

### 3.5 PREPARING PLANT MATERIALS FOR PLANTING

- A. Container grown stock shall be removed carefully and handled only by the root ball. Do not lift or handle container plants by tops, stems, or trunks at any time.
- B. Do not bind or handle any plant with wire or rope at any time so as to damage bark or break branches. Lift and handle plants only from bottom of ball.
- C. Balled and burlap (B&B) plants shall have firm balls of earth. Plants moved with a ball will not be accepted if the ball is cracked or broken before or during planting operations. B&B material shall be dug only when dormant. Pre-dug stored B&B material shall be inspected and approved at the storage site.

### 3.6 INSTLLATION OF PIT PLANTED MATERIALS

- A. Do not commence any planting until the irrigation system is completely automated or can be operated manually.
- B. Fill plant pits with soil mix to compact depth to receive plant root ball, so top of root ball is two (2") inches above finished grade.

- C. Install PVC watering tubes in tree pits, vertically, at edge of pit as shown.
- D. Scarify the walls and bottom of all plant pits immediately prior to the placement of plant and backfill mix. The Contractor shall remove all glazing caused by an auger or mechanical hole digger.
- E. For boxed & container grown material, break vertical bands and remove top and bottom of container. Carefully lower plant into pit with backhoe or approved method and adjust elevation. Cut horizontal banks and remove sides. Prune away girdled roots and tease root hair masses. Carefully fill pit and compact by watering in to support root ball.
- F. Place B&B plants carefully in the prepared planting pit. Do not disturb root ball or untie twine or roping until backfill settlement is complete and tree is staked, if applicable. Fill planting pit by flooding each eight (8") inches of backfill for balls greater than 24" diameter. Wrap trunks with double layer of tree wrap.
- G. Smooth planted areas to conform to specified grades after full settlement has occurred. Contractor shall bear final responsibility for proper surface drainage of planted areas. Any discrepancy in the drawings or specifications, obstructions on the site, or prior work done by another party, which contractor feels precludes establishing proper drainage, shall be brought to the attention of the landscape architect in writing.
- H. Mulch circles shall not exceed width of root mass by more than 4". Mulch circles shall meet lawn or bed grades evenly and smoothly.
- I. Water all plants immediately again after planting.
- J. Apply pre-emergent weed control material in areas to receive mulch.
- K. Spread mulch in required areas to the compacted depth of two (3") inches.

### **3.7 INSTALLATION OF BED PLANTED MATERIALS**

- A. Install steel edging where shown. Anchor with steel stakes spaced not more than three (3') feet O.C. or as per often as necessary to have smooth radius or straight tangent. Drive stake to one (1") inch below top of edging.
- B. Fill all shrub and groundcover beds with plant bed mix to finished grade (compacted) plus two (2") inches minimum.
- C. Excavate in planting mix for individual plant and install as required. Set plant plumb and brace rigidly in position until planting soil mix has been tamped solidly around the ball and roots.
- D. When plant pits have been backfilled approximately two-thirds (2/3) full, fertilizer per manufacturer's recommendations at the maximum rate.
- E. Water plant thoroughly, saturating root ball, before installing remainder of the planting soil to top of pit, eliminating all air pockets. Top of root ball shall be two (2") inches above finished grade.
- F. Smooth planting areas to conform to specified grade after full settlement has occurred. Contractor shall bear final responsibility for proper surface drainage of planting areas.
- G. Water all plants immediately again after planting.
- H. Apply pre-emergent weed control material over entire area to receive mulch.
- I. Mulch all shrub and groundcover beds to three (3") thick.



**3.8 SURFACE DRAINAGE OF PLANTING AREAS**

- A. Contractor shall bear final responsibility for proper surface drainage of planted areas. Any discrepancy in the drawings or specifications, obstructions on the site, or prior work done by another party, which contractor feels precludes establishing proper drainage, shall be brought to the attention of the landscape architect in writing.

**3.9 POST PLANTING FERTILIZATION**

- A. Tree Planting
  - 1. Apply organic fertilizer 30 - 45 days after installation.
  - 2. Inject material specified in Section 2 with a high pressure injector into soil at depth and diameter shown below.

Tree Caliper	Application Points	Radius	Depth	Application Rate Per Tree
Under 2"	3	4" - 6"	16" - 18"	1-1/2
2" - 4"	3	4" - 6"	18" - 24"	2
4" - 5"	4	4" - 6"	2' - 3'	2-1/2
5" - 6"	5	4" - 6"	3' - 4'	3
Above 6"	3' O.C.	4" - 6"		5 gal./100 sf Root Area (Drip Line)

- B. Shrub Beds
  - 1. Apply one application of organic fertilizer for all beds within 30 to 45 days of planting. Application rate per manufacturer's recommendation.

**3.10 PRUNING**

- A. Prune containerized plants only at time of planting and according to standard horticultural practice to preserve the natural character of the plant. Prune by removing entangled branching and by removing crotches. Avoid removing branch tips wherever possible. Pruning shall be done under supervision of the landscape architect.
- B. Remove all dead wood, suckers, and broken or badly bruised branches. Use only clean, sharp tools.
- C. Prune lower branching from trees to a height of 18" above ground per 1 1/4" caliper.
- D. Prune B&B material in addition to place of growth as may be directed by landscape architect by removing a percentage of interior branching proportional to the root loss during digging (up to 1/3).

**3.11 STAKING**

- A. The Contractor, will be responsible for material remaining plumb and straight for all given conditions through the guarantee period. Tree support shall be done as outlined on the following tables and as illustrated on the details.
- B. Trees should be staked during the same day as planting. Plants shall stand plumb after staking.

- C. Stake all trees under 3 inches caliper in accordance with the following table:

<u>Tree Caliper</u>	<u>Stakes</u>	<u>Length</u>	<u>Stake Size</u>
To 1-3/4 in.	2	8'	Lodge/pole (2" dia)
2 in. to 3 in.	2	8'	Lodge/pole (2" dia)

### 3.12 GUYING

- A. Guying shall be completed immediately after planting in accordance with the following table. Where manufactured product is specified, install per manufacturer's instructions. Plants shall stand plumb after guying.
- B. Guy trees at points of branching with guys spaced equally around and outside perimeter of ball. Wrap rubber tire straps at points of contact with bark positioned at crotches and fasten to a deadman with specified cable with double crimp clamp. One turnbuckle shall be provided for each guy.

<u>Tree Caliper at 12" Above Grade</u>	<u>No. Guys</u>	<u>Cable Size</u>	<u>Deadmen</u>
3-1/4" to 4-1/2"	3	1/8" Dia. 7 x 7 Galvanized Steel Cable	Duck Bill Earth Anchor Model 68 DTS Kit
4-3/4" to 6"	3	1/8" Dia. 7 x 7 Galvanized Steel Cable	Duck Bill System Model 68 DTS Kit
6-1/4" to 8"	3	3/16" Dia.	Duck Bill System Model 88 DTS Kit

### 3.13 MAINTENANCE BY THE CONTRACTOR

- A. The contractor shall begin maintenance after each plant is installed and continue until final acceptance.
- B. The contractor's maintenance period shall begin upon inspection and approval at Substantial Completion and shall be for 90 days or to be determined by owner.
- C. The contractor's maintenance of new planting shall consist of watering, cultivating, weeding, mulching, re-staking, tightening and repair of guys, resetting plants to proper grades or upright position, and furnishing and applying such pesticide sprays and invigorates as are necessary to keep the plantings free of insects and disease and in thriving condition.
- D. Protect planting areas and plants at all times against damage of all kinds for duration of maintenance period. Maintenance includes temporary protection barriers and signs as required for protection. If any plants become damaged or injured, because sufficient protection was not provided, treat or replace as directed by landscape architect at no additional cost to the owner.

### 3.14 FINAL ACCEPTANCE

- A. Work under this section will be accepted by landscape architect upon satisfactory completion of all work, including maintenance, but exclusive of replacement of plant materials under the warranty period. Upon termination of maintenance period, the owner will assume responsibility for maintenance of the work.

### **3.15 WARRANTY**

- A. Planting shall be warranted by the contractor to remain alive and healthy for a period of 12 months after the date of Substantial Completion. Plants in an impaired, dead or dying condition after initial acceptance or within 12 months shall be removed and replaced. New planting and method of placing shall comply with the requirements of the specifications. Plants replacing those removed during the guarantee period shall also be guaranteed to remain alive and healthy for an additional 12 months after installation and acceptance.
- B. Contractor shall not be held responsible for failure due to neglect by owner or property manager, vandalism, acts of god, during warranty Period. Report such conditions to the landscape architect or owner's representative in writing when discovered.
- C. Contractor shall indicate during Pre-Bid regarding warranty status of plant material in the case of no irrigation system provided in the project.
- D. Submit a letter of warranty containing the following information:
  - 1. "We hereby guarantee that the landscape planting we have furnished and installed is free from disease and in good condition, and the work has been completed in accordance with the drawings and specifications, ordinary wear and tear and unusual abuse, or neglect excepted.

We agree to repair or replace any defects in material or workmanship which may develop during the period of one (1) year from acceptance, and also to repair or replace any damage resulting from the repairing or replacing of such defects, at no additional cost to the owner. We shall make such repairs or replacements within a reasonable time, as determined by the owner, after receipt of written notice.

In the event of our failure to make such repairs or replacements within a reasonable time after receipt of written notice from the owner by certified mail, we authorize the owner to proceed to have said repairs or replacements made at our expense, and we will pay the costs and charges therefore, upon demand."

### **3.16 CLEAN UP**

- A. Clean up all areas as required for complete and acceptable inspection.
- B. It is Contractor's responsibilities to replace or restore any damaged or disturbed areas during planting operation back to its original condition.

### **3.17 INSPECTIONS**

- A. Submit requests for inspections to the landscape architect at least five (5) days prior to anticipated inspection date.
- B. It is Contractor's responsibilities to replace or restore any damaged or disturbed areas during planting operation back to its original condition.

**END OF SECTION**

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**SECTION 33 11 16**

**SITE WATER UTILITY DISTRIBUTION PIPING**

CONDITIONS OF THE CONTRACT, AND DIVISION 00 and 01, APPLY TO THIS SECTION.

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the contract, including general and supplementary conditions and other Divisions 1 Specification Sections, apply to this section.

**1.2 SUMMARY**

- A. Summary: Section includes water service piping and appurtenances from the source of potable water to a point 5 feet outside the building.
- B. Submittals: Submit Record Documents locating actual horizontal and vertical location of installed water service piping, valves, and related work in accordance with requirements of Division 1.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. PVC Pipe 4 Inches and Larger: AWWA C 900, Class 150; with bell end and elastomeric seal gasket, with plain end for cast iron or ductile iron fittings, or with plain end for PVC elastomeric gasket fittings. Provide gaskets complying with ASTM F 477. Provide PVC couplings and fittings complying with AWWA C 900, with ASTM F 477 elastomer seal gaskets.
- B. PVC Pipe 4 Inches and Smaller: ASTM D 1785 or ASTM D 2241, Class 200, SDR-21. Provide PVC Schedule 40 socket type, solvent cement joint (ASTM D 2564); or elastomeric gasket joint (ASTM F 477). Provide PVC couplings and fittings complying with ASTM D 2466, Schedule 40, with a working pressure not less than the working pressure of the pipe(s) being joined.
- C. Cast Iron Pressure Pipe and Ductile Cast Iron Pipe 4 Inches and Larger: ANSI/AWWA C 106 (A 21.6) or ANSI/AWWA C 151 (A 21.51), with fittings complying with AWWA C 110 and rubber gaskets complying with AWWA C 111; cast-iron fittings, ASTM A 126. Furnish Pressure Class 150, with standard outside coating and cement mortar lined to AWWA C 104 Standard, for Laying Condition F, with 5' tamped backfill cover.
1. For water line construction within 9' of any existing or proposed sanitary sewer and all water services, wrap pipe and fittings with 8 mil polyethylene per AWWA C 105.
- D. Soft Copper Water Tube 2 inches and smaller (Right-Of-Way Piping Only): ASTM B 88, Type K, seamless, annealed temper with wrought copper fittings complying with ANSI B16.22, solder type, with tin alloy (95-5, Sb5 or HA-B) solder complying with ASTM B 32.
- E. Tapping Sleeves: Gray iron or ductile iron pipe conforming to ASTM A 377 (ANSI A 21.51) with mechanical joints or leaded joint ends, split sleeve type, flanged outlet with machined recess and drilled for Class 125, ANSI B 16.1.

- 1 F. Control Valves:
- 2 1. Tapping Valves: AWWA Standard C 500; standard NRS bronze double disc type
- 3 water works valves, 2" square operating nut - clockwise to open; inlet - Class 125
- 4 flange with machined projection; outlet - standard push-on or mechanical joint hubs,
- 5 with a minimum working pressure of 175 psi.
- 6
- 7 2. Line Valves: AWWA Standard C 500; standard NRS bronze double disc type; 2"
- 8 square operating nut - clockwise to open; push-on or mechanical joint hubs.
- 9
- 10 3. Valves for Meter Installation: AWWA C 500; standard NRS bronze double disc
- 11 type with hand wheel - counter clockwise to open, clockwise to close; Class 125
- 12 flanges.
- 13
- 14 G. Water Meter: AWWA C 701, turbine type for standard service and conforming to the City of
- 15 Houston Department of Public Works, Water Division specifications.
- 16 H. Water Meter Vault: Cast-in-place concrete conforming to requirements of authorities having
- 17 jurisdiction City of Houston, Department of Public Works, Water Division Standard 110 and
- 18 111 or solid masonry wall vault conforming to Water Division Standard 110 and 111. Provide
- 19 complete, including all appurtenances. Provide water meter vault cover fabricated and
- 20 installed in accordance with Water Division Standard 112 and 113, respectively.
- 21 I. Water Meter Boxes: Precast concrete conforming to City of Houston, Department of Public
- 22 Works, Water Division standards with cast iron cover and frame equivalent to Tyler Pipe
- 23 Figure 6150 or Oldcastle Precast, Inc. No. 36 body with No. 36-HT C. I. Cover with hinged
- 24 lid.
- 25 J. Control Valve Boxes: Concrete with cast iron cover and frame with lock equivalent to Tyler
- 26 Pipe Fig. 6150 or Oldcastle Precast, Inc. No. 36 body with No. 36-HT C. I. Cover with hinged
- 27 lid.
- 28 K. Backflow Preventers: Provide Watts Model 9D backflow preventer complete with galvanized
- 29 iron water pipe vent and fittings wrapped with Protecto Wrap Co. "Thru Wall Flashing"
- 30 flashing tape, W. R. Grace "Perm-A-Barrier", Polyguard Products "Polyguard 650", MFM
- 31 Building Products "Sub Seal 40", or equivalent accepted by Architect, to 6" above grade.
- 32

33 **PART 3 – EXECUTION**

34 **3.1 INSTALLATION**

- 36 A. Install, clean, test and disinfect water distribution systems and parts of existing systems that
- 37 have been altered, extended, or repaired in accordance with requirements of the City of
- 38 Houston "Specifications for New Water Taps and Service Line Installations, Large Meters
- 39 and Unmetered Sprinkler Connections to City Water Mains" with revisions in effect as of the
- 40 date of Owner - Contractor agreement.
- 41 B. Provide bedding and backfill constructed in accordance with Section 31 23 00 - Earthwork.
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44 **END OF SECTION**

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**SECTION 33 12 19**

**WATER UTILITY DISTRIBUTION FIRE PROTECTION**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the contract, including general and supplementary conditions and other Divisions 1 Specification Sections, apply to this section.

**1.2 SUMMARY**

- A. Section includes private fire protection service mains and appurtenances from the source of water to a point 5 feet outside the building.

**PART 2 – PRODUCTS**

**2.1 MATERIAL**

- A. Pipe and Fittings: Ductile iron pipe (AWWA C151), 4" and larger; elastomeric gaskets (AWWA C111), and ductile iron fittings (AWWA C110).
- B. PVC Pipe 4 Inches and Larger: AWWA C 900, Class 150; with bell end and elastomeric seal gasket, with plain end for cast iron fittings. Provide gaskets complying with ASTM F 477.
- C. Cast Iron Fittings for Pipe 4 Inches and Larger: AWWA C 111; cast-iron fittings, Pressure Class 150, with standard outside coating and cement mortar lined to AWWA C 104 Standard.
- D. Tapping Sleeve and Valve: Complete assembly, including tapping sleeve, tapping valve, and bolts and nuts. Use service clamp and stop compatible with drilling machine and outlet matching service piping.
- E. Line Valves: AWWA Standard C 500; standard NRS bronze double disc type; 2" square operating nut - clockwise to open; push-on or mechanical joint hubs.
- F. OS & Y Valve: Fire Marshall approved, AWWA C500, cast iron double disc, bronze disc and ring seats, cast iron or ductile iron body and bonnet, OS & Y, clockwise to close, bronze stem, 200 psi working pressure, and Class 125 flanges.
- G. Swing Type Check Valves: Fire Marshall approved, size as indicated and produced by Grinnell Corp., Mueller Co., Hersey Products Div.; or Watts Industries, Inc., Water Products Div.; or Zurn Industries, Inc., Wilkins Div.
- H. Post Indicator Valve: Fire Marshall approved, complying with UL 789 and produced by American Cast Iron Pipe Co., American Flow Control Div.; or Grinnell Corp., Mueller Co., Water Products Div.; or Nibco, Inc.; or United States Pipe & Foundry Co.
- I. Fire Department Connection: Fire Marshall approved and produced by Elkhart Brass Manufacturing Co., Inc.; or Grinnell Corp., Grinnell Supply Sales Co.; or Guardian Fire Equipment, Inc.; or Smith Industries, Inc., Potter-Roemer Div.
- J. Valve Box: Cast-in-place concrete or precast concrete conforming to City of Houston, Department of Public Works, Water Division Standard 110 and 111 or solid masonry wall vault conforming to Water Division Standard 110 and 111. Provide complete, including all appurtenances. Provide water meter vault cover with the word "Water" cast

1 or permanently formed on lid, fabricated and installed in accordance with Water Division  
2 Standard 112 and 113, respectively.

3 K. Freestanding Fire Hydrants: Mueller Co., Water Products Div. (or approved equivalent)  
4 A24015 three way, 5-1/4" valve opening, dry-barrel fire hydrants (base valve type)  
5 complying with AWWA C 502, Article 3.1 of the City of Houston, Public Work  
6 Department, "Specifications for Water Main Construction", and as follows:

- 7 1. Working Pressure: 150 psi.
- 8 2. Valve Opening Direction: Counterclockwise, indicated by arrow and the word  
9 "Open" cast on dome.
- 10 3. Male Nozzles: Two 2-1/2" hose connections and one 4-1/2" pumper connection  
11 with caps and chains threaded to conform to American National Standard Fire  
12 Hose Connection Screw Threads. Provide nozzle cap nuts to match operating  
13 stem nuts and be securely attached to barrel with minimum 1/8" chain.
- 14 4. Operating Stem Nuts: Non-rising, 1-1/2" (point to opposite flat) pentagon (5-  
15 sided) by 1-1/4" deep.

16 L. Valves for Meter Installation: AWWA C 500; standard NRS bronze double disc type  
17 with hand wheel - counterclockwise to open, clockwise to close; Class 125 flanges.

18 M. Water Meter: AWWA C 701, turbine type for fire service and conforming to the City of  
19 Houston Department of Public Works, Water Division specifications.

20 N. Water Meter Vault: conforming to City of Houston, Department of Public Works, Water  
21 Division Standards. Provide complete, including all appurtenances. Provide water meter  
22 vault cover fabricated and installed in accordance with City of Houston Requirements.  
23  
24

25  
26 **PART 3 – EXECUTION**

27  
28 **3.1 INSTALLATION**

- 29 A. Install, clean, test and disinfect fire protection service distribution systems and parts of existing  
30 systems that have been altered, extended, or repaired in accordance with requirements of  
31 authorities having jurisdiction.
- 32 B. Provide bedding and backfill constructed in accordance with Section 31 23 00 - Earthwork.  
33  
34

35 **END OF SECTION**





1 slope with spigot end entered fully into adjacent bell. Seal joint in accordance with local  
2 authorities having jurisdiction.

3 C. Provide bedding and backfill constructed in accordance with Section 31 23 00- Earthwork.

4 D. Testing Lines: Inspect and test lines before backfilling to assure free flow without displacement or  
5 other damage. Remove obstructions, replace damaged components, and re-inspect system until  
6 satisfactory. Plug ends of completed pipe and conduct low pressure (4 psig) air test in accordance  
7 with ASTM C 924.

8  
9

10

**END OF SECTION**