REQUEST FOR COMPETITIVE SEALED PROPOSALS FOR

PARKING EXPANSION FOR DUNBAR EARLY EDUCATION CENTER (CSP 26-25.12-DEC-13)

FOR

TEXARKANA TEXAS INDEPENDENT SCHOOL DISTRICT

PROPOSAL RESPONSES DUE BY 1:30 PM,
TUESDAY, DECEMBER 2, 2025
4241 SUMMERHILL ROAD, TEXARKNA, TEXAS

NOVEMEBER 2025

MTG ENGINEERS & SURVEYORS
5930 Summerhill Road 903.838.8533 telephone
Texarkana, TX 75503 903.832.4700 facsimile
TBPE No. 354

11/14/2025

MTG PROJECT NO. 256071 **SET NO. _____**

CONTRACT DOCUMENTS AND SPECIFICATIONS

PARKING EXPANSION FOR
DUNBAR EARLY EDUCATION CENTER
(CSP 26-25.12-DEC-13)

TEXARKANA INDEPENDENT SCHOOL DISTRICT

INDEX OF DOCUMENTS

Index of Plan Sheets

Supplemental Documents

Geotechnical Investigation Report (ETTL Job No. G 6046-226)

Texarkana Independent School District
Request for Competitive Sealed Proposals Selection Criteria and Questions

The Texarkana Independent School District is requesting competitive sealed proposals. The following criteria will be used in determining the vendor to award the contract to:

- **a.** the purchase price; **50 points**
- **b.** the reputation of the vendor and of the vendor's goods or services and quality of the vendor's goods or services; **25 points**
- **c.** the vendor's past relationship with the district; **2 points**
- **d.** the impact on the ability of the district to comply with laws and rules relating to historically underutilized businesses; **1 point**
- **e.** Proposed Personnel; **8 points**
- **f.** Financial Capability; **8 points**
- **g.** Safety Record; **6 points**

Total possible points **100**.

Vendors should submit their sealed proposal to the Texarkana Independent School District by the proposal opening deadline:

Texarkana Independent School District
Attn: Purchasing Department – Dunbar Parking
4241 Summerhill Road
Texarkana, TX 75503

1) List past relationship with the District up to prior fifteen years.
2) Provide (no more than one page per project front/back) the last three projects in similar size/scope you have completed most recently and describe the quality of these projects. Photos may be submitted. Please provide reference contact information of owner for each project.
3) Provide a list of proposed key personnel along with their experience, education, and special qualifications. Include key personnel of proposed subcontractors in this list also.
4) State your financial capability to perform this project. Please list any bankruptcy filings your company has had in the last 5 years, provide most recent financial statement, and provide any proposed financing you have arranged for this project.
5) List your current workman's compensation experience modifier rate. List safety record for last 5 years. List any current or proposed litigation or inquiry against your company involving worker safety. Describe your safety plan for this project (no more than one page).
6) Is your company a registered HUB vendor with the State of Texas? If so, please provide your certificate.

Any reference to brand name is descriptive, not restrictive, similar products will be considered. If proposing a different product than what is specified it must be noted in writing and detailed specifications must be provided with proposal response.

The construction contract enclosed will be very similar to the one that will be executed with the awarded vendor. You do not need to fill out that form and return it at this time, but need to review for expected requirements.

TISD reserves the right to accept or reject any or all proposals, the right to waive technicalities, the right to award the contract in the best interest of the District. All rights reserved.

Project estimate is $330,000.00

Texarkana Independent School District
Certificate of Interested Parties – Form 1295

The District is required to comply with House Bill 1295, which amended the Texas Government Code by adding Section 2252.908, Disclosure of Interested Parties. Section 2252.908 prohibits the District from entering into a contract resulting from this RFP with a business entity unless the business entity submits a Disclosure of Interested Parties – Form 1295 to the District at the time the business entity submits the signed contract. The Texas Ethics Commission has adopted rules requiring the business entity to file Form 1295 electronically with the Texas Ethics Commission.

All vendors *(except a publicly traded business)* must electronically complete, print, sign and submit Form 1295 with their proposals or contracts even if no interested parties exist.

Instructions to Vendors:

1. Go to the Texas Ethics Commission Website https://www.ethics.state.tx.us/filinginfo/1295/ ,
2. Register and complete Form 1295 online - include the proposal number and the contract/RFP name,
3. Print a copy of the submitted Form 1295 and sign it - it will have a certification # in the top right corner,
4. Include a copy of the completed signed Form 1295 with the proposal response.

Resources:

Form 1295 Frequently Asked Questions:

- https://www.ethics.state.tx.us/resources/FAQs/FAQ_Form1295.php

Instructional Video – First Time Business User:

- https://www.ethics.state.tx.us/filinginfo/videos/Form1295/FirstLogin-Business/Form1295Login-Business.html

Instructional Video – How to Create a Certificate:

- https://www.ethics.state.tx.us/filinginfo/videos/Form1295/CreateCertificate/CreateCertificate.html

Texarkana Independent School District
Administration

TO: ALL CURRENT AND PROSPECTIVE VENDORS

FROM: David DeFoy, Director of Purchasing and Special Events

SUBJECT: FORM CIQ: CONFLICT OF INTEREST QUESTIONNAIRE

DATE: November 17, 2025

Pursuant to the State of Texas House Bill 914, attached is form CIQ: Conflict of Interest Questionnaire. Please read, fill out, and return with original signatures the form CIQ to the TISD Purchasing Department at the address below. If you already have a questionnaire on file and no information has changed, you do not need to file this form again. Officers of the District which could apply to this questionnaire include but are not limited to:

Board of Trustees:

Bryan DePriest
Wanda Boyette
Ronald Ruffin
Bill Kimbro
Paul Miller
Amy Bowers

Administration:

Doug Brubaker, Superintendent of Schools
Sherri Penix, Deputy Superintendent
Todd Marshall, Chief Operating Officer
Anita Clay, Chief Financial Officer
David DeFoy, Director of Purchasing and Special Events
A more comprehensive list of TISD administrators may be viewed online at www.txkisd.net.

Please be sure to include the person doing business with TISD or the vendor name in box #1 of the form.

If you have any questions, please contact the Purchasing Department. You may also refer to the Texas Attorney General Opinion GA-0446 which can be viewed at the Texas Attorney General's website:
https://www.texasattorneygeneral.gov/opinions/greg-abbott/ga-0446

4241 Summerhill Road Texarkana ISD, Texas 75503 903.794.3651 Fax: 903.792.2632

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor doing business with local governmental entity

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 knowingly violates Section 176.006, Local Government Code. 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 questionnaire.** (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

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

_____

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.**

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.**

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 of vendor doing business with the governmental entity Date

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.

Texarkana Independent School District

FELONY CONVICTION NOTICE FORM

Statutory citation covering notification of criminal history of contractor is found in the Texas Education Code §44.034.

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".

THIS NOTICE IS NOT REQUIRED OF A PUBLICLY-HELD CORPORATION

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

VENDOR'S NAME: _____

AUTHORIZED COMPANY OFFICIAL'S NAME: _____

A. My firm is a publicly-held corporation, therefore, this reporting requirement is not applicable.

Signature of Company Official: _____

B. My firm is not owned nor operated by anyone who has been convicted of a felony.

Signature of Company Official: _____

C. My firm is owned or operated by the following individual(s) who has/have been convicted of a felony.

Name of Felon(s): _____
(attach additional sheet if necessary)

Details of Conviction(s): _____
(attach additional sheet if necessary)

Signature of Company Official: _____

(Please return form with RFP/CSP response or vendor application.)

TEXAS CERTIFICATIONS ADDENDUM FOR ALL TEXARKANA INDEPENDENT SCHOOL DISTRICT PROCUREMENT CONTRACTS

The following certifications and provisions are required and apply when Texarkana Independent School District ("TISD") expends state and local funds for any contract resulting from this procurement process. Accordingly, the parties agree that the following terms and conditions apply to the Contract between the District and ("Vendor") in all situations where Vendor has been paid or will be paid with State and Local funds:

Certification of Compliance with Texas Family Code

Pursuant to Texas Family Code, Section 231.006, a child support obligor who is more than thirty (30) days delinquent in paying child support or a business entity in which the child support obligor is a sole proprietor, partner, shareholder, or owner with an ownership interest of at least twenty-five percent (25%) is not eligible to receive payments from State funds under a contract to provide property, materials, or services until all arrearages have been paid; the obligor is in compliance with a written repayment agreement or court order as to the existing delinquency; or a court of continuing jurisdiction over the child support order has granted the obligor an exemption as part of a court-supervised effort to improve earnings and child support payments. The undersigned proposer certifies that he or she, as the proposing individual, or the proposing business entity named in this contract, bid or application, is not ineligible under Section 231.006 of the Texas Family Code, to receive the specified grant, loan or payment, and acknowledges that a contract resulting from this solicitation may be terminated and payment may be withheld if the certification provided herein is found to be inaccurate. NOTE: Owners not owning at least twenty-five percent (25%) of the business entity submitting this proposal need not execute this certification and acknowledgement.

Does Vendor agree to? YES_____Initials of Authorized Representative of Vendor

CERTIFICATION OF HOUSE BILL 89, SECTION 2270.001 TEXAS GOVERNMENT CODE

Vendor agrees that, under the provisions of Subtitle F, Title 10, Government Code Chapter 2270:

Vendor does not boycott Israel currently; and Will not boycott Israel during the term of the contract.

"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

"Company" means a for-profit sole proprietorship, 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.

Does Vendor agree? YES_____Initials of Authorized Representative of Vendor

CERTIFICATION OF SENATE BILL 252, SECTION 2252 TEXAS GOVERNMENT CODE

Vendor agrees that, under the provisions of Subtitle F, Title 10, Government Code Chapter 2270:

Vendor does not engage in business with Iran, Sudan, or foreign terrorist organizations and will not during the term of the contract.

Does Vendor agree? YES_____Initials of Authorized Representative of Vendor

CERTIFICATION OF SENATE BILL 13, SECTIONS 809 and 2274 TEXAS GOVERNMENT CODE

Prohibition of Boycott Energy Companies. In accordance with Texas Government Code Chapter 2274, Professional (Contractor) verifies that it does not Boycott Energy Companies and agrees that during the term of this Agreement will not Boycott Energy Companies as that term is defined in Texas Government Code Section 809.001, as amended. This section does not apply if Professional (or Contractor) is a sole proprietor, a nonprofit entity, or a governmental entity; and only applies if: (i) Professional (or Contractor) has ten (10) or more fulltime employees and (ii) this Agreement has a value of $100,000.00 or more to be paid under the terms of this Agreement.

Does Vendor agree? YES_____Initials of Authorized Representative of Vendor

CERTIFICATION OF SENATE BILL 19, SECTION 2274 TEXAS GOVERNMENT CODE

In accordance with Texas Government Code Chapter 2274, Professional (Contractor) verifies that it does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association; and (ii) will not discriminate during the term of the contract against a firearm entity or firearm trade association. This section only applies if: (i) Professional (or Contractor) has ten (10) or more fulltime employees and (ii) this Agreement has a value of $100,000.00 or more to be paid under the terms of this Agreement; and does not apply: (i) if Professional (or Contractor) is a sole proprietor, a non-profit entity, or a governmental entity; (ii) to a contract with a sole-source provider; or (iii) to a contract for which none of the bids from a company were able to provide the required certification.

Does Vendor agree? YES_____Initials of Authorized Representative of Vendor

CERTIFICATION OF SENATE BILL 2116, SECTIONS 2274 and 113 TEXAS GOVERNMENT CODE

PROHIBITION ON AGREEMENTS WITH CERTAIN FOREIGN-OWNED COMPANIES IN CONNECTION WITH CRITICAL INFRASTRUCTURE PROHIBITED CONTRACTS: (a) Company verifies that it will not enter into a contract or other agreement relating to critical infrastructure in this state with the District : (1) if, under the contract or other agreement, the company would be granted direct or remote access to or control of critical infrastructure in this state, excluding access specifically allowed by the governmental entity for product warranty and support purposes; and (2) if the governmental entity knows that the company is (A) owned by or the majority of stock or other ownership interest of the company is held or controlled by: (i) individuals who are citizens of China, Iran, North Korea, Russia, or a designated country; or (ii) a company or other entity, including a governmental entity, that is owned or controlled by citizens of or is directly controlled by the government of China, Iran, North Korea, Russia, or a designated country; or (B) headquartered in China, Iran, North Korea, Russia, or a designated country. (b) The prohibition described by Subsection (a) applies regardless of whether: (1) the company's or its parent company's securities are publicly traded; or (2) the company or its parent company is listed on a public stock exchange as: (A) Chinese, Iranian, North Korean, or Russian company; or (B) a company of a designated country. DESIGNATION OF COUNTRY AS THREAT TO CRITICAL INFRASTRUCTURE. (a) The governor, after consultation with the public safety director of the Department of Public Safety, may designate a country as a threat to critical infrastructure for purposes of this chapter.

Does Vendor agree? YES_____Initials of Authorized Representative of Vendor

CERTIFICATION OF APPLICABILITY TO SUBCONTRACTRS

Vendor agrees that all contracts it awards pursuant to the Contract shall be bound by the foregoing terms and conditions.

Does Vendor agree? YES_____Initials of Authorized Representative of Vendor

CERTIFICATION OF TEC 22.0834 Criminal History Record Information Review of Certain Employees: Fingerprint Background Criminal History Information Checks

Vendors and all their employees that perform work and will have direct contact opportunities with Texarkana ISD students must undergo criminal history fingerprinting background checks and be approved by the District to be eligible to perform work at any District location. The District will be the final determiner of the definition of direct contact.

The vendor no longer has access to this required criminal history information to certify themselves so the approval must come from the District. Vendors must contact the District's Human Resources Department to obtain instructions on how to complete this process and the Vendor or its employees will be responsible for the cost of these background checks. The Local Education Entity (LEE) Fast Pass option will be required. The District has an IdentoGO service located in its facilities that utilizes this option.

This requirement will not apply to construction, alteration, or repair to an instructional facility if the contractor uses separate sanitary facilities, installs a barrier fence, and has a policy that employees may not interact with students or enter areas used by students.

Vendor acknowledges the above requirements and will ensure required applicable background checks will be completed and approved by the District before any on site work begins by them or their employees.

Does Vendor agree? YES_____Initials of Authorized Representative of Vendor

CERTIFICATION OF GOVERNMENT CODE 552.104(c)

A person, including a board, may not include a provision in a contract related to a parade, concert, or other entertainment event paid for in whole or in part with public funds that prohibits or would otherwise prevent the disclosure of information relating to the receipt or expenditure of public or other funds by a board for the event. A contract provision that violates Government Code 552.104(c) is void.

Vendor acknowledges the above requirements and will not enter into such a contract with the District.

Does Vendor agree? YES_____Initials of Authorized Representative of Vendor

CERTIFICATION OF GOVERNMENT CODE 2272.003(a)

A district may not enter into a taxpayer resource transaction with an abortion provider or an affiliate of an abortion provider. Gov't Code 2272.003(a)

"Taxpayer resource transaction" means a sale, purchase, lease, donation of money, goods, services, or real property, or any other transaction between a governmental entity and a private entity that provides to the private entity something of value derived from state or local tax revenue, regardless of whether the governmental entity receives something of value in return.

"Affiliate" means a person or entity who enters into with another person or entity a legal relationship created or governed by at least one written instrument, including a certificate of formation, a fran-chise agreement, standards of affiliation, bylaws, or a license, that demonstrates:

1. Common ownership, management, or control between the parties to the relationship;
2. A franchise granted by the person or entity to the affiliate; or
3. The granting or extension of a license or other agreement au-thorizing the affiliate to use the other person's or entity's brand name, trademark, service mark, or other registered identifica-tion mark.

Vendor agrees that it is not an abortion provider or affiliate of an abortion provider as stated above.

Does Vendor agree? YES_____Initials of Authorized Representative of Vendor

CERTIFICATION OF GOVERNMENT CODE 403.1067(A) Lobbying Restriction – Tobacco Education Grant Funds

A district receiving funds or grants from the Permanent Fund for Health and Tobacco Education and Enforcement may not use the funds to pay:

1. Lobbying expenses incurred by the district;
2. A person or entity that is required to register with the Texas Ethics Commission under Government Code Chapter 305 (Registration of Lobbyists);
3. Any partner, employee, employer, relative, contractor, consultant, or related entity of a person or entity described by item 2; or
4. A person or entity who has been hired to represent associations or other entities for the purpose of affecting the outcome of legislation, agency rules, ordinances, or other government policies.

Vendor agrees that it will not provide services listed above to the District with said funds.

Does Vendor agree? YES_____Initials of Authorized Representative of Vendor

VENDOR AGREES TO COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, RULES, REGULATIONS, AND ORDINANCES. IT IS FURTHER ACKNOWLEDGED THAT VENDOR CERTIFIES COMPLIANCE WITH ALL PROVISIONS, LAWS, ACTS, REGULATIONS, ETC. AS SPECIFICALLY NOTED ABOVE.

Vendor's Name: _____

Address, City, State, and Zip code: _____

Phone Number:_____ Fax Number: _____

Printed Name and Title of Authorized Representative: _____

Email Address: _____

Signature of Authorized Representative: _____

Date:_____

If part of an RFP/CSP/BID/RFQ, or other solicitation then return completed form with those documents, otherwise send to the Texarkana Independent School District Purchasing Department, 4241 Summerhill Road, Texarkana, Texas 75503, or email to Angel LeGrand, angel@txkisd.net or David DeFoy, david.defoy@txkisd.net . Questions may be directed to the above emails or by phone to 903.794.3651 ext. 1025 or 1028.

Form **W-9**
(Rev. March 2024)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Go to *www.irs.gov/FormW9* for instructions and the latest information.

Give form to the requester. Do not send to the IRS.

Before you begin. For guidance related to the purpose of Form W-9, see *Purpose of Form*, below.

Print or type. See ***Specific Instructions*** on page 3.

1 Name of entity/individual. An entry is required. (For a sole proprietor or disregarded entity, enter the owner's name on line 1, and enter the business/disregarded entity's name on line 2.)

2 Business name/disregarded entity name, if different from above.

3a Check the appropriate box for federal tax classification of the entity/individual whose name is entered on line 1. Check only **one** of the following seven boxes.

☐ Individual/sole proprietor ☐ C corporation ☐ S corporation ☐ Partnership ☐ Trust/estate

☐ LLC. Enter the tax classification (C = C corporation, S = S corporation, P = Partnership) . . . . .

Note: Check the "LLC" box above and, in the entry space, enter the appropriate code (C, S, or P) for the tax classification of the LLC, unless it is a disregarded entity. A disregarded entity should instead check the appropriate box for the tax classification of its owner.

☐ Other (see instructions)

3b If on line 3a you checked "Partnership" or "Trust/estate," or checked "LLC" and entered "P" as its tax classification, and you are providing this form to a partnership, trust, or estate in which you have an ownership interest, check this box if you have any foreign partners, owners, or beneficiaries. See instructions . . . . . ☐

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any)

Exemption from Foreign Account Tax Compliance Act (FATCA) reporting code (if any)

(Applies to accounts maintained outside the United States.)

5 Address (number, street, and apt. or suite no.). See instructions.

Requester's name and address (optional)

6 City, state, and ZIP code

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

Note: If the account is in more than one name, see the instructions for line 1. See also *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number

			–		–				

or

Employer identification number

		–							

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and, generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here	**Signature of U.S. person**	**Date**

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to *www.irs.gov/FormW9*.

What's New

Line 3a has been modified to clarify how a disregarded entity completes this line. An LLC that is a disregarded entity should check the appropriate box for the tax classification of its owner. Otherwise, it should check the "LLC" box and enter its appropriate tax classification.

New line 3b has been added to this form. A flow-through entity is required to complete this line to indicate that it has direct or indirect foreign partners, owners, or beneficiaries when it provides the Form W-9 to another flow-through entity in which it has an ownership interest. This change is intended to provide a flow-through entity with information regarding the status of its indirect foreign partners, owners, or beneficiaries, so that it can satisfy any applicable reporting requirements. For example, a partnership that has any indirect foreign partners may be required to complete Schedules K-2 and K-3. See the Partnership Instructions for Schedules K-2 and K-3 (Form 1065).

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS is giving you this form because they

Texarkana Independent School District
4241 Summerhill Rd.
Texarkana, TX 75501
(903) 764-3651

Texarkana Independent School District will allows payment by ACH direct deposit for vendor payments to increase efficiency and improve the quality of services. Payments by ACH shall be deposited directly into your bank account. Please complete the form below and return to the Business Office by mail addressed above or email to accounts.payable@txkisd.net.

Automated Clearing House Agreement (ACH)

(PAYMENT BY ACH)

Original Request: ☐	Change Request: ☐	Termination Request: ☐

Section 1- Vendor Information

Vendor Name:
Address:
City/State/Zip: Phone:
Last 4 digits of EIN or SSN (to verify vendor identification):
Email Address for Notification of Deposit (required):

Section 2 – Bank Account Information (contact bank ACH department for correct routing number)

Financial Institution Name:
Financial Institution Address:
Routing Number for ACH:
Depositor Account Number:
Type of Account: _____ Checking _____ Savings

Section 3 – Authorization

I authorize Texarkana Independent School District to credit my account with the depository named above. If the district should erroneously deposit funds into my account, upon notification by the district I will authorize the necessary debit entries to correct the error, not to exceed the amount deposited in error.
This authorization will remain in effect until the district has received written notification from me that it is to be terminated. A new authorization form must be completed if the above-name bank account is closed, or if vendor wished to designate a new bank account to receive funds. Failure to notify TISD of a closed account will cause a delay in receiving payments.
Signature **Date**:

Please return form to: TISD Business Office at business.office@txkisd.net
Or call 903-794-3651 ext 1022 with questions

CONSTRUCTION AGREEMENT

THIS CONSTRUCTION AGREEMENT is made by and between the Texarkana, Texas Independent School District ("TISD" or "Owner"), and _ ("Contractor").

WHEREAS, TISD has offered Contractor -- and Contractor has accepted TISD's offer -- to perform work on the Project as defined herein.

NOW, THEREFORE, TISD and Contractor agree as follows:

Article 1. The Project

1.1 The "Project" referenced in the Contract Documents is generally described as follows:

Article 2. Performance

2.1 Unless otherwise provided in these Contract Documents, the Contractor shall be responsible for performing, or causing to be performed all work, including labor and materials, necessary to build, construct, erect and equip, in accordance with the Contract Documents, plans, drawings and specifications, for completion of the Project.

2.2 Owner shall be responsible for paying Contractor for his performance the amounts hereafter stated, subject to the terms and conditions in the Contract Documents.

Article 3. Contract Sum

3.1 Subject to other provisions in the Contract Documents, the Owner agrees to pay the Contractor for the Contractor's performance of the Contract the following amount for construction and completion of the Project: _____
This amount shall be subject to modifications, based upon change orders and other stipulations contained in the Contract Documents.

Article 4. Payments to Contractor

4.1 The Contractor shall submit monthly Applications for Payment on AIA Form G702 to the Architect or Engineer for approval. Continuation sheets shall be submitted on AIA Form G703. If the Architect or Engineer approves the application, he shall submit a Certificate for Payment to the Owner. The Architect or Engineer may require any additional information deemed necessary and appropriate to substantiate the Application for Payment. Materials that are verified to be on the job site or other approved location for use in the Project may also be incorporated into the Application for Payment.

4.1.1 Each Application for Payment should be for one calendar month, ending on the last day of the month, or as otherwise mutually agreed. The Architect or Engineer shall have seven (7) days from date of receipt from the Contractor of the Application for Payment to approve or reject the Application for Payment. The Owner shall pay the amounts certified by the Architect or Engineer to the Contractor within ten (10) days of receipt of the Certificate for Payment from the Architect or Engineer.

4.1.2 Each Application for Payment shall be based on the value of the work completed during the month for which it is submitted. The Application for Payment must be prepared and submitted in such

form and supported by such data to substantiate its accuracy, as required by the Architect or Engineer.

4.1.3 Each Application for Payment must indicate the percentage of completion of the Project effective at the end of the period covered by the application. The amount of each progress payment shall be computed by multiplying the percentage of completion of the Project times the contract sum for the Project, less retainage, and less prior payments.

4.1.4 Any additional amounts that may be due the Contractor as a result of changes in the Project, when the amount is not in dispute, may be included in monthly Applications for Payment, subject to retainage. Any amounts in dispute may either be settled at the time of final payment, or as otherwise provided in these Contract Documents.

4.1.5 Monthly Applications for Payment may include amounts properly allocable to materials and equipment delivered and suitably stored at the job site for use in completing the Project. The parties may agree that equipment and materials for which Application for Payment is submitted may be stored at a location away from the job site, provided that the location is agreed upon in writing, is secure, and the materials and equipment are insured at the designated location. Any Application for Payment for equipment and materials shall be subject to retainage.

4.2 Retainage for the Project is set at five percent (5%). During the course of applying for monthly progress payments, at no time shall Contractor be entitled to receive an amount that exceeds ninety-five percent (95%) of the total percentage of work completed and approved equipment and materials stored to date of application.

4.3 No payments shall be made to Contractor after the deadline for substantial completion of the Project, until substantial completion of the Project is achieved.

4.4 If Owner is entitled to deduct liquidated damages, or any other damages provided in this Contract, including clean-up fees, Owner shall be entitled to deduct such liquidated damages and fees from any payments due Contractor at any time.

4.5 In case Contractor fails to complete the work, or has unsettled claims with Owner, any final payment to Contractor shall be subject to deduction for such amounts as the Architect or Engineer shall determine as the cost for completing incomplete work and the value of unsettled claims.

4.6 When the Contract has been fully performed by the Contractor, including completion of punch list items, correcting nonconforming work, providing all documents to Owner as required in these Contract Documents, including, without limitation by enumeration, manuals, transfer of manufacturer's warranties, delivery of completed "as built" drawings, and a Final Certificate for Payment has been issued by the Architect or Engineer, and the Owner has determined that the Project is fully and finally completed, final payment shall be made by the Owner within thirty (30) days after the issuance of the Architect or Engineer's Final Certificate for Payment and the Owner's determination that final completion has been achieved.

4.7 All sums due hereunder are payable at the principal offices of Owner in Texarkana, Bowie County, Texas.

Article 5. Effective Date, Date of Commencement and Substantial

5.1 **Completion** The effective date of this Agreement is December 17, 2025.

5.2 The date of commencement for purposes of calculating compliance with the number of days for final completion shall be March 17, 2025.

5.3 The Contractor shall achieve substantial completion of the Project not later than the number of calendar days specified below from the commencement date, subject to adjustments of the time for substantial completion as provided in the Contract Documents. It is specifically understood and agreed by and between Owner and Contractor that time is of the essence in the substantial completion of the Project, and that failure to substantially complete the Project within the designated period, or as it may be extended, shall be construed as a breach of this Agreement.

5.3.1 Substantial completion of the Project shall be achieved within 75 days from the notice to proceed. The number of days allowed for substantial completion are calendar days, including Saturdays, Sundays and holidays.

Article 6. Liquidated Damages

6.1 Time is of the essence in all phases of the work. Timely substantial completion is an essential condition of this contract. If Contractor fails to achieve substantial completion of the Project within the stated time, or as extended, Contractor agrees to pay Owner a stipulated amount of $500.00 per day for each day beyond the date designated for substantial completion, or as that date may be modified in accordance with the terms of the Contract Documents.

6.2 Contractor shall pay Owner the amounts specified in paragraph 6.1 per day for each and every calendar day the breach continues after the deadline for substantial completion of the Project, even if Owner partially occupies any portion of the Project prior to completion. Such damages shall be in addition to, and not in lieu of any other rights or remedies Owner may have against Contractor for failure to timely substantially complete the Project.

6.3 If the Project is not substantially completed by the time stated in the contract, or as extended, no payments for work completed beyond that time on the Project will be made until the Project does reach substantial completion as determined by the Owner.

6.4 As used in the Construction Agreement and the Contract Documents, the term "substantial completion" shall be defined as follows:

.1 All structural systems, including, but not limited to, floor slabs, shall be complete.

.2 The building shell shall be complete and weatherproofed; walls, roof, exterior doors and windows are to be completed.

.3 MEP systems shall be complete as to maintain temperature control, adequate lighting for classroom and facility functions, and sanitation requirements.

.4 Code required fire separation walls, and all interior walls, shall be completed.

.5 All miscellaneous equipment, finishes, and systems that Contractor is to provide in accordance with the requirements of the Contract Documents, and that Owner requires for its intended use and occupancy of the facility, shall be installed and completed.

.6 Certificate of Occupancy issued by City of Texarkana, Texas.

.7 Owner is permitted to move into, occupy and use the facility for its intended purpose, pending final completion.

Article 7. Final Completion

7.1 Timely final completion is an essential condition of this Contract. Contractor agrees to achieve final completion of the contract by December 19, 2025.

7.2 Owner and Contractor agree that should Contractor fail to achieve final completion of the Contract by the deadline provided above, Owner shall continue to be damaged to a greater degree by such delay. Contractor and Owner have agreed that the amount of liquidated damages for each calendar day final completion is delayed beyond the contract date set for final completion shall be $500.00 per day.

7.3 Contractor shall pay Owner the amounts specified in paragraph 7.2 per day for each and every calendar day the breach continues after the deadline for final completion of the Project. Such damages shall be in addition to, and not in lieu of any other rights or remedies Owner may have against Contractor for failure to timely and finally complete the Project. If the Project is not finally completed by the time stated in the contract, or as extended, no payments for work completed beyond that time on the Project will be made until the Project does reach final completion as determined by the Owner.

Article 8. Termination, Suspension and Dispute Resolution

8.1 This Contract may be terminated by the Owner or the Contractor, or may be suspended by the Owner as provided in Article 14 of the General Conditions, as amended.

8.2 Notwithstanding any provision to the contrary in the Contract Documents, this Contract is not subject to arbitration. Any reference in AIA Document A201-2007 to "arbitration" or "arbitrator" or the requirement to submit any dispute to arbitration is hereby deleted. Dispute resolution between the parties shall be governed by this Article 8.

8.3 If a dispute arises between the parties relating to this Agreement, the parties agree to use the following dispute resolution procedure prior to either party pursuing other available remedies.

.1 A meeting shall be held promptly between the parties or their designated representatives to attempt in good faith to informally negotiate a resolution of the dispute.

.2 If resolution is not readily achieved by informal negotiations, the parties may agree to select a neutral third party ("NTP") to assist in resolution of the dispute. If used, the NTP shall be a person with expertise in the subject matter of the dispute and in the interpretation of contract documents who is immediately available and acceptable to the parties.

.2.1 The NTP shall promptly conduct an on-site investigation and, thereafter, promptly convene a private meeting between representatives of the parties to hear the parties' positions and render oral recommendations for resolution of the dispute. The recommendations of the NTP shall not be binding on any party.

.2.2 By separate written agreement, the parties may further define the role of the NTP and may expand the NTP to consist of a team of persons possessing the necessary expertise.

.2.3 Use of the NTP is voluntary. No party to this Agreement will be deemed to be in breach of this Agreement solely because of a refusal to utilize a NTP.

.3 At all times during the course of dispute resolution, Contractor and TISD shall continue diligently and without delay to perform the respective services and obligations of this Agreement.

.4 Contractor acknowledges that any negotiated dispute resolution must be approved by the Board of Trustees of TISD at a meeting properly noticed for such purpose in accordance with Texas law.

.5 Each party shall pay its own costs and expenses, including attorney's fees, incurred during the dispute resolution procedure as outlined above. The fees and expenses of the NTP shall be divided equally by Contractor and TISD.

.6 If the parties fail to resolve the dispute with the help of the NTP venue for any action would be Bowie County, Texas.

Article 9. Designation of Contract Documents

9.1 The following, except for modifications issued after execution of this Agreement, shall constitute the Contract Documents, which collectively shall govern the relationship of the parties to this Agreement:

.1 "Agreement" or "Contract" refers to this executed Construction Agreement between TISD and Contractor. Any reference to AIA Document A101-2007 in any of the Contract Documents or any other document related to this Project shall mean this Construction Agreement.

.2 General Conditions of the Contract for Construction, AIA Document A201, 2007 Edition, as amended or supplemented by

Addendum 1: Supplementary General Conditions: and
Addendum 2: Special Conditions.

3 Addendum 3: Designated Portions of the Project Manual Incorporated as Part of the Contract Documents. The complete text of the sections identified in the Project Manual in Addendum 3 are incorporated by reference, in their entirety, and made a part hereof for any and all purposes.

.4 Exhibit 1: Contractor's completed sealed proposal, as accepted.

.5 Exhibit 2: Building Construction Trade Wage Rates and Worker Classification Definitions for Bowie County, Texas.

.6 Exhibit 3: Heavy/Highway Construction Wage Rates for Bowie County, Texas.

.7 Drawings and Specifications.

.8 Performance Bond in the amount of 100% of the contract price.

.9 Payment Bond in the amount of 100% of the contract price.

.10 Insurance certificates for worker's compensation, comprehensive general liability, all risk coverage, and any other insurance coverage required to be provided by Contractor.

.11 Notice to Proceed.

.12 Any written change orders issued and approved during the course of construction.

.13 Any modifications to the Agreement, which shall be in the form of an addendum or exhibit, signed by Owner and Contractor, and incorporated into this Agreement.

9.2 The foregoing documents are incorporated herein by reference and made a part of this Construction Agreement for any and all purposes. Where reference is made in this Agreement to a provision of the General Conditions, or other Contract Documents, the reference necessarily includes any amendment or supplement to that provision.

Article 10. General Provisions

10.1 This Agreement shall extend to and shall be binding upon the parties hereto, and their respective successors and assigns; provided, however, that unless otherwise provided for herein, this Agreement shall not be assigned to any person without the written consent of each party. This does not prevent Contractor from engaging subcontractors to perform various phases of the Project, but Contractor shall be fully responsible to Owner for the work, actions and omissions of all such subcontractors.

10.2 Any notice or other instrument authorized or required by this Agreement or the Contract Documents to be given to TISD or Contractor shall be in writing and delivered in person, evidenced by a signed receipt, or mailed by certified mail, return receipt requested, postage prepaid, or electronic facsimile transmission to the persons indicated below, or to such other persons or addresses as TISD or Contractor may provide by notice to the other. The date of the notice shall be the date of delivery if the notice is personally delivered, or the third day following the date of the mailing if the notice is mailed by certified mail:

TISD: 4121 Summerhill Road, Texarkana, Texas 75503
ATTN: Chief Operating Officer

Contractor:

10.3 This Agreement shall be governed exclusively by the laws of the State of Texas. Venue for any dispute arising between the parties shall be in the state district courts of Bowie County, Texas.

10.4 If any judicial proceeding is necessary to enforce or interpret the terms of this Agreement, the prevailing party, as determined by the judge, shall be entitled to reasonable attorneys' fees, costs and expenses in addition to any other relief to which such party is entitled.

10.5 The failure of TISD or Contractor to object to or to take affirmative action with respect to any conduct of the other which is a breach of this Agreement shall not be construed as a waiver of that breach or of any prior or future breaches of this Agreement.

10.6 This Agreement constitutes the entire understanding of the parties to this Agreement, and supersedes all prior proposals, representations, communications, negotiations and agreements between the parties, whether oral or written. By signing this Agreement, each party represents that the other has fully satisfied its respective duties and obligations under all prior written and oral agreements between them.

10.7 In construing this Agreement, none of the parties hereto shall have any term or provision, or any uncertainty or ambiguity as to any provisions herein, construed against such party solely by reason of such party having drafted the same, as a result of the manner of the preparation of this Agreement, or otherwise. Each term and provision of this Agreement shall be construed and interpreted so as to render it enforceable. If any provision of this Agreement is held to be illegal, unenforceable or invalid for any reason, the remaining provisions shall not be affected or impaired thereby.

10.8 TISD and Contractor are independent contractors, and this Agreement shall not constitute the formation of a partnership, joint venture, employment or master/servant relationship. Neither TISD nor Contractor (i) shall exercise control over the performance of the other hereunder, or (ii) shall be deemed to be the agent, employee, or representative of the other party. Nothing contained in this Agreement shall create a contractual relationship with or a cause of action in favor of a third party against either TISD or Contractor.

10.9 This Agreement may not be amended or changed in any of its provisions except by a subsequent written agreement signed by duly authorized representatives of TISD and Contractor.

10.10 Execution of this Agreement shall constitute approval and acceptance of all terms, covenants and conditions as modified and contained in the Contract Documents.

Contractor

BY: _____ Dated: _____

Texarkana, Texas, Independent School District

BY: _____ Dated: _____

Chief Operating Officer

ADDENDUM 1

Special Conditions

These SPECIAL CONDITIONS are incorporated as part of the Contract Documents between Owner and Contractor.

1. Parties to the Project

   1.1 "Owner" shall mean The Texarkana Independent School District.

   1.2 “Contractor" shall mean the person, firm, or corporation which has executed the Construction Agreement with the Owner and is thus solely responsible to the Owner for the execution and completion of the Work. The term "Contractor" and "General Contractor" shall be interchangeable.

   1.3 "Subcontractor" shall mean any person, firm or corporation having a contract with Contractor to furnish labor, material, services, equipment or any combination thereof for the work on this project.

2. Interpreting the Contract Documents

   2.1 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

   .1 Construction Agreement
   .2 Addendum 1: Special Conditions
   .3 Addendum 2: Supplementary General Conditions to AIA Document A201-2007
   .4 Change Orders
   .5 Drawings and Specifications
   .6 Addendum 3: Designated Portions of the Project Manual Incorporated as Part of the Contract Documents (the complete text of the sections identified in the Project Manual in Addendum 3 are incorporated by reference, in their entirety, and made a part hereof for any and all purposes)
   .7 Exhibit 1: Proposal of Contractor as Approved and Accepted
   .8 Exhibit 2: Building Construction Trades Wage Rates and Worker Classification Definitions
   .9 Exhibit 3: Heavy/Highway Construction Department of Labor Wage Rates
   .10 General Conditions of the Contract for Construction, AIA Document A201-2007

   2.2 In the case of an inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality and greater quantity of Work shall be provided in accordance with the Architect or Engineer's interpretation, and Owner's approval.

3. Trenching and Shoring

   3.1 Contractor shall bear sole responsibility for design and execution of acceptable trenching and shoring procedures, in accordance with State of Texas statutory requirements, Texas Health and Safety Code § 756.023, and OSHA Regulations 1926.652-653.

   3.2 On trench excavations in excess of five feet in depth, Contractor shall pay a qualified engineer, experienced in the engineering, design and preparation of drawings and specifications for compliance with state requirements for trenching and shoring, to prepare and professionally seal

detailed drawings and specifications directing Contractor in the safe execution of trenching and shoring.

3.3 Costs for trenching and shoring engineering and execution shall appear as a pay line item in the "Schedule of Values." Contractor shall attach to pay request a notarized letter from shoring engineer that designed Contractor's trenching and shoring systems addressed to Owner attesting that engineer has (1) reviewed trenching and shoring systems installed in field and found them in conformance with shoring engineer's detailed plans and specifications, (2) line item on Contractor's pay request accurately represents work installed and materials on site, and (3) engineer recommends payment to Contractor of line item for trenching and shoring based on engineer's observations. Contractor's monthly Application for Payment that is submitted without the required letter from Contractor's shoring engineer is subject to return without review until letter is submitted.

4. Prevailing Wage Rates

4.1 Attention is called to Chapter Section 2258.021 of the Texas Government Code which, among other things, provides that it shall be mandatory upon Contractor and any subcontractor to pay a worker employed by it or on behalf of it:

.1 not less than the general prevailing rate of hourly 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 hourly wages for legal holiday and overtime work.

This section does not apply to maintenance work.

4.2 In compliance with Section 2258.022 of the Texas Government Code, Owner has determined that the general prevailing rate of wages in the locality in which the work under this contract is to be performed shall be those rates as determined by surveys conducted by the General Services Commission of the State of Texas for Building Construction Trades and the Federal Department of Labor for Heavy/Highway Construction. Rules regarding compliance and prevailing wage rates to be paid on this project are contained in **Exhibits 2 and 3** attached hereto.

5. Right of Entry

5.1 The Owner reserves the right of entry to the property at all times for inspection of the work.

5.2 The Owner may perform collateral work or have work under separate contracts performed on the property.

6. Workers' Compensation Insurance Coverage

6.1 Definitions:

.1 Certificate of coverage ("certificate") - A copy of a certificate of insurance, a certificate of authority to self-insure issued by the commission, or a coverage agreement (TWCC - 81, TWCC - 82, TWCC - 83, or TWCC - 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.

.2 Duration of the project - includes the time from the beginning of the work on the project until Contractor's/person's work on the project has been completed and accepted by the governmental entity. Persons providing services on the project ("subcontractor" in Texas Labor Code, Section 406.096) - includes all persons or entities performing all or part of the services Contractor has undertaken to perform on the project, regardless of whether that person contracted directly with 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, or employees of any entity which furnishes persons to provide services on the project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to the project. "Services" does not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

6.2 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 Contractor providing services on the project, for the duration of the project.

6.3 Contractor must provide a certificate of coverage to the governmental entity prior to being awarded the contract.

6.4 If the coverage period shown on Contractor's current certificate of coverage ends at a time within the duration of the project, Contractor must, prior to the end of the coverage period, file a new certificate of coverage with the governmental entity showing that coverage has been extended.

6.5 Contractor shall obtain from each person providing services on a project, and provide the governmental entity:

.1 a Certificate of coverage, prior to that person beginning work on the project, so he governmental entity will have on file certificates of coverage showing coverage or all persons providing services on the project; and

.2 no later than seven days after receipt by 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.

6.6 Contractor shall retain all required certificates of coverage for the duration of the project, and for one year thereafter.

6.7 Contractor shall notify the Owner in writing by certified mail or personal delivery, within 10 days after Contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project.

6.8 Contractor shall post on each project site a notice, in the text, form and manner prescribed by the Texas Workers[1] Compensation Commission, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

6.9 Contractor shall contractually require each person with whom it contracts to provide services on a project, to:

.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;

.2 provide to 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;

.3 provide 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 of coverage ends during the duration of the project;

.4 obtain from each other person with whom it contracts, and provide to Contractor (i) a certificate of coverage, prior to the other person beginning work on the project; and (ii) 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;

.5 retain all required certificates of coverage on file for the duration of the project and for one year thereafter;

.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

.7 contractually require each person with whom it contracts to perform as required by this section 6.9 with the certificates of coverage to be provided to the person for whom they are providing services.

6.10 By signing the Construction Agreement or providing or causing to be provided a certificate of coverage, Contractor represents to the Owner that all employees of Contractor who will 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 Contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

6.11 Contractor's failure to comply with any of the provisions contained in the above Section 6 is a breach of contract by Contractor which entitles the Owner to declare the contract void if Contractor does not remedy the breach within ten days after receipt of notice of breach from the Owner.

7. Prohibition on Drugs, Tobacco and Alcohol

7.1 Owner has designated the Project area and work site a “tobacco, alcoholic beverage, and drug (illicit or non-prescribed controlled drugs) free” area.

7.2 Smoking and chewing of tobacco products is prohibited on Owner's property. Contractor shall post no smoking and no tobacco signs in number, in form, and in locations as approved by the Owner.

7.3 Drugs, drug paraphernalia, alcohol, weapons and firearms are strictly prohibited on Owner's property. Possession of such items, or being under the influence of drugs or alcohol, shall be prosecuted to the full extent of the law.

7.4 Contractor shall notify his employees, vendors, and all subcontractors to enforce the prohibitions in this Section 7. Contractor and any subcontractor shall ensure compliance with this Section 7 for all personnel under their direct or indirect supervision.

8. Criminal History Notification (TEX. EDUC. CODE § 44.034)

8.1 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. This provision applies to all subcontractors and sub-subcontractors.

8.2 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 1.1 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.

9. Prohibition on Gratuities

The Owner may, by written notice to Contractor, cancel the Contract for Construction without liability to Contractor if it is determined by the Owner that gratuities, in the form of entertainment, gifts, or anything of monetary value, were offered or given by Contractor, or any agent, or representative of Contractor, to any officer or employee of the Independent School District with a view toward securing a contract or securing favorable treatment with respect to the awarding, amending, or making of any determinations with respect to the performing of such a contract. In the event the Construction Agreement is canceled by the Owner pursuant to this provision, Owner shall be entitled, in addition to any other rights and remedies, to recover or withhold the amount of the cost incurred by Contractor in providing such gratuities.

10. Prohibition on Advertising

Contractor or any Subcontractors shall not advertise or publish without the Owner's prior written consent, any pictures, photographs, video tapes, computer schematics, or other depictions of the work in progress, or the completed project, except to the extent necessary to comply with proper requests for information from an authorized representative of the federal, state or local government. This prohibition shall extend to all print and electronic media (including the Internet).

11. Scheduling of Work

11.1 The work shall be carefully scheduled and executed in a manner that will cause the least possible interference with the Owner's operations and property.

11.2 It is specifically understood and agreed between Owner and Contractor that time is of the essence in completing this project. Contractor agrees it shall work five days during each calendar week, normally Monday through Friday, until final completion of the project, subject to state and national holidays customarily observed by Contractor.

11.3 In the event weather conditions, natural disasters, or other events beyond the control of Contractor prevent Contractor from working Monday through Friday, or Contractor is delayed as a result of any act of the Owner, Contractor may apply to the Architect or Engineer for an extension of the substantial completion date that is commensurate with the number of days lost due to any of the above conditions. Contractor must make application for an extension of time within seven (7) days of the events causing the delay. Failure to timely make request for extension is a waiver of the right to extension for that particular incident. A waiver of a prior right of an extension shall not waive the right to request an extension as a result of subsequent events. The request will be submitted to the Architect or Engineer along with any documents supporting the request.

11.4 In the event the project is not substantially completed by the contract deadline, or as it may extended as provided above, no progress payments will be made on or beyond the date for substantial completion, until the project is substantially completed and accepted as that term is defined in these Contract Documents. This right to withhold payment is in addition to any other rights or remedies in these Contract Documents for failure to substantially complete the project by the deadline and to fully and finally complete the project.

11.5 Prior to beginning the actual work, the Architect or Engineer, Contractor and Owner's representative will meet on site to discuss the scheduling and coordination of the work.

11.6 If applicable, the Owner may relocate and/or install certain outside utilities as noted on the plans. If required, this work will begin prior to execution of this contract and be under way as this project starts. Contractor shall coordinate his operations with the Owner to help expedite the work of both parties.

11.7 The Owner may provide certain work under separate contract. This work may begin before or while work under this contract is in progress. Contractor shall coordinate his operations with the Owner to help expedite the work of both parties.

12. Progress Meetings

Contractor shall meet with the Architect or Engineer and Owner's representative as often as necessary to maintain communications between all parties as may be necessary to maintain scheduling and execution of the work in a manner which is least disruptive to the Owner.

13. Maintenance Manuals and Recommendations

Contractor shall furnish the Owner three (3) copies of maintenance manuals and recommendations for all work installed. Maintenance recommendations shall be furnished in a form approved by the Architect or Engineer and shall be neatly typewritten and bound.

14. Manufacturer's Directions

All manufactured articles, materials, appliances and equipment shall be applied, installed, connected, erected, used, cleaned, conditioned and placed in operation as directed by the representative manufacturers, insofar as these directions are applicable to this particular project and are not in conflict with superior requirements in the specifications.

15. Prohibition on Hazardous Materials

15.1 Contractor shall comply with Federal and State Regulations to verify use of only "lead free" and "asbestos free" materials.

15.2 Contractor shall provide written certification for himself, all Subcontractors, vendors, suppliers, and other entities, stating that materials and/or equipment used in the construction of the project do not contain lead or asbestos in any form or concentration.

16. Record Drawings, As-built Drawings

16.1 Contractor shall provide as-built drawings which clearly show all differences between the contract work as drawn and as actually installed, as well as work added to the contract which is not indicated on the contract drawings.

16.2 Special attention should be paid to precisely documenting changes to concealed work, meaning work installed underground or in areas which can not be readily inspected by use of access panels, inspection plates or other removable features.

16.3 Contractor shall maintain a set of record drawings at the job site. These drawings shall be kept legible and current and shall be available for inspection at all times by the Owner or Architect or Engineer.

16.4 Upon final completion of the work, Contractor shall transfer the changes noted on the record drawings to the as-built drawings.

16.5 As-built drawings shall contain the names, addresses and phone numbers of all the Subcontractors and shall be signed by Contractor.

16.6 As-built drawings shall be prepared on mylar based reproducibles paid for by Contractor. The Architect or Engineer's original drawings will be made available to a commercial blueprint or copy company as selected by Contractor. As-builts shall be provided for all sheets of the drawings for each phase of the work bid.

16.7 In showing changes in the work or added work, use the same legends as used on the contract drawings. The as-built drawings shall consist of a complete set of mylar based reproducibles. If no changes are made on a particular as-built drawing, a notation reading "No Change" shall be made in the lower right hand comer of the drawing.

16.8 Upon completion of the as-built drawings, Contractor shall submit one set of blueline copies to the Architect or Engineer for approval. Any changes required by the Architect or Engineer must be made. Upon receipt of approval of modified drawings, Contractor shall deliver the as-built mylars and one set of blueline copies to the Owner and Architect or Engineer.

16.9 The Architect or Engineer shall be the sole judge of acceptability of the as-built drawings. Final payment on the project will not be made until the mylar as-builts and copies as described above are delivered to and accepted by the Architect or Engineer.

17. Storage

Contractor shall provide suitable storage sheds or other means to protect all stored material subject to damage from the weather. Storage sheds or other types of covers shall have a neat appearance and sheds in particular should be painted.

18. Heating, Cooling, and Lighting

Adequate lighting must be provided throughout the project. The permanent HVAC system should be put in operation as soon as possible and shall be used to dry out the building and to provide suitable conditions for finish work.

19. Protection of Property

19.1 Contractor shall protect walks, curbing, drives, parking lots, planting beds, shrubs, trees and lawn areas. All damage caused by Contractor or any Subcontractors shall be remedied at the expense of Contractor.

19.2 Contractor shall provide necessary barricades to protect persons entering, leaving or walking around the building during the course of the work or during periods when no work is in progress but when conditions around the project could pose a danger.

20. Telephone

Contractor shall provide a land line telephone for all persons employed on the project. Contractor shall pay for the installation, maintenance, removal, and for all charges for the use of this telephone, except charges for long distance calls which shall be paid by the party making those calls.

21. Fences

Contractor must provide temporary fencing and other barricades to protect stored materials on the site and provide a secure and safe work area around the project. Contractor must coordinate size, location and appearance of all fenced storage and work areas with the Owner's and Architect or Engineer's approval prior to erection.

22. Offices

Contractor shall provide his own office on the premises, maintain it, and remove it when directed by the Owner or the Architect or Engineer. Contractor shall also furnish office space for the Architect or Engineer. Contractor shall coordinate size and location of all offices with the Owner and Architect or Engineer prior to erection or placement on the premises.

23. Miscellaneous

23.1 Nothing in these Special Conditions shall be construed to diminish the duties, responsibilities and obligations of Contractor as contained in the Construction Agreement between the Owner and Contractor.

23.2 Owner’s rules and regulations relating to drug policy, tobacco policy, sexual harassment policy, State of Texas and Texas Education Agency facilities laws, regulations and guidelines, city building codes, ADA guidelines and regulations, and without limitation by enumeration, any other applicable rule or regulation, shall apply to the Architect or Engineer, Contractor and subcontractors on any School District project while on the construction site. The Architect or Engineers and Contractor will be expected to be knowledgeable of all the laws, policies, and regulations listed above. Owner’s policies are available from the Assistant to the Superintendent, upon request.

23.3 Contractor and subcontractors shall ensure that on-site fraternization shall not occur between personnel under Contractor's or subcontractor's direct or indirect supervision, and students, school employees and the general public.

23.4 All Title VI, Title IX and other applicable Federal and State Regulations shall be complied with and enforced.

23.5 All dates contained or implied in the Contract Documents commence with the date stated in the Construction Agreement, unless otherwise expressly stated.

23.6 Expenses incurred by Contractor, and of its employees, and any subcontractors and their employees in connection with travel shall be borne exclusively by Contractor or the subcontractor, in accordance with their respective policy. Such expense includes, without limitation by enumeration, telephone, meals, lodging, transportation and subsistence. In no event shall Contractor or any subcontractor be entitled to any additional compensation from Owner as a result of incurring such expenses.

23.7 Construction meetings between the Owner, Architect or Engineer and Contractor will be held a minimum of one time per week, or more frequently as deemed necessary by the Owner or Architect or Engineer, through Final Acceptance and Approval of the project by the Owner.

23.8 Acceptance of substantial completion and Final Acceptance and Approval by the Owner is contractual, with the Owner making the final decision.

23.9 In the event Owner is entitled to liquidated damages under any provision of the Contract Documents, Owner may deduct the amounts of liquidated damages from the next payment due Contractor following the event giving rise to an assessment of liquidated damages, or Owner, at its option, may assess the liquidated damages and deduct them from the final payment due Contractor. In the event the liquidated damages due Contractor should exceed the amount of the final payment due Contractor, Contractor shall pay Owner the difference within fifteen (15) days of receipt of written notice from Owner of the balance due. Owner may offset any liquidated damages due to it from Contractor at any time against any sums due to Contractor by Owner.

23.10 The failure to enforce the breach of any term or condition contained in these Contract Documents shall never be construed as a waiver to enforce the same or any subsequent breach within the time prescribed by law.

23.11 Contractor shall save and keep Owner and Owner’s property free from all mechanic’s and materialmen’s liens and all other liens and claims, legal or equitable arising out of Contractor’s work hereunder. In the event any such lien or claim is filed by anyone claiming by, through, or under Contractor, Contractor shall remove and discharge same within ten (10) days of the filing thereof.

23.12 In the event Owner or Architect or Engineer perform tests to evidence compliance with the plans and specifications, and if such tests reveal a failure to meet the requirements of the plans and specifications, such tests shall be paid for by Contractor. Contractor shall then verify by independent tests that work has been done to correct all discrepancies.

23.13 Contractor will coordinate with Owner to move onto site. Contractor shall not commence work at site under this Contract until he obtains all required insurance and submits appropriate certifications. Contractor shall, prior to commencement of Work, submit evidence satisfactory to Owner that payment and performance bonds have been issued in the required amounts.

23.14 Contractor shall inspect any surfaces for level tolerances and "bird baths," and rectify any such deficiencies.

23.15 Submittal of required as-built drawings, warranties, manuals and documents will be submitted to Owner prior to final acceptance phase.

23.16 All guarantees and warranties will be properly assigned to Owner and approved by Owner prior to Final Acceptance and Approval.

23.17 All record documents will be properly marked.

23.18 Any critical work left incomplete or unfinished shall, on the recommendations of the Architect or Engineer and/or engineer, be completed within specifications by Owner or its independent contractor. The cost of such completion shall deducted from the contract amount by change order.

23.19 When applicable, special emphasis will be made by Contractor to ensure effective and efficient drainage of all construction sites and parking areas during all phases of construction.

23.20 With the exception of such provisions, obligations, duties and responsibilities that are clearly limited to Contractor in these Contract Documents, all the terms, covenants, conditions, rules and requirements imposed upon Contractor in these Contract Documents shall equally apply to and govern the conduct and performance of any of Contractor's subcontractors, sub-subcontractors and their employees.

23.21 Contractor shall submit a minimum of five (5) copies of shop drawings, product data and/or samples plus one reproducible paper sepia to the Architect or Engineer unless stated differently elsewhere in the contract documents. The Architect or Engineer will not accept shop drawings or other submittals unless Contractor has first reviewed and corrected them and certifies that requirements of the contract documents have been met.

23.22 If a dimensional discrepancy exists, Contractor shall take field measurements required for proper fabrication and installation of work. Upon commencement of any item of work, Contractor shall be responsible for dimensions related to such item of Work and shall make any corrections necessary to make work properly fit at no additional cost to Owner.

23.23 Contractor shall carefully study and compare Contract Documents with existing conditions at Project site and shall at once report in writing to Architect or Engineer any error, inconsistency or omission he may discover or any materials, systems, procedures, or methods of construction, either shown on Contract Drawings or specified, which he feels are incorrect, inadequate, obsolete, or unsuitable for purpose intended, or which he would not be satisfied to warranty as specified. Contractor shall not proceed with any work in such areas until written instructions are received from Architect or Engineer. Failure to report a conflict in Contract Documents shall be conclusive evidence that Contractor has elected to proceed in more expensive manner.

23.24 Before ordering any material or doing any work, Contractor shall verify all dimensions and check all conditions in order to assure himself that they properly reflect those on Drawings. Any inconsistency shall be brought to the attention of the Architect or Engineer. In the event that discrepancies occur between ordered material and actual conditions, of which Architect or Engineer was not notified beforehand, costs to correct such discrepancies shall be borne by Contractor.

23.25 Failure to submit a written plan indicating action by Contractor to regain time schedule for completion of work within contract time shall be grounds to deny any related extension request.

23.26 All insurance coverage required to be provided by Contractor in these Contract Documents shall be on an occurrence basis. **Owner will not accept any claims made coverage.** Each policy of insurance to be purchased and maintained by Contractor and each certificate of insurance for said insurance shall contain a complete waiver of subrogation against Owner, Architect or Engineer and Architect or Engineer's Engineers. Each certificate shall also list Owner, Architect or Engineer and Architect or Engineer's Engineers as a party insured. If Owner is damaged by failure of Contractor to maintain required insurance, then Contractor shall bear all reasonable costs properly attributed thereto.

23.27 No sureties will be accepted by Owner who are now in default or delinquent on any bonds or who are interested in any litigation pending against Owner or Contractor during term of this Contract. A surety upon any bond furnished in connection with this Contract shall be by a company holding a certificate of authority as an acceptable surety on Federal Bonds and as acceptable reinsuring company listed in the Federal Register of the Department of Treasury's latest annual edition of surety companies. The surety company or companies furnishing surety bonds for this Contract must show a Department of Treasury underwriting limitation not less than total amount of the Contract. Should any surety be determined unsatisfactory at any time by Owner, notice will be given to Contractor, and Contractor shall immediately provide a new surety acceptable to Owner and at no additional cost to Owner. This Contract shall not be valid nor will any payments be due or paid until approval of each bond by Owner.

23.28 Owner shall have the right to operate equipment until defects are corrected and warranties met, and shall have the right to operate rejected equipment until it is replaced without charge for depreciation, use or wear.

23.29 Contractor shall observe the following policies of employment:

.1 Contractor and Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin, age, or other impermissible discriminatory reason. Contractor shall ensure that applicants are employed and that employees are treated during employment without regard to their race, religion, color, sex, national origin, age, or other impermissible discriminatory reason. Such actions shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth policies of non-discrimination.

.2 Contractor and Contractor's Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex, national origin, age, or other impermissible discriminatory reason.

23.30 The date of beginning of Work and the time for completion of Work as specified in the Contract Documents are essential conditions of this Contract. The Work shall be commenced on a date to be specified in the "Notice to Proceed." Contractor agrees that the Work shall be prosecuted regularly and diligently, without interruption, at such a rate of progress as will ensure full

completion thereof within the time specified. It is expressly agreed by Contractor that the time for the completion of the Work described herein is a reasonable time for completion.

23.31 If Contractor shall neglect, fail or refuse to substantially complete the Work within the time indicated by Contractor in his proposal, or any proper extension thereof granted by the Owner, then Contractor does hereby agree, as a part consideration for the awarding of this Contract, to pay to Owner the amount specified in the Contract, not as a penalty but as liquidated damages for such breach of Contract, as provided in these contract documents, for each and every calendar day that Contractor shall be in default after the time stipulated in the Contract for substantial completion of the Work.

23.32 The amount of liquidated damages set forth in the Construction Agreement is agreed upon by and between Contractor and the Owner because of the impracticality and extreme difficulty of ascertaining the actual damages the Owner would sustain in the events described in those articles. Contractor warrants and represents the stipulated amounts set forth in the Construction Agreement are not a penalty but rather constitute a fair estimation by the parties of the actual damages that Owner would incur under the circumstances; and Contractor further warrants and represents it will not contest this fair estimation in the event any provision of the Contract Documents requires payment of this stipulated amount.

Contractor shall not be charged with liquidated damages or any excess costs when the delay in completion of the Work is due:

.1 To any performance, priority or allocated order duly issued by the Government.

.2 To unforeseeable cause beyond the control and without the fault or negligence of Contractor, including but not limited to, acts of God, or of the public enemy, acts of another contractor in performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, or freights embargoes.

23.33 Time is of the essence of each and every portion of this Contract and of the Specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever, and where under the Contract an additional time is allowed for the completion of any work, the new time fixed by such an extension shall be of the essence of this Contract.

23.34 The plans and specifications may make mention of items "By Owner", "To be Furnished By Owner", "To Be Furnished and Installed by Owner", etc. These items are not a part of the Contract.

23.35 The plans and specifications are written to explain <u>what to do, not how to do It.</u> It is assumed and will be required that all workmanship be in a good and workmanlike manner, in accordance with industry standards and in compliance with current approved standards and codes for that particular phase of the work. No careless or slovenly work of any form will be accepted.

23.36 All references to published standards, codes, and statutes shall be to the current edition as of the agreement date unless specific edition is referenced.

23.37 No request for the substitution of products in place of those specified shall be considered after the Contract has been executed, except as specified under the conditions set forth in the General Requirements of the Project Manual. By making requests for substitutions, Contractor (1)

represents that Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified; (2) represents that Contractor will provide same warranty for substitution that Contractor would for that specified; (3) certifies that cost data presented is complete and includes all related costs under this Contract except Architect or Engineer's redesign costs, and waives all claims for additional costs related to substitution which subsequently become apparent; and (4) will coordinate installation of accepted substitute, making such changes as may be required for Work to be complete in all respects.

23.38 The Architect or Engineer may appoint an employee or other person to assist him during the construction. These representatives will be instructed to assist Contractor in interpreting the Contract Documents; however, such assistance shall not relieve Contractor from any responsibility as set forth by the Contract Documents. The fact that the Architect or Engineer's Representative may have allowed work not in accordance with the Contract Documents shall not prevent the Architect or Engineer from insisting that the faulty work be corrected to conform with the Contract Documents and Contractor shall correct same.

23.39 The reference in the Contract Documents to "fully performed or accepted" or similar phrases refers to the final phase of the construction process and includes final acceptance and approval by Owner. This phase will include the installation, testing and satisfactory operation of all major systems designated by the Owner. All building permits, applicable releases, operating certificates, certificates of occupancy, warranties, mechanical/maintenance training, recommendations and manuals, manufacturer's directions and manuals, completed punch list items, property insurance transfer from Contractor to Owner, "as built" drawings, installation of any permanent locks, key transmittal, samples, final cleaning, materials/supply stock will also be completed to the Owner's satisfaction, if applicable, and in Owner's possession prior to this phase. In essence, the facility must be fully and finally completed for use and occupancy to the Owner's satisfaction and all improvements and equipment installed in a good and workmanlike manner, and functioning as intended in accordance with the design and specifications.

23.40 Contractor hereby assigns to Owner any and all claims for overcharges associated with the Contract which arise under the antitrust laws of the United States, 15 U.S.C.A. § 1, *et seq.* (1973).

23.41 The extent to which Owner may extend indemnity and waivers of subrogation to other parties shall be governed and limited by State law where applicable.

ADDENDUM 2

Supplementary General Conditions
to
AIA Document A201-2007

I. All references to "bid," "bidders," and "bidding" in AIA Document A201-2007 shall change to "proposal," "proposer," and "proposal," respectively, consistent with Owner's use of competitive sealed proposals as authorized by Texas Education Code Section 44.031(a) (5) a method provided by 2269 Subchapter D of the Government Code for construction services.

II. Any reference in AIA Document A201-2007 to "arbitration" or "arbitrator" or the requirement to submit any dispute to arbitration is hereby deleted. Dispute resolution between the parties shall be governed by Article 8 of the Construction Agreement.

III. Any reference in AIA Document A201-2007 to "Architect" will be changed to "Architect or Engineer" for purposes of this project. Either the owner's Architect or Engineer will have the authority when conducting business on behalf of the owner with respect to this contract.

* * * * *

The following provisions are intended to modify, add to, or delete the corresponding numbered sections in AIA Document A201-2007.

1.1.1 Delete the second sentence and add:

A Modification issued after execution of the contract is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect.

1.1.2 Delete the third sentence and add:

After execution of the original Contract Documents, the Contract may thereafter be amended or modified only by a written Modification.

1.2.4 By executing the Construction Agreement, Contractor represents that he and his subcontractors and material suppliers have examined the specified products relating to the work and have no objections to products submitted in writing and received by the architect at least seven (7) days prior to the time of proposal.

1.5.1 Add the following to the end of the paragraph:

Signing the Construction Agreement shall be considered as signing all contract documents identified.

2.1.1 Delete the second and third sentences and add:

The Owner shall designate in writing a representative. The Owner's designated representative is authorized to speak on behalf of Owner. However, he has limited authority to make final decisions, which are reserved for Owner's Board of Trustees. Except as otherwise provided in subparagraph 4.2.1, the Architect does not have authority to bind the Owner on any matter requiring the Owner's approval or authorization.

2.1.2 Delete the entire section.

2.2.1 Delete the entire section.

2.2.2 Add the following to the end of the paragraph:

Such costs shall not be considered part of the eligible cost of construction.

2.4 Delete the second sentence and add:

In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's and/or Engineer's, and/or Consultant's additional services made necessary by such default, neglect or failure.

3.3.2 Add:

Contractor agrees to indemnify the Owner for any and all damages, cost or expenses including attorney fees the Owner suffers as a proximate result of and to the extent caused by Contractor's negligent acts, errors, or omissions in the performance of any and all services and duties under this Agreement. This indemnity extends to acts of Contractor's employees, servants, agents, subcontractors, sub-subcontractors and their respective agents and employees, and other persons or entities performing portions of the work for or on behalf of Contractor, or any of its subcontractors or sub-subcontractors. Contractor is not obligated to compensate the Owner in any manner whatsoever for the Owner's own negligence.

3.4.2 Add:

By making requests for substitutions, Contractor:

.1 Represents that Contractor has personally investigated the proposed substitute product and determine that it is equal or superior in all respects to that specified;

.2 Represents that Contractor will provide the same warranty for the substitution that Contractor would for that specified;

.3 Certifies that the cost data presented is complete and includes all related costs under the contract but excludes the Architect's redesign costs (Contractor waives all claims for additional costs related to the substitution which subsequently becomes apparent); and,

.4 Will coordinate the installation of the accepted substitute making such changes as may be required for the work to be complete in all respects.

3.5.1 Add:

In addition to guarantees and warranties noted elsewhere, Contractor shall guarantee all work for a period of one (1) year after the date of final completion against defective material or faulty workmanship that may arise within that period.

Before final payment will be made, Contractor shall provide owner a list of firms authorized to respond to owner's request for immediate, emergency repair for warranty work affecting safety of persons or property. For all other warranty work, contractor shall respond to owner's written

request within fourteen (14) days. In the event of contractor's failure to respond within fourteen (14) days, Contractor authorizes owner to proceed to have the defects repaired and to bill Contractor for all labor and materials, expense and charges necessary for repair. Contractor shall pay owner's invoice within fourteen (14) days. Neither the final certificate for payment or payment of same shall relieve Contractor of the responsibility of negligence or faulty materials and/or workmanship within the extent and period provided by law. All required warranties shall be submitted to the Architect before final payment will be made.

Upon written notice from Owner, Contractor shall promptly remedy defects as covered by his warranty. If Contractor does not respond to Owner's written notice, either by beginning corrective work or notifying the Owner in writing stating when work will begin, within ten (10) days of receipt, the Owner may take measures to correct work himself and Contractor will be obligated to reimburse Owner's costs. If notice of defects covered by the warranty are given in writing to Contractor on a timely basis, the obligation to provide the warranty work may extend beyond the one year warranty period until the warranty defect is remedied and accepted by Owner. Contractor shall provide Bond coverage to extend for the one (1) year period of the warranty to insure his performance under the terms of his obligation.

3.6.1 Add:

The Owner qualifies for exemption from State and Local Sales Tax pursuant to the provisions of Article 20.04(F) of the Texas Limited Sales, Excise and Use Tax Act. Taxes normally levied on the purchase, rent or lease of all materials, supplies, and equipment used or consumed in the performance of this contract may be exempted by issuing to suppliers an exemption certificate in lieu of the tax. The exemption certificate complies with State Comptroller of Public Accounts Ruling No.95-0.07. Any such exemption certificate issued in lieu of the tax shall be subject to the provisions of the State Comptroller of Public Accounts Ruling No.95-0.09 as amended to be effective October 2, 1968.

3.9.1 Add:

Contractor shall furnish a list to the Architect of all engineers, consultants, job-site superintendents, subcontractors and suppliers involved in construction. The Architect shall provide such information to the Owner.

.1 The Owner may reject or require removal of any engineer, consultant, job superintendent, subcontractor, or suppliers involved in the project.

.2 Contractor shall provide an adequate staff for the proper coordination and expedition of the work. Owner reserves the right to require Contractor to dismiss from the work any employee or employees that Owner may deem incompetent, careless, insubordinate, or in violation of any provision in these Contract Documents. This provision is applicable to subcontractors, sub-subcontractors and their employees.

.3 The Owner reserves the right to utilize one or more of its employees to function in the capacity of the School District's Inspector, whose primary function will be daily inspections, checking pay requests, construction timelines, and storage of supplies and materials.

3.10.1 Add:

Contractor shall submit a detailed construction schedule prior to first application for payment to Architect and Owner. The schedule shall include start and finish of each trade for each area of project and dates for ordering and receipt of all materials and equipment to be incorporated into the Project. Compliance and adherence to the schedule is of utmost importance. The schedule shall be coordinated between all trades to assure conformance and shall be updated and submitted to Architect and Owner with each application for payment.

3.18.1 Delete the entire section and substitute the following:

To the fullest extent permitted by law, Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, but only to the extent caused in whole or in part by negligent acts or omissions of Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Paragraph 3.18.1

4.1.3 Delete the entire section

4.2.2 Add:

4.2.2.1 Contractor expressly recognizes that the Architect does not owe him any duty to supervise or direct his work as to protect Contractor from the consequences of his own acts or omissions.

4.2.2.2 Upon reasonable request by the Owner, Contractor shall accompany the Owner and Architect on an inspection tour(s) of the building and shall note any defects and shall start remedying these defects within ten days of the inspection tour. Contractor shall prosecute the Work without interruption until accepted by the Owner and the Architect.

4.2.2.3 If during the Architect's site visits he observes any deviation from requirements of the contract documents, the Architect (or designee) shall report within three (3) business days to the Owner any such deviation. A copy of said report shall be sent to Contractor. Failure to observe or report any deviation shall not be a waiver to subsequently require correction of the same, similar or other deviations.

4.2.8 Add:

The Architect may not make or authorize any changes without Owner approval that involves a major system (for example, without limitation by enumeration, the HVAC, roof, the foundation, etc.), the outward appearance of the structure, color schemes, floor plans, building materials, or mechanical equipment.

4.2.12 Delete the second sentence and add:

When making such interpretations and initial decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, and will not show partiality to either.

4.2.13 Add:

The Architect may not make or authorize any changes without Owner approval that involves the outward appearance of the structure, color schemes, floor plans, building materials, or mechanical equipment.

5.2.1 Delete the second sentence and add:

Owner or Architect shall respond with any objections within 10 days of receipt of the names of persons and entities selected by Contractor.

Change 14 days in third section to 10 days.

5.2.1.1 Within forty-eight (48) hours after proposals are received, contractor shall submit a list of subcontractors on AIA Document G805 to Architect and Owner.

6.2.3 Delete the second sentence and add:

6.2.3.1 If the Architect is required to provide contingent additional services as provided in the Agreement between the Owner and the Architect, specifically relating to additional compensation for the Architect for evaluating an extensive number of claims submitted by Contractor or others in connection with the work, such services shall be paid for by Contractor through the Owner, unless there is negligence or omission by the Architect.

6.2.3.2 If the Architect provides services in connection with a public hearing, or legal proceeding, except in the case where the Architect is a party thereto, and the Owner requests the Architect in writing to provide such services, the cost of such services shall be paid for by the party in default, or the party whose act or omission was a proximate cause of the problem that led to the requirement to provide such services. Such amounts shall be paid to the Owner, who upon receipt of same shall reimburse the Architect.

6.2.3.3 All construction costs resulting from Contractor's oversights, inattention to detail, failure to investigate or failure to follow general architectural principals and procedures will be borne by Contractor.

6.3.1 Add:

6.3.1.1 Job site clean up will be performed on a daily basis. The Owner will periodically check the site to see that all construction areas, nearby roads, walkways and/or grounds are maintained in a clean and safe manner. A fee in the amount of $100.00 will be assessed Contractor each time the Owner is required to clean the area due to failure of Contractor or his designee to satisfactorily perform or enforce this site clean-up requirement. The District will assess the fee. Before assessing the fee, Contractor shall be given notice of the failure to clean the site and one business day after the date of the notice to clean up the site. If Contractor fails to clean up the site, after notice, the Owner may assess the fee for clean-up.

7.1.1.1 A field directive or field order shall not be recognized as having any impact upon the Contract sum and Contractor shall have no claim therefore unless it shall, prior to complying with same, submit to and receive Owner’s written approval of a change proposal.

7.1.1.2 When submitting its change proposal, Contractor shall include and set forth in clear and precise detail, the breakdowns of labor and materials for all trades involved and the estimated impact on the construction schedule. Contractor shall furnish spread sheets from which the breakdowns were prepared, plus spread sheets of any subcontractors, if requested.

7.1.2 Add:

7.1.2.1 Contractor shall make no change in the materials used or in the specified manner of constructing and/or installing the work or supply additional labor, services, or materials beyond that actually required by the terms of the Contract Documents, unless made pursuant to a written order from Owner authorizing Contractor to proceed with the change. No claim for an adjustment of the contract price will be valid unless so ordered.

7.1.2.2 Contractor's total mark-up for overhead and profit on any Change Order shall not exceed 6.5%. On work performed by a subcontractor and supervised by Contractor, the total Contractor mark-up for overhead and profit for any Change Order shall not exceed 6.5%.

7.3.7 Delete the first sentence and add:

The amount of credit to be allowed by Contractor to the Owner for a deletion or change which results in a net decrease or net increase in the Contract Sum shall be actual net cost plus Contractor's allocated percent for profit and overhead as confirmed by the Architect, subject to equitable adjustment recommended by the Architect and approved by the Owner.

7.4.1 Add:

7.4.1.1 The Architect may not make or authorize any changes without Owner approval that involves the outward appearance of the structure, color schemes, floor plans, building materials, or mechanical equipment.

8.2.2 Delete the second sentence and add:

Unless the date of commencement is established by the Contract Documents or a notice to proceed given by the Owner, Contractor shall notify the Owner in writing not less than five days or other agreed period before commencing the Work.

8.3.1 Delete the phrase "mediation and arbitration" in the first sentence and replace with "dispute resolution".

9.3.1.3 Add:

Prior to Contractor's first application for payment, Contractor shall submit a material and labor breakdown using AIA Documents G702 and G703 by trade and portion of work as required to allow Architect to check out application for payment. At a minimum, the breakdown shall include all sections of work as noted in the Specification Table of Contents.

9.3.3 Add:

Contractor shall indemnify and hold Owner harmless from any liens, claims, security interest or encumbrances filed by Contractor, subcontractors, or anyone claiming by, through, or under Contractor or subcontractor for items covered by payments made by the Owner to Contractor.

9.4.2 Delete the third sentence.

9.5.2 Add:

The Owner shall not be deemed in default or in breach of the Contract Documents by reason of withholding payment as provided for in subparagraph 9.5.1.

9.6.1 Add:

Notwithstanding the foregoing, the Owner may refuse to make payment on any Certificate for Payment (including, without limitation, the final Certificate for Payment) for any default under the Contract Documents, including but not limited to those defaults set forth in clauses 9.5.1.1 through 9.5.1.7 hereof. The Owner shall not be deemed in default or in breach of the Contract Documents by reason of withholding payment while any such defaults remain uncured.

9.7 Delete the first sentence and add:

If the Architect does not issue a Certificate for Payment through no fault of Contractor, within seven days after receipt of Contractor's Application for Payment, or if the Owner does not pay Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect, then Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received.

9.8.1 Add:

The term “substantial completion”, as used in the Contract Documents, means the stage in the progress of the work when the Project can be occupied by Owner and utilized for instruction of children without contractor interruption; in general, the only remaining work to be performed by contractors after a determination of substantial completion shall be minor in nature so that such work will not interfere or hamper Owner’s normal and daily instruction of children, and such work shall be solely of a punch-list nature which shall be completed within thirty (30) consecutive calendar days following the date Architect has certified substantial completion.

The work will not be considered suitable for Substantial Completion review until all Project systems included in the Work are operational as designed and scheduled, all designated or required governmental inspections and certifications have been made and posted, designated instruction of Owner’s personnel in the operation of systems has been completed, and all final finishes within the Contract Documents are in place.

As a further condition of substantial completion acceptance, Contractor shall certify in writing that all remaining Work, being solely of a “punch-list” nature, will be completed within thirty (30) consecutive calendar days following the date of substantial completion.

In the event substantial completion is not achieved by the designated date, or as it may be extended, Owner may withhold payment of any further sums due until substantial completion is achieved. Owner shall also be entitled to deduct out of any sums due to Contractor any or all liquidated damages due Owner in accordance with the Contract Documents.

9.9.3 Delete and add:

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

9.10.2 Delete the second and third sentences and add:

If a Subcontractor refuses to furnish a release or waiver required by the Owner, Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such claim. If such claim remains unsatisfied after payments are made, Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such claim, including all costs and reasonable attorneys' fees.

9.10.4 Delete the entire section 9.10.4 and its subsections.

10.3.3 Delete the entire section 10.3.3.

10.4 Delete the entire section 10.4 and add:

Contractor shall post an emergency telephone number in an obvious location giving names of contractor personnel to contact 24 hours each day in the event contractor personnel are not found at the work location.

11.1.1 Delete the entire section 11.1.1 and its subsections and substitute the following:

Contractor shall purchase and maintain, in a company or companies with a "Best Rating" of "A" or better, and licensed to do business in the State of Texas, such insurance as will protect him, the Owner, and Architect, from claims set forth below which may arise out of, or result from, Contractor's operations under the Contract Documents, whether such operations be by himself, or by any subcontractor, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 claims under workers' compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;

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

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

.4 claims for damages insured by usual personal injury liability coverage;

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

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

.7 claims for bodily injury or property damage arising out of completed operations;

.8 claims involving contractual liability insurance applicable to Contractor's obligations under paragraph 3.18; and

.9 premises operations.

Contractual liability shall be the same limits as under paragraph 11.1.2 below.

11.1.2 Add:

All coverages required by Section 11.1.1 shall be in the amount of:

.1	a.	Workmen's Compensation	$ Statutory
	b.	Employer's Liability	$ Statutory
.2	Comprehensive General Liability		
	a.	Bodily Injury:	
		Each Occurrence	$1,000,000
		Aggregate	$2,000,000
	b.	Property Damage	
		Each Occurrence	$1,000,000
		Aggregate	$2,000,000
.3	Automobile Liability		
	a.	Bodily Injury	
		Each Person	$1,000,000
		Each Occurrence	$1,000,000
	b.	Property Damage	
		Each Occurrence	$1,000,000
	c.	Combined Single Limit	$2,000,000

.4 Independent Contractors Liability - Same limit as #2 above.

.5 Products and Completed Operations - Same limits as *#2* above, commencing with issuance of final certificate of payment and remaining in effect for one (1) year.

.6 Property Damage Liability Insurance will provide X, C and U coverage, as applicable.

.7 Umbrella Excess Liability - $ 1,000,000.00

.8 All risk coverage: Full amount of contract price.

Coverages as listed above shall be maintained without interruption from date of commencement of the work until the work has been fully completed and accepted by the Owner. Certain coverages are required to be maintained for longer periods of time.

11.1.3 Add:

The Owner shall require Contractor to include the Owner, Architect or other designated persons or entities as additional insureds on Contractor's Liability Insurance coverage under Paragraph 11.1.1.

11.3.1 Delete the entire section 11.3 and all sub-sections and add the following:

Contractor shall purchase and maintain property insurance upon the entire Work at the site to the full insurable value thereof. Such insurance shall be in a company or companies against which the Owner has no reasonable objection. This insurance shall include the interests of the Owner, Architects, Engineers, Contractor, Subcontractors and Sub-Subcontractors in the Work and shall insure against the perils of fire and extended coverage and shall include "All Risk" insurance for physical loss or damage including, without duplication of coverage, theft, vandalism and malicious mischief. If not covered under the All Risk insurance or otherwise provided in the Contract Documents, Contractor shall effect and maintain similar property insurance on portions of the Work stored off of the site or in transit when such portion of the Work are to be included in an application for payment. If this insurance is written with stipulated amounts deductible under the terms of the policy, Contractor shall pay the difference attributable to deductions in any payments made by the insurance carrier or claims paid by this insurance.

11.3.2 Delete the first sentence and add:

Contractor shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured object during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insured’s.

11.3.3 Delete the second sentence and add:

The Owner waives all rights of action against Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused, except for the negligence of Contractor, its Subcontractors, Sub-subcontractors, or errors or omissions on the part of Contractor.

11.3.6 Change "Owner" to "Contractor" in first line; change "Contractor" to "Owner" in first and last lines.

11.3.8 Delete the first sentence and add:

A loss insured under Contractor's property insurance shall be adjusted by Contractor as fiduciary and made payable to Contractor as fiduciary, and paid to the insured’s, as their interests may appear, subject to requirements of Subparagraph 11.4.10.

11.3.9 Delete the second and third sentences and add:

Contractor shall deposit in a separate account proceeds so received, which Contractor shall distribute in accordance with the interest of each party insured.

11.3.10 Delete the first sentence and add:

Contractor as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to Contractor's exercise of this power; if such objection is made, the dispute shall be resolved as provided in Paragraph 4.5.

Delete the second and third sentence.

11.4.3 Add:

Performance and Payment Bonds shall be required for all work where the Contract exceeds $100,000 and exceeds $25,000.00, respectively. After award of contracts by Owner, the successful Proposer, at his expense, must deliver to the Owner Performance and Payment Bonds, executed by Contractor and Surety, in an amount of 100% of the accepted proposal as security for the faithful performance of the Contract and payment of all persons performing labor and furnishing materials in connection with this Contract. Bonding Company must be licensed, listed, and approved in the State of Texas (State Board of Insurance/Texas Department of Insurance). Bonding Company shall provide on request such other information as necessary to document net worth, stability, total bonding capacity, and projects under coverage, to demonstrate adequate financial capacity for this Project. If the Contract sum exceeds the underwriting limitation of the Surety on the most recent list of acceptable sureties, Contractor shall provide the Owner with evidence that the excess is protected by re-insurance or co-insurance in a form and amount acceptable to the Owner. Such bonds shall meet the requirements of Chapter 2253 of the Texas Government Code. Owner reserves the right to approve the surety or sureties proposed by Contractor.

12.2.2.3 Delete the first sentence and add:

The one-year period for correction of Work shall not be extended by corrective Work performed by Contractor pursuant to this Paragraph 12.2, unless the corrective work does not remedy the problem.

13.1 Delete this entire section 13.1 and all subsections.

13.2.2 Delete this entire section 13.2.2.

13.3 Delete this entire section 13.3 and all subsections.

13.6 Delete and add:

Payments due and unpaid under the Contract Documents shall not bear interest.

13.7 Add at end of paragraph:

or the date of discovery, whichever last occurs.

14.2.3 Add the following to the end of the paragraph:

Any further payment shall be limited to amounts earned to date of Contractor’s removal.

14.2.4 Delete the paragraph and add:

If the costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waive, exceed the unpaid balance, Contractor shall pay the difference to the Owner. The amount to be paid to the Owner shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract.

15.1.2 Add:

Notwithstanding any provision to the contrary, the applicable statute of limitations shall commence to run from the following dates, whichever is later:

.1 when the acts or failures to act occurred and any alleged cause of action accrued, or

.2 the date of discovery of such acts or failures to act.

15.1.3 Add:

The absence of a decision or an unfavorable decision by the Architect or Owner does not give cause for Contractor to stop work.

15.1.4 Add:

Contractor must give Architect and Owner written notice of any concealed or unknown conditions and obtain the Architect's immediate site inspection and evaluation of costs when Contractor believes such conditions may justify a claim for added contract costs. Contractor waives any claim for such cost if he does not give the Architect and Owner this written notice of the conditions and obtain the Architect's immediate inspection of the site condition and decision regarding added cost before Contractor covers up the site containing the concealed and/or unknown condition.

15.1.5.1 Add:

Claims for increase in the contract time shall be presented for consideration at the weekly coordination meeting.

15.1.5.2 Add:

Climatic conditions in and around Bowie County, Texas have been taken into account in determining the amount of time required to achieve substantial completion of the project. After a review of historical weather patterns, the following weather delay averages have been set and shall be anticipated by contractor:

January - 3 days	May - 4 days	September - 4 days
February - 3 days	June - 3 days	October - 3 days
March - 2 days	July - 2 days	November - 3 days
April - 3 days	August - 2 days	December - 3 days.

Weather delays beyond the anticipated days may be submitted by Contractor to Architect for review and forwarded to Owner for consideration. Owner's review and consideration will be based upon documented delay in Contractor's work and progress caused by weather. Delays will only be considered for time extension for that portion of the work during which the delay occurred.

Contractor's sole and exclusive remedy for weather delays of any type shall be a claim for additional time.

15.1.6 Add:

Notwithstanding any provision to the contrary, the applicable statute of limitations shall commence to run from the following dates, whichever is later:

.1 when the acts or failures to act occurred and any alleged cause of action accrued, or

.2 the date of discovery of such acts or failures to act.

15.1.6 Delete the second sentence and add:

This mutual waiver is limited to:

15.1.6.1.1 Delete the entire subsection and replace with the following:

damages incurred by the Owner for income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

In the unnumbered paragraph following 15.1.6.2, delete the first sentence in the unnumbered paragraph and add:

This mutual waiver is limited to foregoing specified consequential damages due to either party's termination in accordance with Article 14 of the General Conditions.

15.2.1 Delete the third sentence and add:

An initial decision by the Architect shall be required as a condition precedent to dispute resolution under Article 8 of the Construction Agreement or litigation of all Claims between Contractor and Owner arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Architect with no decision having been rendered by the Architect.

15.2.2 Delete the entire section and add:

The Architect will review Claims and within ten days of the receipt of the Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, stating reasons for the rejection, (3) approve the Claim, or (4) suggest a compromise.

15.2.3 Delete the second sentence and add:

The Architect may request the Claimant to authorize the retention of such persons at the Claimant's expense.

15.2.5 Delete the second sentence and add:

The approval or rejection of a Claim by the Architect shall be final and binding on the parties subject to the right of dispute resolution under Article 8 of the Construction Agreement and litigation.

15.2.6 Delete the entire section and replace with:

When a written decision of the Architect states that (1) the decision is final but subject to dispute resolution under Article 8 of the Construction Agreement and (2) a demand for dispute resolution of a Claim covered by such decision must be made within 30 days after the date on which the party making the demand receives the final written decision, then failure to demand dispute resolution within said 30 day period shall result in the Architect's decision becoming final and binding upon the Owner and Contractor.

15.2.7 Delete this entire section.

15.3 Delete this entire section and subsections.

15.4 Delete this entire section and subsections.

Section 00300

COMPETITIVE SEALED PROPOSAL
(CSP 26-25.12-DEC-13)
To TEXARKANA INDEPENDENT SCHOOL DISTRICT
For the
PARKING EXPANSION FOR DUNBAR EARLY EDUCATION CENTER
Texarkana, Texas

The undersigned, as proposer, declares that the only person or parties interested in this proposal as principals are those named herein, that this proposal is made without collusion with any other person, firm or corporation, that he has carefully examined the form and conditions of the Contract, Advertisement for proposals, Information for proposals, the drawings and specifications therein referred to, and has carefully examined the locations, conditions, and classes of materials of the proposed work; and agrees that he will provide the necessary labor, machinery, tools apparatus, and other items incidental to the proposed construction, and will do all work and furnish all the materials called for in the Contract Documents in the manner prescribed therein and according to the requirements of the Engineer as set forth therein at and for the unit prices for the individual items as follows:

ITEM NO.	EST. QUAN.	UNIT	DESCRIPTION & UNIT PRICE IN WORDS	UNIT PRICE FIGURES	TOTAL $ AMOUNT
1	1.0	LS	MOBILIZATION & GENERAL CONDITIONS Complete in place The Sum of _____ Dollars and _____ Cents per Lump Sum	$ _____	$ _____
2	1.0	LS	SITE PREPARATION Complete in place The Sum of _____ Dollars and _____ Cents per Lump Sum	$ _____	$ _____
3	411.6	CY	EXCAVATION Complete in place The Sum of _____ Dollars and _____ Cents per Cubic Yard	$ _____	$ _____
4	168.8	CY	EMBANKMENT Complete in place The Sum of _____ Dollars and _____ Cents per Cubic Yard	$ _____	$ _____
5	1,274.2	SY	REINFORCED CONCRETE PAVING (5") Complete in place The Sum of _____ Dollars and _____ Cents per Square Yard	$ _____	$ _____
6	1,434.2	SY	REINFORCED CONCRETE PAVING (6") Complete in place The Sum of _____ Dollars and _____ Cents per Square Yard	$ _____	$ _____

ITEM NO.	EST. QUAN.	UNIT	DESCRIPTION & UNIT PRICE IN WORDS	UNIT PRICE FIGURES	TOTAL $ AMOUNT
7	113.5	LF	REMOVE CONC CURB & GUTTER Complete in place The Sum of _____ Dollars and _____ Cents per Linear Foot	$ _____	$ _____
8	31.4	LF	REMOVE & STORE CONCRETE FENCE Complete in place The Sum of _____ Dollars and _____ Cents per Linear Foot	$ _____	$ _____
9	1.0	EA	REMOVE AND RESET SAFETY END TREATMENT (18") (4:1) Complete in place The Sum of _____ Dollars and _____ Cents per Each	$ _____	$ _____
10	1.0	LS	OBLITERATE EXISTING PAVEMENT MARKINGS Complete in place The Sum of _____ Dollars and _____ Cents per Lump Sum	$ _____	$ _____
11	31.4	LF	STEEL PICKET FENCE/GATE SYSTEM (8 FT) Complete in place The Sum of _____ Dollars and _____ Cents per Linear Foot	$ _____	$ _____
12	1.0	LS	PAVEMENT MARKINGS Complete in place The Sum of _____ Dollars and _____ Cents per Lump Sum	$ _____	$ _____
13	46.0	LF	18" HDPE DRAINAGE PIPE Complete in place The Sum of _____ Dollars and _____ Cents per Linear Foot	$ _____	$ _____
14	1.0	LS	H/C PARKING SIGNAGE Complete in place The Sum of _____ Dollars and _____ Cents per Lump Sum	$ _____	$ _____

ITEM NO.	EST. QUAN.	UNIT	DESCRIPTION & UNIT PRICE IN WORDS	UNIT PRICE FIGURES	TOTAL $ AMOUNT
15	6.7	SY	ROCK RIPRAP (8") Complete in place The Sum of _____ Dollars and _____ Cents per Square Yard	$ _____	$ _____
16	405.0	SY	BLOCK SOD (BERMUDA) Complete in place The Sum of _____ Dollars and _____ Cents per Square Yard	$ _____	$ _____
17	930.0	SY	CELLULOSE FIBER MULCH SEEDING Complete in place The Sum of _____ Dollars and _____ Cents per Square Yard	$ _____	$ _____
18	2.0	EA	DUAL LEAF AUTOMATIC GATE OPENER RETROFIT (STEEL PICKET) (6 FT) Complete in place The Sum of _____ Dollars and _____ Cents per Each	$ _____	$ _____
19	1.0	LS	EROSION AND SEDIMENT CONTROL Complete in place The Sum of _____ Dollars and _____ Cents per Lump Sum	$ _____	$ _____
TOTAL BASE CSP AMOUNT				$ _____	

Owner reserves the right to reduce or eliminate any item without any change in the unit prices.

It is understood and agreed that work shall be completed in full 90 calendar days and it is further agreed that for every day the project is not completed past the 90 working days herein agreed upon for completion of the Project shall be acted upon as herein stipulated.
Furthermore, both the Owner and the Contractor (proposer) are in agreement that each such day of delay, the Owner may withhold, permanently from the Undersigned's total compensation, the sum of Five Hundred Dollars ($500.00) per calendar day as LIQUIDATED DAMAGES for such delay.

In the event of the award of a contract to the undersigned, the undersigned will furnish performance and payment bonds for the full amount of the contract greater than $25,000.00, to secure proper compliance with the terms and provisions of the contract with sureties offered by _____ to insure and guarantee the work until final completion and acceptance, and to guarantee payment of all lawful claims for labor performed and material furnished by the fulfillment of the contract.
The work proposed to be done shall be accepted when fully completed and finished in accordance with the drawings and specifications, to the satisfaction of the Owner.

The undersigned certifies that the proposal prices contained in this proposal have been carefully checked and are submitted as correct and final.

NOTE: proposal prices must be shown in words and figures, and in the event of discrepancy, the words shall control.

Receipt is hereby acknowledged of the following addenda to the Contract Documents:

Addendum No. 1 dated _____ Received _____
Addendum No. 2 dated _____ Received _____

The Contractor hereby certifies that the following subcontractors and subcontract amounts were utilized for proposalding the various components of the Proposal and shall be utilized for accomplishing the

Project unless permitted by the Owner to do otherwise:

Proposal Item No.	Name & Address of Subcontractor	Unit Price	Extension
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

TOTAL AMOUNT TO BE SUBCONTRACTED $_____ ,_____ % OF

TOTAL CSP AMOUNT _____ .

This is a Proposal of _____, a Corporation, organized and existing under the laws of the State of _____, or a Partnership, consisting of

_____, or an Individual doing business as _____.

(Seal and Authorization if Corporation) By _____

_____
(Title)

_____
(Street Address)

_____
(City and State)

BY: _____

Affix Corporate Seal

Attest

BY: _____

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____
_____, as Principal, and

_____, as Surety, are hereby

held and firmly bound unto TEXARKANA INDEPENDENT SCHOOL DISTRICT, as OWNER,

in the penal sum of _____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed, this _____ day of _____, _____,

The Condition of the above obligation is such that whereas the Principal has submitted to a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for the Parking Expansion for Dunbar Early Education Center.

_____

_____

NOW, THEREFORE,

(a) If said BID shall be rejected, or

(b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said BID) and shall furnish a BOND for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID,

then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of such extension

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____(L.S.)
Principal

_____
Surety

By:_____

IMPORTANT- Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

PERFORMANCE BOND

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

CONTRACTOR (*Name and Address*):

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

OWNER (*Name and Address*):
Texarkana Independent School District
4241 Summerhill Road
Texarkana, TX 75503

CONTRACT
Effective Date of Agreement:
Amount:
Description (*Name and Location*): Parking Expansion for Dunbar Early Education Center, Texarkana, TX

BOND
Bond Number:
Date (*Not earlier than Effective Date of Agreement*):
Amount:
Modifications to this Bond Form:

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

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ (Seal)	_____ (Seal)
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

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

1. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 2.1.

2. If there is no Owner Default, Surety's obligation under this Bond shall arise after:
   2.1 Owner has notified Contractor and Surety, at the addresses described in Paragraph 9 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor, and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
   2.2 Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 2.1; and
   2.3 Owner has agreed to pay the Balance of the Contract Price to:
      1. Surety in accordance with the terms of the Contract; or
      2. Another contractor selected pursuant to Paragraph 3.3 to perform the Contract.

3. When Owner has satisfied the conditions of Paragraph 2, Surety shall promptly, and at Surety's expense, take one of the following actions:

   3.1 Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
   3.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
   3.3 Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 5 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
   3.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
      1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
      2. Deny liability in whole or in part and notify Owner citing reasons therefor.

4. If Surety does not proceed as provided in Paragraph 3 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 3.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

5. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 3.1, 3.2, or 3.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To the limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

5.1 The responsibilities of Contractor for correction of defective Work and completion of the Contract;
5.2 Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions of or failure to act of Surety under Paragraph 3; and
5.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

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

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

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

9. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

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

11. Definitions.

11.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.
11.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
11.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
11.4 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or otherwise comply with the other terms thereof.

PAYMENT BOND

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

CONTRACTOR (*Name and Address*):

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

OWNER (*Name and Address*):
Texarkana Independent School District
4241 Summerhill Road, Texarkana TX 75503

CONTRACT
Effective Date of Agreement:
Amount:
Description *(Name and Location)*: Parking Expansion for Dunbar Early Education Center, Texarkana, TX

BOND
Bond Number:
Date (*Not earlier than Effective Date of Agreement*):
Amount:
Modifications to this Bond Form:

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

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ (Seal)	_____ (Seal)
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2 Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

4.1 Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2 Claimants who do not have a direct contract with Contractor:

1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
3. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:

6.1 Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2 Pay or arrange for payment of any undisputed amounts.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use

the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

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

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

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

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. Definitions

15.1 Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract, or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (*Name, Address, and Telephone*) Surety Agency or Broker: Owner's Representative (*Engineer or other*):

SECTION 01 01 00

SUMMARY OF WORK

PART 1 GENERAL

Texarkana ISD is performing Parking Expansion for the Dunbar Early Education Center.

1.1 SECTION INCLUDES

A. Work by Owner.

B. Owner furnished products.

C. Contractor use of site and premises.

D. Future work.

E. Work Sequence.

F. Owner occupancy.

G. List of Drawings.

1.2 WORK BY OWNER

A. The Owner has awarded contracts for engineering services, surveying, field engineering and testing.

1.3 OWNER FURNISHED PRODUCTS – NONE.

1.4 CONTRACTOR USE OF SITE AND PREMISES.

A. Access to Site: WORK ON THE IMPROVEMENTS SHALL BEGIN AS SOON AS POSSIBLE. WORK ACTIVITIES SHALL BE COORDINATED WITH THE OWNER, OTHER PLANNED WORK AND EVENTS ON THE CAMPUS. THE CAMPUS WILL BE IN OPERATION DURING THE ENTIETY OF THE PROJECT.

Otherwise, normal work hours are Monday through Friday, 7:00 a.m. to 5:00 p.m. Overtime work requires prior approval by the engineer/owner.

B. Construction Operations: Limited to areas noted on Drawings.

C. Utility Outages and Shutdown: Scheduling of utility outages or shutdowns requires a minimum of 24 hours notice to the engineer/owner.

1.5 FUTURE WORK - No future work is planned under this contract.

1.6 WORK SEQUENCE

A. Construct Work in stages to accommodate Owner's occupancy requirements during the construction period, coordinate construction schedule and operations with Owner/Engineer:

1. Coordinate with owner’s schedule and other contractors working on site. The improvements shall be constructed in the following priority order.

2. Schedule work so that adjacent property owners’ continuous access to their facility and utilities.

1.7 OWNER OCCUPANCY

A. The Owner will occupy the site during the entire period of construction.

B. Cooperate with Owner to minimize conflict, and to facilitate Owner's/Public's access.

C. Provide barricades, flag person, and flashers as required to protect the public and maintain passage of traffic across the campus’ facilities.

1.8 LIST OF DRAWINGS

Sheet Number	Description
	TITLE SHEET
C1	EXISTING CONDITIONS
C2.	SITE PLAN
C3.	GRADING AND EROSION CONTROL PLAN
C4.	TYPICAL DETAILS
C5.	TYPICAL DETAILS
C6.	FENCE DETAILS
C7.	FEMA FLOODPLAIN ANALYSIS

Supplemental Documents

Geotechnical Investigation Report (ETTL Job No. G 6046-226)

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Measurement and payment criteria applicable to the Work performed under a unit price payment method.

B. Method of payment for each item at unit prices as recorded in the Proposal of the executed Contract Documents.

1.2 AUTHORITY

A. Measurement methods delineated in the individual specification sections are intended to complement the criteria of this section.

B. Take all measurements and compute quantities. The Engineer will verify measurements and quantities.

C. Assist by providing necessary equipment, workers, and survey personnel as required.

1.3 UNIT QUANTITIES SPECIFIED

A. Quantities and measurements indicated in the Proposal are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work and verified by the Engineer shall determine payment.

B. If the actual Work requires fewer quantities than those quantities indicated, the Contractor will be paid for the actual units placed.

C. No payment will be made for materials in excess of plan quantities unless prior approval is obtained from the Engineer at the actual time of construction.

1.4 MEASUREMENT OF QUANTITIES

A. Measurement Devices:
   1. Weigh Scales: Inspected, tested, and certified by the applicable state Weights and Measures department within the past year.
   2. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
   3. Metering Devices: Inspected, tested, and certified by the applicable State department within the past year.

B. Measurement by Weight: Cast iron or ductile iron fittings, concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.

C. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.

D. Measurement by Area: Measured by square dimension using mean length and width or radius.

E. Linear Measurement: Measured by linear dimension at the item centerline or mean chord.

F. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

G. All measurements taken by survey or topography will be calculated by computer using three-dimensional modeling programs.

1.5 PAYMENT

A. Payment Includes: Full compensation for all required labor, Products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; including overhead and profit.

B. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by the Engineer multiplied by the unit sum/price for Work which is incorporated in or made necessary by the Work.

1.6 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements at the Contractors own cost.

B. If in the opinion of the Engineer it is not practical to remove and replace the Work, the Engineer may consider a request from the Contractor for alternate corrections to the work if such corrections are in the best interest of the Owner.

C. The authority of the Engineer to assess the defect and identify payment adjustment is final.

1.7 NON-PAYMENT FOR REJECTED PRODUCTS

A. Payment will not be made for any of the following:
   1. Products wasted or disposed of in a manner that is not acceptable;
   2. Products determined as unacceptable before or after placement;
   3. Products not completely unloaded from the transporting vehicle;

4. Products placed beyond the lines and levels of the required Work;
5. Products remaining on hand after completion of the Work;
6. Loading, hauling and disposing of rejected Products.

1.8 RELATED SECTIONS

A. Section 00330 – Competitive Sealed Proposal.

B. Section 01010 - Summary of Work.

C. Section 01300 - Submittals.

D. Section 01410 - Testing Laboratory Services.

E. Section 01700 - Contract Closeout.

1.9 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Quantities, as given in Section 003300 – Competitive Sealed Proposal, have been carefully computed by the Engineer. Where payment is made based on quantities noted as "field measured" quantities, the Contractor shall be paid for the actual measured amounts. Amounts over plan quantities, if any, will be authorized by change order prepared by the Engineer and approved by the owner. Where payment is made based on "plan quantities", the Contractor will be paid for no more than plan quantities. It is therefore incumbent upon the Contractor to closely adhere to the stipulated plan dimensions, grade and typical section and construct the project thereby. Payment, as stated herein, shall be considered as full compensation for all work required in provision, installation, and completion of the item(s).

B. The Contractor shall furnish all labor, materials, tools, equipment, and perform all work and services associated with each item of work as listed in the Proposal and the Reference Sections of the specifications. Although such work is not specifically indicated, the Contractor shall furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation. If a specific item of work, associated with the completion of another item, is not specifically mentioned herein, elsewhere, or in the Construction Drawings, the Contractor shall furnish, install or construct such item and shall consider it subsidiary and incidental, in terms of payment or compensation, to the various bid items with which it would normally be associated.

C. Refer to Section 00300 – Description of Work for a description of the bid items contained in Section 00330.

D. Project items as listed in Section 003300 – Competitive Sealed Proposal.

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Coordination and Project conditions.

B. Preconstruction meeting.

C. Site mobilization meeting.

D. Progress meetings.

E. Preinstallation meetings.

F. Closeout meeting.

G. Alteration procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of various Sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.

B. Verify that utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate Work of various Sections having interdependent responsibilities for installing, connecting to, and placing operating equipment in service.

C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit as closely as practical; place runs parallel with lines of building. Use spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
   1. Coordination Drawings: Prepare as required to coordinate all portions of Work. Show relationship and integration of different construction elements that require coordination during fabrication or installation to fit in space provided or to function as intended. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are important.

D. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and Subcontractors to ensure coordination of Work.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion and for portions of Work designated for Owner's occupancy.

G. After Owner's occupancy of premises, coordinate access to Site for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

1.3 PRECONSTRUCTION MEETING

A. Architect/Engineer will schedule and preside over meeting after Notice of Award.

B. Attendance Required: Architect/Engineer, Owner, Construction Manager, major Subcontractors, and Contractor.

C. Minimum Agenda:
1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of list of Subcontractors, list of products, schedule of values, and Progress Schedule.
5. Designation of personnel representing parties in Contract, and Engineer.
6. Communication procedures.
7. Procedures and processing of requests for interpretations, field decisions, field orders, submittals, substitutions, Applications for Payments, proposal request, Change Orders, and Contract closeout procedures.
8. Scheduling.
9. Critical Work sequencing.
10. Scheduling activities of Geotechnical Engineer.

D. Contractor: Record minutes and distribute copies to participants within two days after meeting, with two copies each to Engineer, Owner, and those affected by decisions made.

1.4 SITE MOBILIZATION MEETING

A. Architect/Engineer will schedule and preside over meeting at Project Site prior to Contractor occupancy. Contractor presides over meeting.

B. Attendance Required: Architect/Engineer, Owner, Contractor, Contractor's superintendent, major Subcontractors.

C. Minimum Agenda:
1. Use of premises by Owner and Contractor.
2. Owner's requirements and occupancy.
3. Construction facilities and controls.
4. Temporary utilities.
5. Survey and project layout.

6. Security and housekeeping procedures.
7. Schedules.
8. Procedures for testing.
9. Procedures for maintaining record documents.
10. Requirements for startup of equipment.
11. Inspection and acceptance of equipment put into service during construction period.

D. Contractor: Record minutes and distribute copies to participants within two days after meeting, with two copies each to Engineer, Owner, and those affected by decisions made.

1.5 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, and preside over meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, and Architect/Engineer, Owner, as appropriate to agenda topics for each meeting.

D. Minimum Agenda:
1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems impeding planned progress.
5. Review of submittal schedule and status of submittals.
6. Review of off-Site fabrication and delivery schedules.
7. Maintenance of Progress Schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on Progress Schedule and coordination.
13. Other business relating to Work.

E. Contractor: Record minutes and distribute copies to participants within two days after meeting, with two copies each to Architect/Engineer, Owner, and those affected by decisions made.

1.6 PREINSTALLATION MEETINGS

A. When required in individual Specification Sections, convene preinstallation meetings at Project Site five days before starting Work of specific Section.

B. Require attendance of parties directly affecting, or affected by, Work of specific Section.

C. Notify Engineer five days in advance of meeting date.

D. Prepare agenda and preside over meeting:
   1. Review conditions of installation, preparation, and installation procedures.
   2. Review coordination with related Work.

E. Record minutes and distribute copies to participants within two days after meeting, with two copies each to Engineer, Owner, and those affected by decisions made.

1.7 CLOSEOUT MEETING

A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.

B. Attendance Required: Contractor, major Subcontractors, Engineer, Owner, and others appropriate to agenda.

C. Notify Engineer five days in advance of meeting date.

D. Minimum Agenda:
   1. Start-up of facilities and systems.
   2. Operations and maintenance manuals.
   3. Testing, adjusting, and balancing.
   4. System demonstration and observation.
   5. Operation and maintenance instructions for Owner's personnel.
   6. Contractor's inspection of Work.
   7. Contractor's preparation of an initial "punch list."
   8. Procedure to request Architect/Engineer inspection to determine date of Substantial Completion.
   9. Completion time for correcting deficiencies.
   10. Inspections by authorities having jurisdiction.
   11. Certificate of Occupancy and transfer of insurance responsibilities.
   12. Partial release of retainage.
   13. Final cleaning.
   14. Preparation for final inspection.
   15. Closeout Submittals:
      a. Project record documents.
      b. Operating and maintenance documents.
      c. Operating and maintenance materials.
      d. Affidavits.
   16. Final Application for Payment.
   17. Contractor's demobilization of Site.
   18. Maintenance.

E. Record minutes and distribute copies to participants within two days after meeting, with two copies each to Engineer, Owner, and those affected by decisions made.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 ALTERATION PROCEDURES

A. Entire facility will be occupied for normal operations during progress of construction. Cooperate with Owner in scheduling operations to minimize conflict and to permit continuous usage.
   1. Perform Work not to interfere with operations of occupied areas.
   2. Keep utility and service outages to a minimum and perform only after written approval of Owner.
   3. Clean Owner-occupied areas daily. Clean spillage, overspray, and heavy collection of dust in Owner-occupied areas immediately.

B. Materials: As specified in product Sections; match existing products with new and salvaged (if allowed by contract) products for patching and extending Work.

C. Employ original or skilled and experienced installer to perform alteration and renovation Work.

D. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion. Comply with Section 01 70 00 - Execution and Closeout Requirements

E. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

F. Remove debris and abandoned items from area and from concealed spaces.

G. Prepare surface and remove surface finishes to permit installation of new Work and finishes.

H. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.

I. Remove, cut, and patch Work to minimize damage and to permit restoring products and finishes to original or specified condition.

J. Refinish existing visible surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes.

K. Where new Work abuts or aligns with existing Work, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

L. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Architect/Engineer for review.

M. Where change of plane of 1/4 inch or more occurs, submit recommendation for providing smooth transition to Architect/Engineer for review or request instructions from Engineer.

N. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing other imperfections.

O. Finish surfaces as specified in individual product Sections.

END OF SECTION

SECTION 01 33 00

SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Proposed products list.

D. Shop drawings.

E. Product data.

F. Samples.

G. Manufacturers' instructions.

H. Manufacturers' certificates.

1.2 RELATED SECTIONS

A. Section 01410 - Testing and Laboratory Services.

B. Section 01700 - Contract Closeout.

1.3 SUBMITTAL PROCEDURES

A. Transmit each submittal with Engineer accepted form in duplicate.

B. Sequentially number the transmittal forms. Resubmittals are to have original number with an alphabetic suffix.

C. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.

D. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to expedite the Project, and deliver to Engineer, MTG Engineers & Surveyors, Inc. at 5930 Summerhill Road, Texarkana, TX 75503. Coordinate submission of related items.

F. Identify variations from Contract Documents and specified Product or system limitations which may be detrimental to successful performance of the completed Work.

G. Provide space for Contractor and Engineer review/approval stamps.

H. Revise and resubmit submittals as required, identify all changes made since previous submittal.

I. All submittals shall include three copies and one reproducable plus the number of copies the contractor needs to do the work or alternatively, one Adobe PDF submittal.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial progress schedule within 15 days after date of Owner-Contractor Agreement for Engineer review.

B. Revise and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying current status and changes since previous version.

D. Indicate estimated percentage of completion for each item of Work at each submission.

E. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates.

1.5 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Owner-Contractor Agreement, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.6 SHOP DRAWINGS

A. Submit the number and types of drawing as shown above.

B. After review, Engineer will distribute in accordance with Article on Procedures above and for Record Documents described in Section 01700 - Contract Closeout.

1.7 PRODUCT DATA

A. Submit the number of copies which the Contractor requires, plus two copies which will be retained by the Engineer.

B. Mark each copy to identify applicable products, models, options, and other data.

Supplement manufacturers' standard data to provide information unique to this Project.

C. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents described in Section 01700 - Contract Closeout.

1.8 SAMPLES

A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

B. Reviewed samples which may be used in the Work are indicated in individual specification Sections.

1.9 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, and finishing, in quantities specified for Product Data.

B. Identify conflicts between manufacturers' instructions and Contract Documents.

1.10 MANUFACTURER'S CERTIFICATES

A. When specified in individual specification Sections, submit manufacturers' certificate to Engineer for review, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product but must be acceptable to Engineer.

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Quality control.

B. Tolerances.

C. References.

D. Labeling.

E. Mockup requirements.

F. Testing and inspection services.

G. Manufacturers' field services.

1.2 QUALITY CONTROL

A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.

B. Comply with specified standards as the minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

C. Perform Work using persons qualified to produce required and specified quality.

D. Products, materials, and equipment may be subject to inspection by Architect/Engineer at place of manufacture or fabrication. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.

E. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current as of date for receiving Bids or date of Owner-Contractor Agreement when there are no Bids except where specific date is established by code.

C. Obtain copies of standards and maintain on Site when required by product Specification Sections.

D. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

E. Neither contractual relationships, duties, or responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference in reference documents.

1.5 LABELING

A. Attach label from agency approved by authorities having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.

B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:
   1. Model number.
   2. Serial number.
   3. Performance characteristics.

C. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

1.6 MOCK-UP REQUIREMENTS

A. Tests will be performed under provisions identified in this Section and identified in individual product Specification Sections.

B. Assemble and erect specified or indicated items with specified or indicated attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mockups shall be comparison standard for remaining Work.

D. Where mockup has been accepted by Architect/Engineer and is specified in product Specification Sections to be removed, remove mockup and clear area when directed to do so by Architect/Engineer.

1.7 TESTING AND INSPECTION SERVICES

A. Owner will employ and pay for specified services of an independent firm to perform testing and inspection.

B. Independent firm will perform tests, inspections, and other services specified in individual Specification Sections and as required by Architect/Engineer or Owner.
   1. Laboratory: Authorized to operate at Project location.
   2. Laboratory Staff: Maintain full-time Professional Engineer on staff to review services.
   3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.

C. Testing, inspections, and source quality control may occur on or off Project Site. Perform off-Site testing as required by Architect/Engineer or Owner.

D. Reports shall be submitted by independent firm to Architect/Engineer, Contractor, and authorities having jurisdiction, in duplicate or email, indicating observations and results of tests and compliance or noncompliance with Contract Documents.
   1. Submit final report indicating correction of Work previously reported as noncompliant.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
   1. Notify Architect/Engineer and independent firm 24 hours before expected time for operations requiring services.
   2. Make arrangements with independent firm and pay for additional Samples and tests required for Contractor's use.

F. Employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work according to requirements of Contract Documents.

G. Retesting or re-inspection required because of nonconformance with specified or indicated requirements shall be performed by same independent firm on instructions from Architect/Engineer. Payment for retesting or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.

H. Agency Responsibilities:
   1. Test Samples of mixes submitted by Contractor.
   2. Provide qualified personnel at Site. Cooperate with Architect/Engineer and Contractor in performance of services.
   3. Perform indicated sampling and testing of products according to specified standards.

4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
5. Promptly notify Architect/Engineer and Contractor of observed irregularities or nonconformance of Work or products.
6. Perform additional tests required by Architect/Engineer.
7. Attend preconstruction meetings and progress meetings.

I. Agency Reports: After each test, promptly submit two or email copies of report to Architect/Engineer, Contractor, and authorities having jurisdiction. When requested by Architect/Engineer, provide interpretation of test results. Include the following:
1. Date issued.
2. Project title and number.
3. Name of inspector.
4. Date and time of sampling or inspection.
5. Identification of product and Specification Section.
6. Location in Project.
7. Type of inspection or test.
8. Date of test.
9. Results of tests.
10. Conformance with Contract Documents.

J. Limits on Testing Authority:
1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency or laboratory may not approve or accept any portion of the Work.
3. Agency or laboratory may not assume duties of Contractor.
4. Agency or laboratory has no authority to stop the Work.

1.8 MANUFACTURER'S FIELD SERVICES

A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Architect/Engineer seven days in advance of required observations. Observer is subject to approval of Owner.

C. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

D. Refer to Section 01 33 00 - Submittal Procedures, "Manufacturer's Field Reports" Article.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 41 00

TESTING LABORATORY SERVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Selection and payment.

B. Contractor submittals.

C. Laboratory responsibilities.

D. Laboratory reports.

E. Limits on testing laboratory authority.

F. Contractor responsibilities.

G. Schedule of inspections and tests.

1.2 RELATED SECTIONS

A. General Conditions: Inspections, testing, and approvals required by public authorities.

B. Section 01300 - Submittals: Manufacturer's certificates, material certifications, and mix designs.

C. Section 01700 - Contract Closeout: Project Record Documents.

D. Individual Specification Sections: Inspections and tests required and standards for testing.

1.3 REFERENCES

A. ANSI/ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

B. ANSI/ASTM E329 - Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.

C. ANSI A21.51/AWWA C151 and ANSI A21.4/AWWA C104 – Ductile Iron Pipe with Cement Mortar Lining and Seal Coat.

D. AWWA M9 – Concrete Pressure Pipe.

1.4 SELECTION AND PAYMENT

A. Owner will employ and pay for services of an independent testing laboratory to perform specified inspection and testing.

B. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.5 QUALITY ASSURANCE

A. Comply with requirements of ANSI/ASTM E329 and ANSI/ASTM D3740.

B. Laboratory: Authorized to operate in state in which Project is located.

C. Laboratory Staff: Maintain a full time staff to review services.

D. Testing Equipment: Calibrated at reasonable intervals with devices of accuracy traceable to either National Bureau of Standards (NBS) Standards or accepted values of natural physical constants.

1.6 LABORATORY RESPONSIBILITIES

A. Test samples of mixes submitted by Contractor.

B. Provide qualified personnel at site. Cooperate with Engineer and Contractor in performance of services.

C. Perform specified inspection, sampling, and testing of Products in accordance with specified standards.

D. Ascertain compliance of materials and mixes with requirements of Contract Documents.

E. Promptly notify Engineer and Contractor of observed irregularities or non-conformance of Work or Products.

F. Perform additional inspections and tests required by Engineer.

G. Attend preconstruction conferences and progress meetings as required.

1.7 LABORATORY REPORTS

A. After each inspection and test, promptly submit two copies of laboratory report to Engineer, and to Owner.

B. Include:

1. Date issued,
2. Project title and number,
3. Name of inspector,
4. Date and time of sampling or inspection,
5. Identification of product and Specifications Section,
6. Location in the Project,
7. Type of inspection or test,
8. Date of test,
9. Results of tests,
10. Conformance with Contract Documents.

C. When requested by Engineer, provide interpretation of test results.

1.8 LIMITS ON TESTING LABORATORY AUTHORITY

A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.

B. Laboratory may not approve or accept any portion of the Work.

C. Laboratory may not assume any duties of Contractor.

D. Laboratory has no authority to stop the Work.

1.9 CONTRACTOR RESPONSIBILITIES

A. Deliver to laboratory at designated location, adequate samples of materials proposed to be used, which require testing, along with proposed mix designs.

B. Cooperate with laboratory personnel, and provide access to the Work.

C. Provide incidental labor and facilities to provide access to Work to be tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.

D. Notify Engineer and laboratory 24 hours prior to expected time for operations requiring inspection and testing services.

END OF SECTION

SECTION 01 56 00

TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Water Control.

B. Dust Control.

C. Erosion and Sediment Control.

E. Traffic Control.

F. Student Control.

1.2 REGULATORY

A. Conform to local & state guidelines for construction site access and maintenance.

1.3 WATER CONTROL

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.4 DUST CONTROL

A. Execute Work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.5 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Minimize amount of bare soil exposed at one time.

C. Provide temporary measures such as berms, dikes, and drains to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

F. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.6 TRAFFIC CONTROL

A. All barricades, signs and traffic control devices shall be used and placed as directed by the Manual of Uniform Traffic Control Devices (MUTCD) or local/state regulations whichever is the most comprehensive. All traffic control flaggers and supervisors shall demonstrate knowledge of the MUTCD.

1.7 STUDENT CONTROL

A. When students are present, protect students by means of temporary fencing, filling settled areas, safely storing materials, safely operating equipment and keeping gates closed.

END OF SECTION

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Field engineering.

B. Closeout procedures.

C. Starting of systems.

D. Demonstration and instructions.

E. Testing, adjusting, and balancing.

F. Project record documents.

G. Operation and maintenance data.

H. Manual for materials and finishes.

I. Manual for equipment and systems.

J. Spare parts and maintenance products.

K. Product warranties and product bonds.

L. Maintenance service.

M. Examination.

N. Preparation.

O. Execution.

P. Cutting and patching.

Q. Protecting installed construction.

R. Final cleaning.

1.2 FIELD ENGINEERING

A. Employ land surveyor registered at Project location in State of Texas and acceptable to Architect/Engineer.

B. Owner will locate and Contractor shall Locate and protect survey control and reference points. Promptly notify Architect/Engineer of discrepancies discovered.

C. Control datum for survey is indicated on Drawings.

D. Prior to beginning Work, verify and establish connection elevations of existing facilities to ensure that new Work will meet existing elevations in smooth and level alignment except where specifically detailed or indicated otherwise.

E. Verify setbacks and easements; confirm Drawing dimensions and elevations.

F. Provide field engineering services. Establish elevations, lines, and levels using recognized engineering survey practices.

G. Submit copy of Site drawing signed by land surveyor certifying elevations and locations of the Work are in conformance with Contract Documents.

H. Maintain complete and accurate log of control and survey Work as Work progresses.

I. On completion of foundation walls and major Site improvements, prepare certified survey illustrating dimensions, locations, angles, and elevations of construction and Site Work.

J. Protect survey control points prior to starting Site Work; preserve permanent reference points during construction.

K. Promptly report to Architect/Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.

L. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect/Engineer.

1.3 CLOSEOUT PROCEDURES

A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:
   1. Submit maintenance manuals, Project record documents, digital images of construction photographs and other similar final record data in compliance with this Section.
   2. Complete facility startup, testing, adjusting, balancing of systems and equipment, demonstrations, and instructions to Owner's operating and maintenance personnel as specified in compliance with this Section.
   3. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.

4. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.
5. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.
6. Make final change-over of locks eliminating construction master-key system and transmit keys directly to Owner. Advise Owner's personnel of change-over in security provisions.
7. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.
8. Perform final cleaning according to this Section.

B. Substantial Completion Inspection:
   1. When Contractor considers Work to be substantially complete, submit to Architect/Engineer:
      a. Written certificate that Work, or designated portion, is substantially complete.
      b. List of items to be completed or corrected (initial punch list).
   2. Within seven days after receipt of request for Substantial Completion, Architect/Engineer will make inspection to determine whether Work or designated portion is substantially complete.
   3. Should Architect/Engineer determine that Work is not substantially complete:
      a. Architect/Engineer will promptly notify Contractor in writing, stating reasons for its opinion.
      b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Architect/Engineer.
      c. Architect/Engineer will reinspect Work.
      d. Redo and Inspection of Deficient Work: Repeated until Work passes Architect/Engineer's inspection.
   4. When Architect/Engineer finds that Work is substantially complete, Architect/Engineer will:
      a. Prepare Certificate of Substantial Completion on AIA G704 - Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Architect/Engineer and Owner (final punch list).
      b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.
   5. After Work is substantially complete, Contractor shall:
      a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
      b. Complete Work listed for completion or correction within time period stipulated.
   6. Owner will occupy portions of project as specified in Section 01 10 00 - Summary.

C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.
   1. When Contractor considers Work to be complete, submit written certification that:
      a. Contract Documents have been reviewed.
      b. Work has been examined for compliance with Contract Documents.

c. Work has been completed according to Contract Documents.
d. Work is completed and ready for final inspection.

2. Submittals: Submit following:
   a. Final punch list indicating all items have been completed or corrected.
   b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
   c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
   d. Accounting statement for final changes to Contract Sum.
   e. Contractor's affidavit of payment of debts and claims on AIA G706 - Contractor's Affidavit of Payment of Debts and Claims.
   f. Contractor affidavit of release of liens on AIA G706A - Contractor's Affidavit of Release of Liens.
   g. Consent of surety to final payment on AIA G707 - Consent of Surety to Final Payment Form.
3. Perform final cleaning for Contractor-soiled areas according to this Section.

D. Final Completion Inspection:
1. Within seven days after receipt of request for final inspection, Architect/Engineer will make inspection to determine whether Work or designated portion is complete.
2. Should Architect/Engineer consider Work to be incomplete or defective:
   a. Architect/Engineer will promptly notify Contractor in writing, listing incomplete or defective Work.
   b. Contractor shall remedy stated deficiencies and send second written request to Architect/Engineer that Work is complete.
   c. Architect/Engineer will reinspect Work.
   d. Redo and Inspection of Deficient Work: Repeated until Work passes Architect/Engineer's inspection.

1.4 STARTING OF SYSTEMS

A. Coordinate schedule for startup of various equipment and systems.

B. Notify Architect/Engineer seven days prior to startup of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify that tests, meter readings, and electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute startup under supervision of manufacturer's representative or Contractors' personnel according to manufacturer's instructions.

G. When specified in individual Specification Sections, require manufacturer to provide authorized representative who will be present at Site to inspect, check, and approve equipment or system installation prior to startup and will supervise placing equipment or system in operation.

H. Submit a written report according to Section 01 33 00 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion and/or final inspection.

B. Demonstrate Project equipment and instructed by qualified manufacturer's representative who is knowledgeable about the Project.

C. Video Recordings: Provide high-quality color video recordings of demonstration and instructional sessions. Engage commercial videographer to record sessions. Include classroom instructions, demonstrations, board diagrams, and other visual aids. Include menu navigation.

D. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

E. Use operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

F. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

G. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

H. Required instruction time for each item of equipment and system is specified in individual Specification Sections.

1.6 TESTING, ADJUSTING, AND BALANCING

A. Owner will appoint, employ, and pay for services of independent firm to perform testing, adjusting, and balancing.

B. Independent firm will perform services as required.

C. Reports will be submitted by independent firm to Architect/Engineer indicating observations and results of tests and indicating compliance or noncompliance with requirements of Contract Documents.

1.7 PROJECT RECORD DOCUMENTS

A. Maintain on Site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed Shop Drawings, product data, and Samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates used.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as follows:
   1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
   2. Include locations of concealed elements of the Work.
   3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.
   4. Dimension ends, corners, and junctions of buried utilities to permanent facility components using triangulation.
   5. Identify and locate existing buried or concealed items encountered during Project.
   6. Measured depths of foundations in relation to finish main floor datum.
   7. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   8. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   9. Field changes of dimension and detail.
   10. Details not on original Drawings.

G. Submit marked-up paper copy documents to Architect/Engineer before Substantial Completion with claim for final Application for Payment.

H. Submit PDF electronic files of marked-up documents to Architect/Engineer before Substantial Completion with claim for final Application for Payment.

1.8 OPERATION AND MAINTENANCE DATA

A. Submit in PDF composite electronic indexed file.

B. Submit data bound in 8-1/2 x 11-inch text pages, three D side ring binders with durable plastic covers.

C. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," title of Project, and subject matter of binder when multiple binders are required.

D. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

E. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

F. Contents: Prepare table of contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by Specification Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Include the following:
      a. Significant design criteria.
      b. List of equipment.
      c. Parts list for each component.
      d. Operating instructions.
      e. Maintenance instructions for equipment and systems.
      f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
      g. Safety precautions to be taken when operating and maintaining or working near equipment.
   3. Part 3: Project documents and certificates, including the following:
      a. Shop Drawings and product data.
      b. Air and water balance reports.
      c. Certificates.
      d. Originals of warranties and bonds.

1.9 MANUAL FOR MATERIALS AND FINISHES

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.

B. For equipment or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

D. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

E. Additional Requirements: As specified in individual product Specification Sections.

F. Include listing in table of contents for design data, with tabbed fly sheet and space for insertion of data.

1.10 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Each Item of Equipment and Each System: Include description of unit or system and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

D. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; by label machine.

E. Include color-coded wiring diagrams as installed.

F. Operating Procedures: Include startup, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and special operating instructions.

G. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

H. Include servicing and lubrication schedule and list of lubricants required.

I. Include manufacturer's printed operation and maintenance instructions.

J. Include sequence of operation by controls manufacturer.

K. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

L. Include control diagrams by controls manufacturer as installed.

M. Include Contractor's coordination drawings with color-coded piping diagrams as installed.

N. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

O. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

P. Include test and balancing reports as specified in Section 01 40 00 - Quality Requirements.

Q. Additional Requirements: As specified in individual product Specification Sections.

R. Include listing in table of contents for design data with tabbed dividers and space for insertion of data.

1.11 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.

B. Deliver to Project Site and place in location as directed by Owner; obtain receipt prior to final payment.

1.12 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.

B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include table of contents and assemble in three D side ring binder with durable plastic cover.

F. Submit prior to final Application for Payment.

1.13 MAINTENANCE SERVICE

A. Furnish service and maintenance of components indicated in Specification Sections during warranty period.

B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.

D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual Specification Sections.

D. Verify that utility services are available with correct characteristics and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance according to manufacturer's instructions.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer-required or -recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

3.3 EXECUTION

A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.

B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.

D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
2. Physically separate products in place, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual-effect choices to Architect/Engineer for final decision.

E. Allow for expansion of materials and building movement.

F. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.
1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.

G. Mounting Heights: Where not indicated, mount individual units of Work at industry recognized standard mounting heights for particular application indicated.
1. Refer questionable mounting heights choices to Architect/Engineer for final decision.
2. Elements Identified as Accessible to Handicapped: Comply with applicable codes and regulations.

H. Adjust operating products and equipment to ensure smooth and unhindered operation.

I. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

3.4 CUTTING AND PATCHING

A. Employ original installers to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements affecting:
1. Structural integrity of element.
2. Integrity of weather-exposed or moisture-resistant elements.
3. Efficiency, maintenance, or safety of element.
4. Visual qualities of sight-exposed elements.
5. Work of Owner or separate contractor.

C. Execute cutting, fitting, and patching including excavation and fill to complete Work and to:
1. Fit the several parts together, to integrate with other Work.
2. Uncover Work to install or correct ill-timed Work.
3. Remove and replace defective and nonconforming Work.
4. Remove samples of installed Work for testing.

5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.

E. Cut masonry and concrete materials using masonry saw or core drill.

F. Restore Work with new products according to requirements of Contract Documents.

G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.

H. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.

I. Identify hazardous substances or conditions exposed during the Work to Architect/Engineer for decision or remedy.

3.5 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual Specification Sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Use durable sheet materials to protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

3.6 FINAL CLEANING

A. Execute final cleaning prior to final Project assessment.
   1. Employ experienced personnel.

B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains, and foreign substances; polish transparent and glossy surfaces.

C. Clean equipment and fixtures to sanitary condition with appropriate cleaning materials.

D. Replace filters of operating equipment.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Clean Site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from Site.

END OF SECTION

SECTION 02 11 00

SITE PREPARATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Remove surface debris.

B. Clear site of plant life and grass.

C. Remove trees and shrubs.

D. Remove root system of trees and shrubs.

E. Topsoil excavation.

F. Remove other obstructions as necessary for the construction of the project.

1.2 RELATED SECTIONS

A. Section 01025 - Measurement and Payment: Requirements applicable to unit prices for the work of this Section.

B. Section 01532 - Tree Protection.

C. Section 31 22 13 - Rough Grading.

1.3 REGULATORY REQUIREMENTS

A. Conform to applicable code for disposal of debris, burning debris on site if allowed by Owner and Regulatory Agencies, and dust control.

B. Coordinate clearing Work with utility companies.

PART 2 PRODUCTS

2.1 MATERIALS

A. Not applicable on this Project.

PART 3 EXECUTION

3.1 PREPARATION

A. Verify that existing plant life designated to remain, is tagged or identified.

3.2 PROTECTION

A. Locate, identify, and protect utilities that remain, from damage.

B. Protect trees, plant growth, and features designated to remain, as final landscaping.

C. Protect bench marks and existing structures from damage or displacement.

3.3 CLEARING

A. Clear areas required for access to site and execution of Work.

B. Remove trees and shrubs within marked areas indicated. Remove stumps and root system.

C. Clear undergrowth and deadwood, without disturbing subsoil.

3.4 REMOVAL

A. Remove debris, rock, and extracted plant life from site.

3.5 TOPSOIL EXCAVATION

A. Excavate topsoil from areas to be further excavated, to an average depth of 6 inches.

B. Load, haul and stockpile in area designated on Owner project directed by the Engineer. Protect from erosion. Remove excess topsoil not being reused, from site.

C. Do not excavate wet topsoil.

D. At completion of topsoil replacement, grade remaining stockpiles to a stable shape and slope and revegetate.

END OF SECTION

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Formwork for cast-in place concrete.
   2. Shoring, bracing, and anchorage.
   3. Architectural form liners.
   4. Form accessories.
   5. Form stripping.

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
   2. ACI 301 - Specifications for Structural Concrete.
   3. ACI 318 - Building Code Requirements for Structural Concrete.
   4. ACI 347 - Guide to Formwork for Concrete.

B. American Forest and Paper Association:
   1. AF&PA - National Design Specifications for Wood Construction.

C. The Engineered Wood Association:
   1. APA/EWA PS 1 - Voluntary Product Standard for Construction and Industrial Plywood.

D. American Society of Mechanical Engineers:
   1. ASME A17.1 - Safety Code for Elevators and Escalators.

E. ASTM International:
   1. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
   2. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.

F. West Coast Lumber Inspection Bureau:
   1. WCLIB - Standard Grading Rules for West Coast Lumber.

1.3 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing in accordance with ACI 318 to conform to applicable code requirements to achieve concrete shape, line and dimension as indicated on Drawings.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings for Concrete Structures as required in plans: Signed and sealed by professional engineer.
   1. Submit formwork, shoring, and reshoring shop drawings.
   2. Indicate the following:
      a. Pertinent dimensions, openings, methods of construction, types of connections, materials, joint arrangement and details, ties and shores, location of framing, studding and bracing, and temporary supports.
      b. Means of leakage prevention for concrete exposed to view in finished construction.
      c. Sequence and timing of erection and stripping assumed compressive strength at time of stripping, height of lift and height of drop during placement.
      d. Vertical, horizontal and special loads in accordance with ACI 347, Section 2.2 and camber diagrams, when applicable.
      e. Notes to formwork erector showing size and location of conduits and piping embedded in concrete in accordance with ACI 318, Section 6.3.
      f. Procedure and schedule for removal of shores and installation and removal of reshores.

C. Product Data: Submit data on void form materials.

D. Design Data: Signed and sealed by professional engineer.
   1. Indicate design data for formwork and shoring.
   2. Indicate loads transferred to structure during process of concreting, shoring and reshoring.
   3. Include structural calculations to support design.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 347, ACI 301 and ACI 318, as applicable.

B. For wood products furnished for work of this Section, comply with AF&PA.

C. Perform Work in accordance with appropriate city and state agency requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Products storage and handling requirements.

B. Deliver void forms and installation instructions in manufacturer's packaging.

C. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.7 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate this Section with other sections of work, requiring attachment of components to formwork.

PART 2 - PRODUCTS

2.1 WOOD FORM MATERIALS

A. Form Materials: At discretion of Contractor.

B. Lumber Forms:
   1. Provide properly seasoned good-quality lumber that is free from imperfections that would affect its strength or impair the finished surface of the concrete.
   2. Provide timber or lumber that meets or exceeds the requirements for species and grade in the submitted formwork plans.
   3. Maintain forms or form lumber that will be reused so that it stays clean and in good condition. Do not use any lumber that is split, warped, bulged, or marred or that has defects that will produce inferior work, and promptly remove such lumber from the work.

C. Plywood Forms:
   1. Application: Use for exposed finish concrete.
   2. Forms: Conform to PS 1; full size 4 x 8 feet panels; each panel labeled with grade trademark of APA/EWA.
   3. Plywood for Surfaces to Receive Membrane Waterproofing: Minimum of 5/8 inch thick; APA/EWA “B-B Plyform Structural I Exterior” grade.
   4. Plywood where “Smooth Finish” is required, as indicated on Drawings: APA/EWA “HD Overlay Plyform Structural I Exterior” grade, minimum of 3/4 inch thick.

2.2 PREFABRICATED FORMS

A. Furnish materials in accordance appropriate city and state agency requirements.

B. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

C. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

D. Pan Type: Steel of size and profile required.

E. Tubular Column Type: Round, spirally wound laminated fiber material, surface treated with release agent, non-reusable, sizes as indicated on Drawings.

F. Steel Forms: Sheet steel, suitably reinforced, and designed for particular use indicated on Drawings.

G. Form Liners: Smooth, durable, grainless and non-staining hardboard, unless otherwise indicated on Drawings.

H. Framing, Studding and Bracing: Stud or No. 3 structural light framing grade.

2.3 FORMWORK ACCESSORIES

A. Form Ties: Removable or Snap-off type, galvanized metal, fixed length, free of defects capable of leaving holes larger than 1 inch in concrete surface.

B. Spreaders: Standard, non-corrosive metal form clamp assembly, of type acting as spreaders and leaving no metal within 1 inch of concrete face. Wire ties, wood spreaders or through bolts are not permitted.

C. Form Anchors and Hangers:
   1. Do not use anchors and hangers exposed concrete leaving exposed metal at concrete surface.
   2. Symmetrically arrange hangers supporting forms from structural steel members to minimize twisting or rotation of member.
   3. Penetration of structural steel members is not permitted.

D. Form Release Agent: Colorless mineral oil that will not stain concrete, or absorb moisture , or impair natural bonding or color characteristics of coating intended for use on concrete.

E. Corners: Fillet or Chamfer, rigid plastic or wood strip type.

F. Dovetail Anchor Slot: Galvanized steel, 22 gage thick, release tape sealed slots, anchors for securing to concrete formwork.

G. Vapor Retarder: Where indicated on Drawings, 6 mil thick polyethylene sheet.

H. Bituminous Joint Filler: ASTM D1751.

I. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength and character to maintain formwork in place while placing concrete.

J. Water Stops: In accordance with manufacturer’s recommendations and as specified in the plans.

2.4 COATINGS

A. Coatings for Aluminum: Polyamide epoxy finish coat with paint manufacturer’s recommended primer for aluminum substrate. Apply one coat primer and one coat finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings.

C. When formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect/Engineer.

3.2 INSTALLATION

A. Earth Forms, when permitted:
   1. Trench earth forms neatly, accurately, and at least 2 inches wider than footing widths indicated on Drawings.
   2. Trim sides and bottom of earth forms.
   3. Construct wood edge strips at top of each side of trench to secure reinforcing and prevent trench from sloughing.
   4. Form sides of footings where earth sloughs.
   5. Tamp earth forms firm and clean forms of debris and loose material before depositing concrete.

B. Formwork - General:
   1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
   2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
   3. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings.
   4. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
   5. Complete wedging and bracing before placing concrete.

C. Forms for Smooth Finish Concrete:
   1. Use steel, plywood or lined board forms.
   2. Use clean and smooth plywood and form liners, uniform in size, and free from surface and edge damage capable of affecting resulting concrete finish.
   3. Install form lining with close-fitting square joints between separate sheets without springing into place.
   4. Use full size sheets of form lines and plywood wherever possible.
   5. Tape joints to prevent protrusions in concrete.
   6. Use care in forming and stripping wood forms to protect corners and edges.
   7. Level and continue horizontal joints.
   8. Keep wood forms wet until stripped.

D. Forms for Surfaces to Receive Membrane Waterproofing: Use plywood or steel forms. After erection of forms, tape form joints to prevent protrusions in concrete.

E. Framing, Studding and Bracing:
   1. Space studs at 16 inches on center maximum for boards and 12 inches on center maximum for plywood.
   2. Size framing, bracing, centering, and supporting members with sufficient strength to maintain shape and position under imposed loads from construction operations.
   3. Construct beam soffits of material minimum of 2 inches thick.
   4. Distribute bracing loads over base area on which bracing is erected.
   5. When placed on ground, protect against undermining, settlement or accidental impact.

F. Erect formwork, shoring, and bracing to achieve design requirements, in accordance with requirements of ACI 301 and ACI 318.

G. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

H. Obtain Architect/Engineer’s approval before framing openings in structural members not indicated on Drawings.

I. Install chamfer strips on external corners of exposed structures.

J. Install void forms in accordance with manufacturer's recommendations.

3.3 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces are indicated to receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

D. Reuse and Coating of Forms: Thoroughly clean forms and reapply form coating before each reuse. For exposed work, do not reuse forms with damaged faces or edges. Apply form coating to forms in accordance with manufacturer’s specifications. Do not coat forms for concrete indicated to receive “scored finish”. Apply form coatings before placing reinforcing steel.

3.4 INSTALLATION - INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Install formed openings for items to be embedded in or passing through concrete work.

B. Locate and set in place items required to be cast directly into concrete.

C. Coordinate with Work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

D. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.

E. Install water stops continuous without displacing reinforcement.

F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

H. Form Ties:
   1. Use sufficient strength and sufficient quantity to prevent spreading of forms.
   2. Place ties at least 1 inch away from finished surface of concrete.
   3. Leave inner rods in concrete when forms are stripped.
   4. Space form ties equidistant, symmetrical and aligned vertically and horizontally unless otherwise shown on Drawings.

I. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.

J. Construction Joints:
   1. Install surfaced pouring strip where construction joints intersect exposed surfaces to provide straight line at joints.
   2. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage.
   3. Show no overlapping of construction joints. Construct joints to present same appearance as butted plywood joints.
   4. Arrange joints in continuous line straight, true and sharp.

K. Embedded Items:
   1. Make provisions for pipes, sleeves, anchors, inserts, anchor slots, nailers, water stops, and other features.
   2. Do not embed wood or uncoated aluminum in concrete.
   3. Obtain installation and setting information for embedded items furnished under other Specification sections.
   4. Securely anchor embedded items in correct location and alignment prior to placing concrete.
   5. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 for size and location limitations.

L. Openings for Items Passing Through Concrete:
   1. Frame openings in concrete where indicated on Drawings. Establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections.
   2. Coordinate work to avoid cutting and patching of concrete after placement.
   3. Perform cutting and repairing of concrete required as result of failure to provide required openings.

M. Screeds:
   1. Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs.
   2. Slope slabs to drain where required or as shown on Drawings.
   3. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms. Remove freestanding water.

N. Screed Supports:
   1. For concrete over waterproof membranes and vapor retarder membranes, use cradle, pad or base type screed supports which will not puncture membrane.
   2. Staking through membrane is not be permitted.

O. Cleanouts and Access Panels:
   1. Provide removable cleanout sections or access panels at bottoms of forms to permit inspection and effective cleaning of loose dirt, debris and waste material.
   2. Clean forms and surfaces against which concrete is to be placed. Remove chips, saw dust and other debris. Thoroughly blow out forms with compressed air just before concrete is placed.

3.5 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.6 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Architect/Engineer.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

D. Leave forms in place for minimum number of days as specified in ACI 347.

3.7 ERECTION TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 301 and ACI 318.

3.8 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

C. Notify Architect/Engineer after placement of reinforcing steel in forms, but prior to placing concrete.

D. Schedule concrete placement to permit formwork inspection before placing concrete.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCING - CIVIL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Reinforcing bars.
2. Welded wire fabric.
3. Reinforcement accessories.

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 301 - Specifications for Structural Concrete.
2. ACI 318 - Building Code Requirements for Structural Concrete.
3. ACI 530.1 - Specifications for Masonry Structures.
4. ACI SP-66 - ACI Detailing Manual.

B. ASTM International:
1. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
2. ASTM A184/A184M - Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
3. A185/A185M-07 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
4. ASTM A496/A496M - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
5. ASTM A497/A497M - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
6. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
7. ASTM A704/A704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
8. ASTM A706/A706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
9. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
10. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
11. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.
12. ASTM A934/A934M - Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars.
13. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.

C. American Welding Society:
   1. AWS D1.4 - Structural Welding Code - Reinforcing Steel.

D. Concrete Reinforcing Steel Institute:
   1. CRSI - Manual of Standard Practice.
   2. CRSI - Placing Reinforcing Bars.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Certificates: Submit AWS qualification certificate for welders employed on the Work.

C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with CRSI - Manual of Standard Practice, ACI 301, ACI 318.

B. Perform Work in accordance with appropriate city and state agency requirements.

C. Maintain one copy of document on site.

1.5 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate with placement of formwork, formed openings and other Work.

PART 2 - PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, 60 ksi yield grade, deformed billet bars or as shown on plans.

B. Deformed Bar Mats: ASTM A184/A184M; fabricated from ASTM A615/A615M; 60 ksi yield strength, steel bars, as shown on plans.

C. Welded Plain Wire Fabric: ASTM A185/A185M; in flat sheets; as shown on plans.

D. Dowels: ASTM A615/A615M; 60 ksi yield strength, plain steel bars; square ends with burrs removed; size and finish as indicated on drawings.

2.2 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage annealed type or as shown on plans.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor retarder puncture.

C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic-coated steel or Plastic tipped steel type; size and shape to meet Project conditions.

D. Reinforcing Splicing Devices: Mechanical threaded type; full tension and compression; sized to fit joined reinforcing.

2.3 FABRICATION

A. Fabricate concrete reinforcement in accordance with CRSI Manual of Practice or ACI 318.

B. Form standard hooks for 180 degree bends, 90 degree bend, stirrup and tie hooks, and seismic hooks as indicated on Drawings.

C. Form reinforcement bends with minimum diameters in accordance with ACI 318.

D. Fabricate column reinforcement with offset bends at reinforcement splices.

E. Form spiral column reinforcement from minimum 3/8 inch diameter continuous deformed, plain bar or wire.

F. Weld reinforcement in accordance with AWS D1.4.

G. Locate reinforcement splices not indicated on Drawings, at point of minimum stress.

2.4 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.

PART 3 - EXECUTION

3.1 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position beyond specified tolerance.
   1. Do not weld crossing reinforcement bars for assembly except as permitted by Architect/Engineer.

B. Do not displace or damage vapor retarder.

C. Accommodate placement of formed openings.

D. Space reinforcement bars with minimum clear spacing in accordance with ACI 318 of one bar diameter, but not less than 1 inch.
   1. Where bars are indicated in multiple layers, place upper bars directly above lower bars.

E. Maintain concrete cover around reinforcement in accordance with ACI 318 as follows or as shown on plans:

Reinforcement Location		Minimum Concrete Cover
Footings and Concrete Formed Against Earth		3 inches
Concrete exposed to earth or weather	No. 6 bars and larger	2 inches
	No. 5 bars and smaller	1-1/2 inches
Supported Slabs, Walls, and Joists	No. 14 bars and larger	1-1/2 inches
	No. 11 bars and smaller	3/4 inches
Beams and Columns		1-1/2 inches
Shell and Folded Plate Members	No. 6 bars and larger	3/4 inches
	No. 5 bars and smaller	1/2 inches

F. Bond and ground reinforcement as shown in plans.

G. Place dowels to achieve paving and curb alignment as detailed.

H. Provide doweled joints at locations and spacing as shown on Plans.

I. Repair damaged epoxy coating to match shop finish.

3.2 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Install reinforcement within the following tolerances for flexural members, walls, and compression members:

Reinforcement Depth	Depth Tolerance	Concrete Cover Tolerance
Greater than 8 inches	plus or minus 3/8 inch	minus 3/8 inch
Less than 8 inches	plus or minus 1/2 inch	minus 1/2 inch

C. Install reinforcement within the tolerances specified in ACI 530.1 for foundation walls.

3.3 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Perform field inspection and testing in accordance with ACI 318.

C. Provide free access to Work and cooperate with appointed firm.

D. Reinforcement Inspection:
   1. Placement Acceptance: Specified and ACI 318 material requirements and specified placement tolerances.
   2. Welding: Inspect welds in accordance with AWS D1.1.
   3. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.
   4. Weldability Inspection: Inspect for reinforcement weldability when formed from steel other than ASTM A706/A706M.
   5. Continuous Weld Inspection: Inspect reinforcement as required by ACI 318.
   6. Periodic Weld Inspection: Other welded connections.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete for the following:
   1. Building frame members.
   2. Shear walls.
   3. Elevator shaft walls.
   4. Foundation walls.
   5. Supported slabs.
   6. Slabs on grade.
   7. Control, expansion and contraction joint devices.
   8. Equipment pads.
   9. Light pole base.
   10. Flagpole base.
   11. Thrust blocks.
   12. Manholes.
   13. Site Paving

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete.
   2. ACI 305 - Hot Weather Concreting.
   3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
   4. ACI 308.1 - Standard Specification for Curing Concrete.
   5. ACI 318 - Building Code Requirements for Structural Concrete.

B. ASTM International:
   1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
   2. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   3. ASTM C33 - Standard Specification for Concrete Aggregates.
   4. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
   5. ASTM C42/C42M - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
   6. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
   7. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
   8. ASTM C150 - Standard Specification for Portland Cement.
   9. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
   10. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

11. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
12. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
13. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
14. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
15. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
16. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
17. ASTM C685/C685M - Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing.
18. ASTM C845 - Standard Specification for Expansive Hydraulic Cement.
19. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
20. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
21. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
22. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
23. ASTM C1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete.
24. ASTM C1157 - Standard Performance Specification for Hydraulic Cement.
25. ASTM C1218/C1218M - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
26. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
27. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
28. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
29. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
30. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
31. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
32. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
33. ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
34. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data on joint devices, attachment accessories, and admixtures.

C. Design Data:
   1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
      a. Hot and cold weather concrete work.
      b. Air entrained concrete work.
   2. Identify mix ingredients and proportions, including admixtures.
   3. Identify chloride content of admixtures and whether or not chloride was added during manufacture.

D. Samples: When indicated on plans, Submit a minimum of two samples.

E. Manufacturer's Installation Instructions: Submit installation procedures and interface required with adjacent Work.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 318.

B. Conform to ACI 305 when concreting during hot weather.

C. Conform to ACI 306.1 when concreting during cold weather.

D. Acquire cement and aggregate from one source for Work.

E. Perform Work in accordance with appropriate city and state agency requirements.

F. Maintain one copy of each document on site.

1.6 MOCKUP

A. Section 01 40 00 - Quality Requirements: Requirements for mockup.

B. Construct mockup for architectural concrete surfaces receiving special treatment or finish as result of formwork.

C. Remove mockup when directed by Architect/Engineer.

1.7 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I – Normal, Type II – Moderate, and/or Type III - High Early Strength.

B. Blended Cement: ASTM C595; Type IS or IP.

C. Normal Weight Aggregates: ASTM C33.
   1. Coarse Aggregate Maximum Size: In accordance with ACI 318.

D. Water: ACI 318; potable, without deleterious amounts of chloride ions.

2.2 ADMIXTURES

A. Furnish materials in accordance with appropriate city and state agency requirements.

B. Air Entrainment: ASTM C260.

C. Chemical: ASTM C494/C494M.
   1. Type A - Water Reducing.
   2. Type B - Retarding.
   3. Type C - Accelerating.
   4. Type D - Water Reducing and Retarding.
   5. Type E - Water Reducing and Accelerating.
   6. Type F - Water Reducing, High Range.
   7. Type G - Water Reducing, High Range and Retarding.

D. Fly Ash: ASTM C618 Class C.

E. Silica Fume: ASTM C1240.

F. Plasticizing: ASTM C1017/C1017M Type I, plasticizing, Type II, plasticizing and retarding.

2.3 ACCESSORIES

A. Bonding Agent: Latex emulsion, Two component modified epoxy resin, and Polyamid cured epoxy.

2.4 JOINT DEVICES AND FILLER MATERIALS

A. Joint Filler Type A: ASTM D1751, ASTM D994; Asphalt impregnated fiberboard or felt, 1/4 inch thick; tongue and groove profile;

B. Joint Filler Type B: ASTM D1752; Premolded sponge rubber.

C. Construction Joint Devices: Integral galvanized steel and extruded plastic; formed to tongue and groove profile, with removable top strip exposing sealant trough, knockout holes spaced at 6 inches, ribbed steel spikes with tongue to fit top screed edge.

D. Sealant and Primer: As specified or as shown in plans.

E. Sealant: ASTM D6690, Type I.

2.5 CONCRETE MIX

A. Select proportions for normal weight concrete in accordance with ACI 301 Method 2 or Method 3.

B. Select proportions for concrete in accordance with ACI 318 without trial mixtures or field experience when approved by Architect/Engineer.

C. Provide concrete to the following criteria:

Material and Property			
Class	Inlets, Manholes, Curb & Gutter, Sidewalks, Driveways, Anchors, Small Roadside Signs, Rip Rap	Headwalls, wingwalls, light pole foundations	Site Paving
Compressive Strength (28 day)	3000 psi	3600 psi	4000 psi
Water/Cement Ratio (Max)	0.6	0.45	0.50
Air Content	5% +/-1.5%	5% +/-1.5%	4.5% +/- 1.5%
Fly Ash Content:	20-35% of cement	20-35% of cement	20-35% of cement
Slump	4” recommended 6.5” maximum	3” minimum 7.5” maximum	4” recommended 5.5” maximum

* Use recommended strength of geotechnical report, if provided.

D. Admixtures: Include admixture types and quantities indicated in concrete mix designs only when approved by Architect/Engineer.
   1. Do not use calcium chloride nor admixtures containing calcium chloride.
   2. Use set retarding admixtures during hot weather.
   3. Add air entrainment admixture to concrete mix for work exposed to freezing and thawing.

E. Average Compressive Strength Reduction: Not permitted.

F. Ready Mixed Concrete: Mix and deliver concrete in accordance with ASTM C94/C94M.

G. Site Mixed Concrete: Mix concrete in accordance with ACI 318.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify requirements for concrete cover over reinforcement.

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

3.2 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials.

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

C. Remove debris and ice from formwork, reinforcement, and concrete substrates.

D. Remove water from areas receiving concrete before concrete is placed.

3.3 PLACING CONCRETE

A. Place concrete in accordance with ACI 301 or ACI 318.

B. Notify testing laboratory and Architect/Engineer minimum 24 hours prior to commencement of operations.

C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, are not disturbed during concrete placement.

D. Separate slabs on grade from vertical surfaces as noted on plans.

E. Install construction joint devices in coordination with pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

F. Deposit concrete at final position. Prevent segregation of mix.

G. Place concrete in continuous operation for each panel or section determined by predetermined joints.

H. Consolidate concrete.

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

J. Place concrete continuously between predetermined expansion, control, and construction joints.

K. Do not interrupt successive placement; do not permit cold joints to occur.

L. Place slabs in checkerboard or saw cut pattern indicated.

M. Saw cut joints in a timely fashion to prevent uncontrolled cracking, but not later than 12 hours after placing. Use 3/16 inch thick blade, cut into 1/3 depth of slab thickness.

3.4 CONCRETE FINISHING

A. Provide formed concrete surfaces to be left exposed (concrete walls, columns, inlets, beams, joists, etc.) with smooth rubbed finish.

3.5 CURING AND PROTECTION

A. Cure concrete in accordance with ACI 308.1.

3.6 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Perform field inspection and testing in accordance with ACI 318.

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

D. Concrete Inspections:
   1. Continuous Placement Inspection: Inspect for proper installation procedures.
   2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.

E. Strength Test Samples:
   1. Sampling Procedures: ASTM C172.
   2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, standard cured.

3. Sample concrete and make one set of three cylinders for every 150 cu yds or less of each class of concrete placed each day and for every 5,000 sf of surface area for slabs and walls.
4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from five randomly selected batches, or from every batch when less than 5 batches are used.
5. Make one additional cylinder during cold weather concreting, and field cure.

F. Field Testing:
1. Slump Test Method: ASTM C143/C143M.
2. Air Content Test Method: ASTM C173/C173M.
3. Temperature Test Method: ASTM C1064/C1064M.
4. Measure slump and temperature for each compressive strength concrete sample.
5. Measure air content in air entrained concrete for each compressive strength concrete sample.

G. Cylinder Compressive Strength Testing:
1. Test Method: ASTM C39/C39M.
2. Test Acceptance: In accordance with ACI 318.
3. Test one cylinder at 7 days.
4. Test two cylinders at 28 days.
5. Obtain and retain one cylinder for testing when requested by Architect/Engineer.
6. Dispose remaining cylinders when testing is not required.

H. Core Compressive Strength Testing:
1. Sampling and Testing Procedures: ASTM C42/C42M.
2. Test Acceptance: In accordance with ACI 318.
3. Drill three cores for each failed strength test from concrete represented by failed strength test.

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

3.7 PATCHING

A. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.

C. Patch imperfections as directed by Architect/Engineer in accordance with ACI 318.

3.8 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by Architect/Engineer.

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

END OF SECTION

SECTION 31 05 13

SOILS FOR EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Subsoil materials.
   2. Topsoil materials.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
   1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
   1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
   2. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   3. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Samples: Submit appropriate quantity, in air-tight containers, sample of each type of fill to testing laboratory.

C. Materials Source: Submit name of imported materials source.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Furnish each subsoil or topsoil material from single source throughout the Work.

B. Perform Work in accordance with appropriate city and state agency requirements.

PART 2 - PRODUCTS

2.1 SUBSOIL MATERIALS

A. Use of onsite excavated soils.

1. If the geotechnical report indicates that onsite excavated soils may meet any of the subsoil types contained herein, they shall be used in preference of imported subsoils.
2. Onsite excavated soils that are to be used for any Subsoil type shall conform to the same standards and testing requirements stated below.
3. It shall be the contractor's responsibility that onsite soils are properly segregated, stockpiled, and verified as adequate in quantity for the intended purpose.

B. Subsoil Type S1:
   1. Select Fill: These soils are typically used in structural embankment areas.
   2. Excavated and re-used material or imported borrow.
   3. Graded.
   4. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
   5. Conforming to the requirements of the geotechnical report. If no geotechnical report the fill materials to be used beneath areas to be paved may consist of any native soil and should be compacted to a minimum density of 95% ASTM D698 (standard proctor) at a moisture content within the range of optimum +/-3% except for fat clay soils which should be placed at above optimum moisture contents. Lime treatment of the finished subgrade can be omitted where the top 18" of finished subgrade in fill areas consists of a select material with the following properties: a PI ranging from 8 to 18, a liquid limit ≤35 and a percentage passing the #200 sieve < 40%.

C. Subsoil Type S2:
   1. General Fill: These soils are typically used in non-structural embankment areas, 10' outside of buildings or 2' outside of other structures.
   2. Excavated and re-used material or imported borrow.
   3. Graded.
   4. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
   5. Conforming to the requirements of the geotechnical report. If no geotechnical report the fill materials to be used shall be approved by the engineer.

D. Subsoil Type S3:
   1. Native Soils for Utilities
   2. Excavated and re-used material or imported borrow.
   3. Graded.
   4. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
   5. Conforming to the requirements of the geotechnical report. If no geotechnical report the fill materials to be used shall be approved by the engineer.

TOPSOIL MATERIALS

E. Topsoil Type S4:
   1. Excavated and reused material.
   2. Graded.
   3. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.

F. Topsoil Type S5:
   1. Imported borrow.

2. Friable loam.
3. Reasonably free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds, and foreign matter.
4. Acidity range (pH) of 5.5 to 8.5.

2.2 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing and Inspection Services Testing and analysis of soil material.

B. Testing and Analysis of Subsoil Material: Perform in accordance with ASTM D698.

C. When tests indicate materials do not meet specified requirements, change material and retest.

D. Furnish materials of each type from same source throughout the Work.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Excavate subsoil and topsoil from areas designated. Strip topsoil to full depth of topsoil in designated areas.

B. Stockpile excavated material meeting requirements for subsoil materials and topsoil materials.

C. Remove excess excavated materials not intended for reuse, from site.

D. Remove excavated materials not meeting requirements for subsoil materials and topsoil materials from site.

3.2 STOCKPILING

A. Stockpile materials on site at locations indicated by Owner.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate differing materials with dividers or stockpile apart to prevent mixing.

D. Prevent intermixing of soil types or contamination.

E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

F. Stockpile unsuitable materials on impervious material and cover to prevent erosion and leaching, until disposed of.

3.3 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

B. Leave unused materials in neat, compact stockpile, if allowed.

C. When borrow area is indicated, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION

SECTION 31 05 16

AGGREGATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Coarse aggregate materials.
   2. Fine aggregate materials.
   3. Document: Geotechnical report; bore hole locations and findings of subsurface materials.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
   1. AASHTO M147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses.
   2. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
   1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
   2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
   3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   4. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
   5. ASTM D4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Samples: Submit, in moisture-tight containers to testing laboratory.

C. Materials Source: Submit name of imported materials suppliers.

D. Manufacturer's Certificate: Certify materials meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Furnish each aggregate material from single source throughout the Work.

B. Perform Work in accordance with appropriate city and state agency requirements.

C. Maintain one copy of document on site.

PART 2 - PRODUCTS

2.1 COARSE AGGREGATE MATERIALS

A. Roadway Sub-base and Base Aggregates: Conforming to TxDOT Standard Specification Item 421 and local standards. Aggregates approved for project use are as follows:
   1. Grade 1, Grade 2 or Grade 3, as shown on the plans.
   2. Type A, Type B, Type C, or Type D material types may be used.
   3. If not listed on plans or specifications, use Type A Grade 2 road base.

B. Foundation and Drainage Aggregates: Conforming to TxDOT and local standards. Aggregates approved for project use are as follows:
   1. Grade 2 or Grade 3, as shown on the plans.

2.2 FINE AGGREGATE MATERIALS

A. Pipe Bedding: Conforming to ASTM D2321 and ASTM D2774. Bedding and haunching types as follows:
   1. Class IA (open graded manufactured) and Class IB (dense graded manufactured).
   2. Class II Clean Coarse Grained Soils (GW, GP, SW, and SP).
   3. Class III Coarse Grained Soils with Fines (GM, GC, SM, and SC).

B. Surface Treatment Cover Stone: Conforming to TxDOT and local standards. Fine Aggregates approved are as follows:

   1. Grade 1, Grade 2 or Grade 3S as shown on the plans.
   2. Type A, Type C, Type D, Type L, Type PA, Type PC, Type PD, or Type PL material types may be used.
   3. If not listed on plans or specifications, use Type 2 or 3S cover stone.

2.3 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing and inspection services.

B. Coarse Aggregate Material - Testing and Analysis: Perform in accordance with ASTM D698, ASTM D4318, ASTM C136.

C. Fine Aggregate Material - Testing and Analysis: Perform in accordance with ASTM D698, ASTM D4318, ASTM C136.

D. When tests indicate materials do not meet specified requirements, change material and retest.

PART 3 - EXECUTION FOR EARTHWORK

3.1 EXCAVATION

A. Excavate aggregate materials from on-site locations designated by Architect/Engineer.

B. Stockpile excavated material meeting requirements for coarse aggregate materials and fine aggregate materials.

C. Remove excess excavated materials not intended for reuse, from site.

D. Remove excavated materials not meeting requirements for coarse aggregate materials and fine aggregate materials from site.

3.2 STOCKPILING

A. Stockpile materials on site at locations designated by Architect/Engineer.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate different aggregate materials with dividers or stockpile individually to prevent mixing.

D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

E. Stockpile unsuitable materials on impervious material and cover to prevent erosion and leaching, until disposed of.

3.3 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

B. Leave unused materials in neat, compact stockpile, if allowed.

C. When borrow area is indicated, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

PART 4 - EXECUTION FOR BASE COURSES

4.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify compacted substrate is dry and ready to support paving and imposed loads.
   1. Proof roll substrate with loaded dump truck or pneumatic roller in minimum two perpendicular passes to identify soft spots.

2. Remove soft substrate and replace with compacted fill.

C. Verify substrate has been inspected, gradients and elevations are correct.

4.2 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place fill on soft, muddy, or frozen surfaces.

4.3 AGGREGATE PLACEMENT

A. When required, install geotextile fabric over subgrade in accordance with manufacturer's instructions.
   1. Lap ends and edges a minimum of 6 inches.
   2. Anchor fabric to subgrade when required to prevent displacement until aggregate is installed.

B. Spread aggregate over prepared substrate to total compacted thickness as indicated on Drawings.

C. Roller compact aggregate to 95% maximum density ASTM D698, or as indicated on Drawings.

D. Level and contour surfaces to elevations, profiles, and gradients indicated.

E. Maintain optimum moisture content of fill materials to attain specified compaction density.

F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

4.4 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Variation From Thickness: ¼ inch.

C. Maximum Variation From Elevation: ¼ inch in 16 feet.

4.5 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Compaction testing will be performed in accordance with ASTM D698.

C. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

D. Frequency of Tests: One test for every 1,500 square yards compacted aggregate.

4.6 COMPACTION

A. Compact materials to 98 percent of maximum density as determined from test strip, in accordance with ASTM D2940.

PART 5 - EXECUTION FOR SURFACE COURSES

5.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify compacted substrate is ready to support paving and imposed loads.
   1. Flexible base shall be compacted, swept and seal coated.
   2. Asphalt surfaces shall be swept and primed.

C. Aggregate shall be clean and dry.

5.2 AGGREGATE PLACEMENT

A. Place and spread using proper equipment and volume of material.

B. Place in accordance with TxDOT Standard Specification Item 316 and local standards.

END OF SECTION

SECTION 31 22 13

ROUGH GRADING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Excavating topsoil.
   2. Excavating subsoil.
   3. Cutting, grading, filling, rough contouring, and compacting.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
   1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
   1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
   2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
   3. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
   4. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   5. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
   6. ASTM D2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
   7. ASTM D2434 - Standard Test Method for Permeability of Granular Soils (Constant Head).
   8. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
   9. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Samples: Submit appropriate quantity, in air-tight containers, sample of each type of fill to testing laboratory.

C. Materials Source: Submit name of imported materials suppliers.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C136, ASTM D2419, and ASTM D2434.

B. Perform Work in accordance with appropriate city and state agency requirements.

C. Maintain one copy of each document on site.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil: as specified in Section 31 05 13.

B. Subsoil Fill: as specified in Section 31 05 13.

C. Structural Fill: Soil materials as specified in Section 31 05 13 and Aggregate materials as specified in Section 31 05 16.

D. Granular Fill: Materials as specified in Section 31 05 13 and Section 31 05 16.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements.

B. Verify site conditions are as indicated on the Drawings.

C. Verify survey bench mark and intended elevations for the Work are as indicated on Drawings.

3.2 PREPARATION

A. Call Local Utility Line Information service not less than three working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum.

C. Notify utility company to remove and relocate utilities.

D. Protect utilities indicated to remain from damage.

E. Protect plant life, lawns, and other features remaining as portion of final landscaping.

F. Protect bench marks, survey control point, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 TOPSOIL EXCAVATION

A. Excavate topsoil from areas to be further excavated, re-landscaped, or re-graded, marked areas, or as shown on plans, without mixing with foreign materials for use in finish grading.

B. Do not excavate wet topsoil.

C. Stockpile in area designated on site to depth not exceeding 8 feet and protect from erosion. Stockpile material on impervious material.

D. Remove excess topsoil not intended for reuse, from site.

3.4 SUBSOIL EXCAVATION

A. Excavate subsoil from areas to be further excavated, re-landscaped, or regarded, marked areas or as shown on plans.

B. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.

C. When excavating through roots, perform Work by hand and cut roots with sharp axe.

D. Remove excess subsoil not intended for reuse, from site.

E. Remove excavated materials not meeting requirements for subsoil materials from site.

F. Stockpile subsoil in area designated on site to depth not exceeding 8 feet and protect from erosion.

G. Benching Slopes: Horizontally bench existing slopes greater than 4H:1V to key placed fill material to slope to provide firm bearing.

H. Stability: Replace damaged or displaced subsoil as specified for fill.

3.5 FILLING

A. Fill areas to contours and elevations with unfrozen materials.

B. Place fill material in continuous layers and compact.

C. Place material in continuous layers as follows:
   1. Subsoil Fill: Maximum 6 inches compacted depth.
   2. Structural Fill: Maximum 6 inches compacted depth.
   3. Granular Fill: Maximum 6 inches compacted depth.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Slope grade away from building minimum 2 percent slope for minimum distance of 10 ft, unless noted otherwise.

F. Make grade changes gradual. Blend slope into level areas.

G. Repair or replace items indicated to remain damaged by excavation or filling.

H. Install Work in accordance with appropriate city and state agency requirements.

3.6 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Top Surface of Subgrade:
   1. Structures: Plus or minus 1/2 inch average from required elevation.
   2. Pavement: Plus or minus 1/2 inch average from required elevation.
   3. Other: Plus or minus 1/10 of a foot.

C. The variance shall not affect the required thickness of concrete or subsequent structures above subsoil.

D. The application of the tolerances will not relieve contractor from other requirements related to paving or structures above subsoils and accessibility requirements.

3.7 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements and 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Perform laboratory material tests in accordance with ASTM D1557, ASTM D698, and AASHTO T180.

C. Perform in place compaction tests in accordance with the following:
   1. Density Tests: ASTM D1556, ASTM D2167, or ASTM D2922.
   2. Moisture Tests: ASTM D3017.

D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

E. Frequency of Tests: 1 per every 1500 Square Yards.

END OF SECTION

SECTION 31 23 16

EXCAVATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Soil densification.
   2. Excavating for building foundations.
   3. Excavating for paving, roads, and parking areas.
   4. Excavating for slabs-on-grade.
   5. Excavating for site structures.
   6. Excavating for landscaping.

1.2 REFERENCES

A. Local utility standards when working within 24 inches of utility lines.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with appropriate city and state agency requirements.

B. Excavation Protection Plan shall be in accordance with OSHA.

C. Maintain one copy of each document on site.

PART 2 - EXECUTION

2.1 PREPARATION

A. Call Local Utility Line Information service not less than three working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum.

C. Notify utility company to remove and relocate utilities.

D. Protect utilities indicated to remain from damage.

E. Protect plant life, trees, lawns, and other features remaining as portion of final landscaping.

F. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

2.2 SOIL DENSIFICATION

A. Conforming to the requirements of the geotechnical report. If no geotechnical report is performed, the subsoil materials should be proof rolled and compacted to a minimum density of 95% ASTM D698 (standard proctor).

2.3 EXCAVATION

A. Perform and protect all work in accordance with OSHA regulations.

B. Protect adjacent structures which may be damaged by excavation work.

C. Excavate subsoil to accommodate building foundations, slabs-on-grade, paving and site structures, and construction operations.

D. Excavate to working elevation as noted on plans.

E. Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity.

F. Slope banks with machine to angle of repose or less until shored.

G. Do not interfere with 45 degree bearing splay of foundations.

H. Grade top perimeter of excavation to prevent surface water from draining into excavation.

I. Trim excavation. Remove loose matter.

J. Remove lumped subsoil, boulders, and rock.

K. Notify Architect/Engineer of unexpected subsurface conditions.

L. Correct areas over excavated with structural fill Type S1 specified in Section 31 05 13, as directed by Architect/Engineer.

M. Remove excess and unsuitable material from site.

N. Overexcavate in accordance with geotechnical report. If no geotechnical report is available, contact Architect/Engineer for instruction.

O. Stockpile subsoil in area designated on site to depth not exceeding 8 feet and protect from erosion.

P. Repair or replace items indicated to remain damaged by excavation.

2.4 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements, 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Perform inspection of excavation and controlled fill operations in accordance with appropriate city and state agency requirements.

C. Request visual inspection of bearing surfaces before installing subsequent work.

2.5 PROTECTION

A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

C. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth operations.

END OF SECTION

SECTION 31 23 17

TRENCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Excavating trenches for utilities from 5 feet outside building to utility service.
   2. Compacted fill from top of utility bedding to subgrade elevations.
   3. Backfilling and compaction.

B. Related Sections:
   1. Geotechnical report; bore hole locations and findings of subsurface materials.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
   1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
   1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
   2. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
   3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   4. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
   5. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
   6. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.3 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data for geotextile fabric indicating fabric and construction.

C. Samples: Submit appropriate quantity, in air-tight containers, sample of each type of fill to testing laboratory.

D. Materials Source: Submit name of imported fill materials suppliers.

E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with appropriate city and state agency requirements.

B. Maintain one copy of each document on site.

1.6 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.7 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

A. Subsoil Fill: Type S1, S2, or S3 as specified in Section 31 05 13.

B. Structural Fill: Type S1 as specified in Section 31 05 13.

C. Granular Fill: Pipe Bedding as specified in Section 31 05 16.

D. Concrete: Lean concrete or Class A Concrete.

PART 3 - EXECUTION

3.1 LINES AND GRADES

A. Lay pipes to lines and grades indicated on Drawings.
   1. Architect/Engineer reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.

B. Use laser-beam instrument with qualified operator to establish lines and grades.

3.2 PREPARATION

A. Call Local Utility Line Information service not less than three working days before performing Work.

1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum locations.

C. Protect plant life, trees, lawns, and other features remaining as portion of final landscaping.

D. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

E. Maintain and protect above and below grade utilities indicated to remain.

F. Establish temporary traffic control and detours when trenching is performed in public right-of-way. Relocate controls and reroute traffic as required during progress of Work.

3.3 TRENCHING

A. Follow all OSHA and industry safety regulations for trench work.

B. Excavate subsoil required for utilities to utility service.

C. Remove lumped subsoil, boulders, and rock.

D. Perform excavation within 24 inches of existing utility service in accordance with utility's requirements.

E. Do not advance open trench more than 200 feet ahead of installed pipe.

F. Cut trenches to width indicated on Drawings. Remove water or materials that interfere with Work.

G. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and pipe utilities.

H. Do not interfere with 45 degree bearing splay of foundations.

I. When Project conditions permit, slope side walls of excavation starting 2 feet above top of pipe. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this section.

J. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by Architect/Engineer until suitable material is encountered.

K. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Structural Fill S1 and compact to density equal to or greater than requirements for subsequent backfill material.

L. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

M. Correct areas over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Architect/Engineer.

N. Remove excess subsoil not intended for reuse, from site.

O. Stockpile subsoil in area designated on site to depth not exceeding 8 feet and protect from erosion.

3.4 SHEETING AND SHORING

A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.

B. Support trenches more than 5 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.

C. Design sheeting and shoring to be removed at completion of excavation work.

D. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.

E. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

3.5 BACKFILLING

A. Backfill trenches to contours and elevations with unfrozen fill materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

C. Place geotextile fabric as specified in plans.

D. Place fill material in continuous layers as shown in plans and compact.

E. Employ placement method that does not disturb or damage foundation perimeter drainage, and utilities in trench.

F. Maintain optimum moisture content of fill materials to attain required compaction density.

G. Do not leave more than 50 feet of trench open at end of working day. All open excavations shall be maintained and protected in accordance with OSHA regulations.

H. Protect open trench to prevent danger to the public.

3.6 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Perform laboratory material tests in accordance with ASTM D698.

C. Perform in place compaction tests in accordance with the following:
   1. Density Tests: ASTM D1556, ASTM D2167, or ASTM D2922.
   2. Moisture Tests: ASTM D3017.

D. When tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest.

E. Frequency of Tests: 1 for every 50 feet under structures.

3.7 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished work.

B. Reshape and re-compact fills subjected to vehicular traffic during construction.

END OF SECTION

SECTION 31 23 23

FILL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Backfilling building perimeter to subgrade elevations.
   2. Backfilling site structures to subgrade elevations.
   3. Fill under slabs-on-grade.
   4. Site filling and backfilling.
   5. Fill under paving.
   6. Fill for over-excavation.

B. Related Sections:
   1. Geotechnical report; bore hole locations and findings of subsurface materials.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
   1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
   1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
   2. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
   3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   4. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
   5. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
   6. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data for geotextile fabric indicating fabric and construction.

C. Samples: Submit appropriate quantity, in air-tight containers, sample of each type of fill to testing laboratory.

D. Materials Source: Submit name of imported fill materials suppliers.

E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with appropriate city and state agency requirements.

B. Maintain one copy of each document on site.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

A. Subsoil Fill: Type S1, S2, or S3 as specified in Section 31 05 13.

B. Structural Fill: Type S1 as specified in Section 31 05 13.

C. Granular Fill: Pipe Bedding as specified in Section 31 05 16.

D. Concrete: Lean concrete or Class A Concrete.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.

C. Verify underground structures are anchored to their own foundations to avoid flotation after backfilling.

D. Verify structural ability of unsupported walls to support loads imposed by fill.

3.2 PREPARATION

A. Compact subgrade to density requirements for subsequent backfill materials.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with structural fill and compact to density equal to or greater than requirements for subsequent fill material.

C. 1.0’ minimum select fill subgrade compacted according to geotechnical report. Refer to geotechnical report for full subgrade requirements.

D. Exposed subgrade should be proof rolled prior to compaction or treatment in accordance with geotechnical report. Areas which prove unstable shall be stabilized

according to the geotechnical report. When a geotechnical report is not provided, Architect/Engineer shall be contacted.

3.3 BACKFILLING

A. Backfill areas to contours and elevations with unfrozen materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

C. Place geotextile fabric over fill prior to placing next lift of fill.

D. Place fill material in continuous layers and compact to required density specifications.

E. Place material in continuous layers in depths accordance with geotechnical report. When geotechnical report is not provided, place lifts as follows:
   1. Subsoil Fill: Maximum 6 inches compacted depth.
   2. Structural Fill: Maximum 6 inches compacted depth.
   3. Granular Fill: Maximum 6 inches compacted depth.

F. Employ placement method that does not disturb or damage other work.

G. Maintain moisture content of backfill materials in accordance with geotechnical report to attain required compaction density. Where no geotechnical report is provided, maintain optimum moisture content.

H. Backfill against supported foundation walls and/or structures. Do not backfill against unsupported foundation walls.

I. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

J. Slope grade away from building in accordance with engineering plans.

K. Make gradual grade changes. Blend slope into level areas.

L. Remove surplus backfill materials from site.

M. Leave fill material stockpile areas free of excess fill materials.

3.4 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Top Surface of Subgrade:
   1. Structures: Plus or minus 1/2 inch average from required elevation.
   2. Pavement: Plus or minus 1/2 inch average from required elevation.
   3. Other: Plus or minus 1/10 of a foot.

C. The variance shall not affect the required thickness of concrete or subsequent structures above subsoil.

D. The application of the tolerances will not relieve contractor from other requirements related to paving or structures above subsoils and accessibility requirements.

3.5 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Perform laboratory material tests in accordance with ASTM D698.

C. Perform in place compaction tests in accordance with the following:
   1. Density Tests: ASTM D1556, ASTM D2167, or ASTM D2922.
   2. Moisture Tests: ASTM D3017.

D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

E. Frequency of Tests: 1 per every 1500 Square Yards of roadway and 1 per every 500 square yard of parking lots and/or building pads.

F. Proof roll compacted fill surfaces.

3.6 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished work.

B. Reshape and re-compact fills subjected to vehicular traffic.

END OF SECTION

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Silt Fences
2. Hay Bales
3. Diversion Dikes
4. Construction Entrance/Exits
5. Channel Liners
6. Diversion Channels.
7. Rock Energy Dissipator.
8. Rock Filter Dams.
9. Sediment Ponds.
10. Sediment Traps.
11. Construction Entrances/Exits.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
1. AASHTO T88 - Standard Specification for Particle Size Analysis of Soils.
2. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
1. ASTM C127 - Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate.
2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
4. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
5. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Provide necessary Stormwater Pollution Prevention Plan Documentation and required permitting by local Municipal Separate Storm Sewer System (MS4) and State regulations, as applicable.

C. Submit data on geosynthetics or other specified items.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements .

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with appropriate city and state agency requirements.

PART 2 - PRODUCTS

2.1 ROCK AND GEOTEXTILE MATERIALS

A. Furnish materials in accordance with appropriate city and state agency requirements.

B. Rock: Sound, hard and angular shape; well graded; without shale seams, structural defects and foreign substances; with width and thickness greater than one third its length; minimum specific gravity of 2.5, as determined in accordance with AASHTO T88or ASTM C127, bulk saturated, and surface dry basis; minimum durability determined by petrographic examination; size and gradation in accordance with NCSA Class, within following limits and as shown on plans:

Square Opening inches	Percent Passing NCSA Size No.					
	R8	R7	R6	R5	R4	R3
42	100					
30		100				
24	15-50		100			
18		15-50		100		
15	0-15					
12		0-15	15-50		100	
9				15-50		
6		0-15	0-15		15-50	100
4				0-15		
3					0-15	15-50
2						0-15

C. Geotextile Fabric: as shown on plans.

D. Channel Liners: Geotextiles, blankets or mats as shown on plans and installed in accordance with manufacturer’s recommendations.

2.2 BLOCK, STONE, AGGREGATE, AND SOIL MATERIALS

A. Precast Solid Concrete Block: as shown in plans and installed in accordance with manufacturer’s recommendations.

B. Stone: As shown in plans.

C. Coarse Aggregate: Type A Grade 2 unless otherwise shown on plans. Soil Backfill: Soil Type S1 **or** S2. Subsoil with no rocks over 6 inches in diameter, frozen earth or foreign matter.

2.3 PLANTING MATERIALS

A. Seeding and Soil Supplements**:** Furnish in accordance with appropriate city and state agency requirements.

B. Mulch: Furnish in accordance with appropriate city and state agency requirements.

2.4 PIPE MATERIALS

A. Pipe: Corrugated steel, Concrete or Plastic, and as shown on plans. Furnish in accordance with appropriate city and state agency requirements.

2.5 FENCING AND DAMS

A. Reinforced Silt Fencing: Geotextile fabric with wire reinforcing and stakes as shown on plans and installed in accordance with manufacturers recommendations.

B. Hay Bales: Hay bales with stakes and as shown on plans.

C. Rock Filter Dams: Rock filter dams with baskets or enclosure and as shown on plans.

D. Wattles or Gutter Dams: Manufactured sediment control cylinders with inert organic materials, netting, geosynthetics and other materials as shown on plans and installed in accordance with manufacturers recommendations.

2.6 ACCESSORIES

A. Anti-Vortex Devices: Furnish in accordance with plans and with appropriate city and state agency requirements.

B. Anti-Seep Collar: Furnish in accordance with plans and with appropriate city and state agency requirements.

C. Trash Rack: Furnish in accordance with plans and with appropriate city and state agency requirements.

2.7 SOURCE QUALITY CONTROL (AND TESTS)

A. Perform tests on materials to ensure conformance with specified requirements.

PART 3 - EXECUTION

3.1 INITIAL REQUIREMENTS

A. Verify compacted subgrade is acceptable and ready to support devices and imposed loads.

B. Verify gradients and elevations of base or foundation for other work are correct.

C. Verify notices, postings, and permit compliance in accordance with appropriate city and state agency requirements.

3.2 DIVERSION CHANNELS

A. Windrow excavated material on low side of channel.

B. Compact to 95 percent maximum density, ASTM D-698.

C. On entire channel area, apply soil supplements and sow seed as specified.

D. Mulch seeded areas with hay as specified.

E. Install Work in accordance with plans and appropriate city and state agency requirements.

3.3 ROCK ENERGY DISSIPATOR

A. Excavate to indicated depth of rock lining or nominal placement thickness as follows. Remove loose, unsuitable material below bottom of rock lining, then replace with suitable material. Thoroughly compact and finish entire foundation area to firm, even surface.

NCSA Class	Nominal Placement Thickness inches
R8	48
R7	36
R6	30
R5	24
R4	18
R3	12

B. Lay and overlay geotextile fabric over substrate. Lay fabric parallel to flow from upstream to downstream. Place materials in accordance with manufacturer's recommendations. If none are available then overlap edges upstream over downstream and upslope over downslope. Provide a minimum overlap of 3 feet. Offset adjacent roll ends a minimum of 5 feet when lapped. Cover fabric as soon as possible and in no case leave fabric exposed more than 4 weeks.

C. Carefully place rock on geotextile fabric to produce an even distribution of pieces, with minimum of voids and without tearing geotextile.

D. Unless indicated otherwise, place full course thickness in one operation to prevent segregation and to avoid displacement of underlying material. Arrange individual rocks for uniform distribution.
   1. Saturate rock with water. Fill voids between pieces with grout, for at least top 6 inches. Sweep surface with stiff broom to remove excess grout.
   2. Moist cure grouted rock for at least 3 days after grouting, using water saturated burlap.

3.4 ROCK BASIN

A. Construct generally in accordance with rock energy dissipator requirements to indicated shape and depth. Rock courses may be placed in several operations but minimum depth of initial course must be 3 feet or greater.

3.5 ROCK BARRIER

A. Determine length required for ditch or depression slope and excavate, compact and foundation area to firm, even surface.

B. Produce an even distribution of rock pieces, with minimum voids to the indicated shape, height and slope.

C. Install Work in accordance with plans and with appropriate city and state agency requirements.

3.6 SEDIMENTATION POND

A. Clear and grub storage area and embankment foundation area site as shown in plans.

B. Excavate key trench for full length of dam. Excavate emergency spillway in natural ground.

C. Install pipe spillway, with anti-seep collar attached, at location indicated.

D. Place forms and reinforcing for concrete footing at bottom of riser pipe with trash rack and anti-vortex device, as shown in plans. Construction of embankment and trench prior to placing pipe is not required.

E. Do not use coarse aggregate as backfill material around pipe. Backfill pipe with suitable embankment material to prevent dam leakage along pipe.

F. On entire sedimentation pond area, apply soil supplements and sow seed as specified.

G. Mulch seeded areas with hay as specified.

H. Install Work in accordance with plans and with appropriate city and state agency requirements.

3.7 SEDIMENT TRAPS

A. Clear site, as shown in plans.

B. Construct trap by excavating and forming embankments as specified.

C. Place coarse aggregate or rock at outlet as indicated on Plans.

D. Place geotextile fabric, as specified for rock energy dissipator.

E. When required, obtain borrow excavation for formation of embankment, as specified.

F. On entire sediment trap area, apply soil supplements and sow seed as specified.

G. Mulch seeded areas with hay as specified.

H. Install Work in accordance with plans and with appropriate city and state agency requirements.

3.8 SITE STABILIZATION

A. Incorporate erosion control devices indicated on the Plans into the Project at the earliest practicable time in accordance with appropriate city and state agency requirements.

B. Construct, stabilize and activate erosion controls before site disturbance within tributary areas of those controls.

C. Temporary stockpile and waste pile heights shall not exceed 8 feet. Slope stockpile sides at 2: 1 or flatter.

D. Stabilize any disturbed area of affected erosion control devices on which activity has ceased and which will remain exposed for more than 20 days.
   1. During non-germinating periods, apply mulch at recommended rates.
   2. Stabilize disturbed areas which are not at finished grade and which will be disturbed within one year in accordance with temporary seeding specifications.
   3. Stabilize disturbed areas which are either at finished grade or will not be disturbed within one year in accordance with permanent seeding specifications.

E. Stabilize diversion channels, sediment traps, and stockpiles immediately.

3.9 DAMS, FENCING AND WATTLES

A. Place as indicated on plans and in accordance with manufacturers recommendations.

B. Secure by stakes, reinforcing, ties, etc.

C. Countersink materials and provide edge protection so that stormwater cannot circumvent controls.

D. Seed and mulch areas around controls to provide secure controls.

E. Install Work in accordance with plans and with appropriate city and state agency requirements.

3.10 CONSTRUCTION ENTRANCES/EXITS

A. Place as indicated on plans.

B. Secure site and provide controls to direct traffic to entrance/exit.

C. Countersink materials and provide edge protection so that stormwater cannot circumvent controls.

D. Seed and mulch areas around controls to provide secure controls.

E. Install Work in accordance with plans and with appropriate city and state agency requirements.

3.11 FIELD QUALITY CONTROL

A. Inspect erosion control devices in accordance with the Stormwater Pollution Prevention Plan or appropriate city and state agency requirements. Make necessary repairs within 5 days to ensure erosion and sediment controls are in good working order.

3.12 CLEANING

A. When sediment accumulation in sedimentation devices has reached a point one-third depth of sediment device, remove and dispose of sediment offsite. Sediment shall not hamper the hydraulic function of the sedimentation devices.

B. Do not damage structure or device during cleaning operations.

C. Do not allow sediment to erode into protected areas, offsite or natural waterways.

END OF SECTION

SECTION 31 37 00

RIPRAP

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Riprap placed loose.
   2. Riprap placed in bags.

1.2 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data for riprap bags, binder and geotextile fabric.

A. Samples**:** Submit appropriate quantity, in air-tight containers, sample of each type of fill to testing laboratory

B. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.3 QUALITY ASSURANCE

A. Furnish each aggregate material from single source throughout the Work.

B. Perform Work in accordance with appropriate city and state agency requirements.

C. Maintain one copy of each document on site.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Furnish materials in accordance with Plans and with city and state agency requirements.

B. Use stones, boulders or quarried rocks that are at least 3 in. in their least dimension, with weight and gradation in accordance with TxDOT Standard Specification Item 432 and as noted on plans. Both the width and the thickness of each piece of riprap must be at least 1/3 of the length.

C. When shown on the plans or approved, material may consist of broken concrete removed under the Contract or from other approved sources. Before placement of each piece of broken concrete, cut exposed reinforcement flush with all surfaces.

D. Binder: Portland cement.

E. Geotextile Fabric: Non-biodegradable, non-woven.

PART 3 - EXECUTION

3.1 PLACEMENT

A. Place stones, boulders or quarried rocks in accordance with TxDOT Standard Specification Item 432 and as noted on plans

B. Place geotextile fabric over substrate, lap edges and ends.

C. Place riprap as indicated on Plans.

D. Installed Thickness: As indicated on Plans.

E. Place rock evenly and carefully to minimize voids, do not tear bag fabric, place rock in one consistent operation to preclude disturbance or displacement of substrate.

END OF SECTION

October 3, 2023

Kenneth Reese, COO
Texarkana ISD
4241 Summerhill Road
Texarkana, Texas 75503

SUBJECT: Dunbar Early Education Center
Texarkana ISD, Texas
Geotechnical Investigation
ETTL Job No. G 6046-226

Dear Mr. Reese:

Submitted herein is the report summarizing the results of a geotechnical investigation conducted at the site of the above-referenced project.

If you have any questions concerning this report, or if we can be of further assistance during construction, please contact us. We are available to perform any construction materials testing and inspection services that you may require. Thank you for the opportunity to be of service.

Sincerely,
ETTL Engineers & Consultants Inc.
Texas Registered Engineering Firm #F3208

Owen Sanderson

Owen B. Sanderson, P.E.
Senior Engineer

08/03/2023

Distribution: (PDF) Corgan

Geotechnical Investigation

Dunbar Early Education Center

Texarkana ISD, Texas

Submitted to

Kenneth Reese, COO
Texarkana ISD

Prepared by

ETTL Engineers & Consultants Inc.
Tyler, Texas

October 3, 2023

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1.0 INTRODUCTION

This study was performed at the request and authorization to proceed granted by Purchase Order No. 6002300053 issued on 12/08/2022 and modified by Ken Reese via email on 8/22/2023. The work was completed in accordance with our proposal dated October 26, 2022, and modified via email to Ken Reese on 8/22/2023. Field operations were conducted on September 5, 2023.

The purpose of this investigation was to define and evaluate the general subsurface conditions of the parcel of land located north of Blake Street and west of Carrol Avenue, Texarkana, Texas. A site map depicting the location is included in **APPENDIX A**.

Specifically, the study was planned to determine the following:

- Subsurface stratigraphy within the limits of exploratory borings.
- Classification, strength, expansive properties, and compressibility characteristics of the foundation soils.
- Subgrade preparation and fill specifications.
- Suitable foundation types and allowable loading.
- Lateral earth pressures for short retaining walls.
- Construction related problems that may be anticipated by the investigation; and
- General pavement recommendations for light, medium, and heavy traffic pavement sections.

This investigation was carried out in three phases: 1) field exploration, sampling, and testing; 2) laboratory testing; and 3) engineering evaluation of data and reporting. The details of which are set forth in the following sections.

A variety of tests were performed on selected soil samples to provide the data used to form the basis for the conclusions and recommendations of this study. The following conclusions and recommendations are based on limited information regarding site grading. Using a handheld GPS unit, ETTL located the borings on the ground based on a site plan provided by the client's representative (Corian). ETTL did not confirm by a survey the locations indicated on the Plan of Borings located in **APPENDIX A**.

2.0 PROJECT DESCRIPTION

The project consists of a single-story early childhood center with parking, access drives, and bus loops. The structure will contain multiple classroom wings with storm shelters on the east and west sides. The building area will be approximately 78,000 SF. Preliminary grading plans were not provided, expect grading with cut and fill to achieve a split-level finish floor elevation of 312' (east side) and 308' (west side). The majority of the structure will be steel and/or wood frame with a brick veneer. The storm shelters will be reinforced masonry walls.

- Typical foundation dead / live loads:
    - 30 / 15 kips for host building
    - 45 / 140 kips for the shelter interior column
    - 3.4 / 5.4 kip-lf, storm shelter perimeter walls

3.0 SITE DESCRIPTION

The project site for the new structure encompasses the area once occupied by a demolished slab on grade structure. At the time of the investigation, only the existing slab remained with adjacent asphalt parking and drives. The original structures had and split-level finish floor similar to the proposed structure with finish floor elevations ranging from 312' to 305'. Overall, the site slopes from east down 12 feet to Cowhorn Creek located to the west. ETTL was not provided foundation details of the original structures or if any fill was placed during its original construction.

4.0 FIELD OPERATIONS

Subsurface conditions were defined by eight (8) sample core borings drilled to depths up to 30 feet (for the main structure), and four (4) sample core borings drilled to a depth of 5 feet for parking and access drives. The field boring logs were prepared as drilling and sampling progressed. The final boring logs are also included in **APPENDIX A**. Descriptive terms and symbols used on the logs are in accordance with the Unified Soil Classification System (ASTM D 2487). A reference key is provided on the final page of this report.

A track-mounted drill rig utilizing dry auger drilling procedures was used to advance the borings. The soils were sampled by means of a 1 3/8-inch I.D. by 24-inch-long split-spoon sampler driven into the bottom of the borehole in accordance with ASTM D 1586 procedures. In conjunction with this sampling technique, the Standard Penetration Test was conducted by recording the N-value, which is the number of blows required by a 140-pound automated weight falling 30 inches to drive a split-spoon sampler 1 foot into the ground. For very dense strata, the number of blows is limited to a maximum of 50 blows within a 6-inch increment. Where possible, the sampler is "seated" six inches before the N-value is determined. The N-value obtained from the Standard Penetration Test provides an approximate measure of the relative density that correlates with the shear strength of the soil. The disturbed samples were removed from the sampler, logged, packaged, and transported to the laboratory for further identification and classification.

Soils were also sampled by means of a 3-inch O.D. by 24-inch-long thick-walled Shelby Tube sampler. Using the drilling rig's hydraulic pressure, the sampler was pushed smoothly into the bottom of the borehole. The consistency of these samples was measured by a calibrated pocket penetrometer. These values, recorded in tons per square foot, are shown on the boring logs. Such samples were extruded in the field, logged, sealed to maintain in situ conditions, and packaged for transport to the laboratory.

TABLE 4.0 – Boring Identification				
Boring	**Depth (ft.)**	**Structure/Location**	**Boring Elevation (ft.)**	**[1] G.W. Depth/Elev. (ft.)**
B-1	30	New Elementary School	304.0	10.0 / 294.0
B-2	20		309.0	5.0 / 304.0
B-3	30		304.0	7.0 / 297.0
B-4	20		311.5	8.0 / 303.5
B-5	30		311.5	7.0 / 304.5
B-6	20		311.5	4.0 / 307.5
B-7	20		308.5	4.0 / 304.5
B-8	30		311.5	4.0 / 307.5
P-1	5	Parking and Drives	305.0	Dry
P-2	5		312.0	Dry
P-3	5		314.0	Dry
P-4	5		303.0	Dry

All boreholes were backfilled with cuttings after collecting final groundwater readings. Samples obtained during our most recent field studies and not consumed by laboratory testing procedures will be retained in our Tyler branch free of charge for a period of 60 days. Please contact the Tyler branch to arrange storage beyond this point in time.

4.1 Groundwater Observations

Seepage and groundwater were observed during and up to 24 hours following the drilling operations. Based on the information obtained during our field investigation and given the caveats listed below, the groundwater is predicted to range between 5 and 10 feet below the existing grade. See **TABLE 4.0**.

Data regarding the groundwater level was obtained by observations in open boreholes. At best this provides only an approximation of the phreatic surface at the time of drilling. *The phreatic surface that should be considered for the design of this project may vary significantly from that which was observed in the borings due to the following factors*:

- The characteristics of the soil profile may have prevented the water level in the borehole from rising to the phreatic level during the time period of observation.
- A given boring may not intercept groundwater bearing zones (i.e., the groundwater is perched or travels in seams or fissures that are not continuous over the entire site)
- Groundwater may only be perched in pockets above local aquacludes, but the distribution of borings is not generally adequate to confirm this with a high level of certainty.
- Groundwater level varies seasonally and with rainfall.

- Rotary wash drilling methods introduce fluid into the boring that often makes it impossible to distinguish between groundwater and drilling fluid.

If the designer believes that the level of groundwater could significantly impact the project, then ETTL should be contacted to develop a plan for piezometer installation and monitoring to assess the groundwater levels more accurately at the site.

5.0 LABORATORY TESTING

Upon return to the laboratory, a geotechnical engineer visually examined all samples and multiple specimens were selected for representative identification of the substrata. By determining the Atterberg liquid and plastic limits (ASTM D4318) and the percentage of fines passing the No. 200 sieve (ASTM D1140), field classification of the various strata was verified. Also conducted were natural moisture content tests (ASTM D2216) and Unconsolidated Undrained Triaxial Compression (ASTM D2850). Summaries of the results are presented on the individual log of boring in **APPENDIX A**. Details of the tests are also included in **APPENDIX B**.

Laboratory tests were conducted on samples recovered from the borings to evaluate the physical and engineering properties of the different materials encountered. The number and type of tests performed for this study are listed in the table below.

TABLE 5.1 – Soil Laboratory Testing Procedures

Laboratory Test	Test Method	Number of Tests
Dry Sieve Analysis (% Passing No. 4)	ASTM D 6913	24
Dry Sieve Analysis (% Passing No. 40)	ASTM D 6913	24
Washed Sieve Analysis (% Passing No. 200)	ASTM D 1140	24
Atterberg Limits (Liquid & Plastic Limits)	ASTM D 4318	24
Moisture Content by Dry Weight	ASTM D 2216	24
U.U. Triaxial Compression	ASTM D 2850	6
Restrain/Free Swell	ASTM D 4546	1
One Dimensional Consolidation	ASTM D 2435	1

The above laboratory tests were performed in general accordance with applicable ASTM, U.S. Army Corps of Engineers procedures, and/or generally accepted practice. It should be noted that reference to ASTM or other standard procedures does not imply that all cross-referenced procedures in ASTM or other standards have been used, or that all ASTM or other procedures used have been followed exactly. Only those ASTM or other standard procedures and/or portions of procedures, which, in the professional judgment of the geotechnical engineer of record for this report, are applicable, appropriate, and necessary for this particular project, have been used or followed.

5.1 Unconsolidated/Undrained Triaxial Compression

The strength characteristics of the cohesive substrata were evaluated by conducting Unconsolidated-Undrained Triaxial compression tests (ASTM D 2850) on selected undisturbed field samples obtained with the Shelby tube sampler. The specimens were confined at in situ pressure and axially loaded until failure occurred. The undrained shear strength (or cohesion) is equal to one-half the peak compressive stress. Moisture content (ASTM D 2216) and dry density (ASTM D 7263) are determined as part of this test.

5.2 One Dimensional Pressure Swell

Pressure-swell testing (ASTM D 4546 Methods A & B (mod)) was performed on intact, relatively undisturbed specimens. In some cases, the moisture content of a specimen is initially dried to assess the swell potential of soils that may be drier than the sample obtained. These tests are conducted by adding moisture to a specimen and observing the amount of pressure necessary to restrain swelling. The restraining pressure is removed, and the specimen is allowed to swell.

5.3 One Dimensional Consolidation

Successive load increments are added to a saturated, 0.78" thick specimen trimmed from a Shelby tube sample in order to determine properties of consolidation due to load over time. Parameters derived from this test are used to predict the settlement of foundations including how much settlement will occur in a given time period. We also develop constrained, drained moduli as they vary with confining pressure for use in predicting settlement.

6.0 FOUNDATION SOIL STRATIGRAPHY AND PROPERTIES

6.1 Site Geology

According to the Bureau of Economic Geology at the University of Texas at Austin, Geologic Atlas of Texas, Texarkana Sheet, the proposed site is located in the Wilcox Group undivided (Ewi) adjacent to the Alluvium (Qal) of Cowhorn Creek.

The characteristic lithology of this group in this area is mostly silty and sandy clay which is very thinly to massive bedded and locally cross-bedded. In part carbonaceous, calcareous siltstone and ironstone concretions are common. The soil is typically various shades of gray. There are local beds of clay, lignite, silt, and quartz sand which weather to various shades of gray, brown, yellow, and red. The thickness of the group in this area is about 700 feet.

For more information please visit:
https://txpub.usgs.gov/txgeology/

6.2 Site Stratigraphy

The soils at the site generally consist of very loose to medium dense interlayered silty/clayey sand (SM/SC), sandy silt (ML), and soft to stiff low plasticity sandy lean clay (CL) to a depth of 23 feet below the existing ground surface. Below 23 feet the soil generally becomes medium dense

(sands and silts), and stiff (clays). A layer of sandy fat clay (CH) is encountered below 8 feet in borings B-2, 3, and 6.

The classifications are based on weathering, depositional environment, mineralogy, color change, lithology, and structure. Detailed on the boring logs and geologic profiles in **APPENDIX A** are the specific types and depths of the various soil strata encountered. The logs show defined boundaries between various soil types, but in reality, the transition between types is generally gradual.

6.2.1 DETERMINING REPRESENTATIVE PROPERTIES

Due to the non-homogeneous nature of the soil and the necessarily limited data, the issue of assigning quantitative design parameters for the various characteristics of a soil mass is a matter of interpretation. In assessing shear strength along a failure surface that passes through a large mass, it is reasonable to expect that strength variations will be encountered along any potential surface. Where data are sufficient, we believe that it is overly conservative to take the lowest test data values as representative of the characteristics of a soil mass. On the other hand, using average values could be unconservative. How we recommend selecting appropriate values to use is explained below.

There is insufficient data (i.e., less than 30 data points for a given parameter for a given soil layer) to warrant a rigorous statistical analysis. Experience has also shown that the average (i.e., best fit to the scattered data) can be unconservative for soils that are not homogeneous (e.g., randomly variable degrees of sand content). We have adopted what we call a P25/P75 approach (as originally promulgated by George Sowers) as an appropriate means for dealing with random variation in soil masses. The average of all applicable test results averaged with the lowest value is termed the “P25” value. The average of all applicable test results with the highest applicable value is termed the “P75” value. Rather than use the worst-case situation when sufficient data are available, we have used either the P25 value (when a low result would be conservative) or the P75 value (when a high result would be conservative) to predict parameters that are used to quantify the behavior of the soil mass. This procedure is only used when the variation in the data is anticipated to be spatially random. If there is a discernible pattern to the variation of the data (e.g., shear strength tends to be softer in low areas) then the data are grouped in accordance with the pattern prior to applying the method stated above (i.e., data are only averaged within groups).

Listed in **TABLE 6.2.1, APPENDIX E** are the soil strata with the predicted P25 and the P75 (as appropriate) engineering properties selected to be applicable throughout the project. Note that properties in isolated situations may be adjusted more favorably when considering the specifics of the situation (contact ETTL for further information, if desired). These properties are derived from our testing of the soils as well as our experience with the soils in question together with published correlations.

6.3 The Behavior of Expansive Soils

Expansive soils can be any of the following soil types: Clayey Sand (SC), Lean Clay (CL), or Fat Clay (CH), which exhibit the ability to change volume (shrink or swell) with the addition or subtraction of moisture. Expansive soils such as are found at various depths throughout the soil profile swell when they absorb moisture and shrink as they dry. Structures placed on these soils move up and down with such volume changes of the soil. When expansive soils are covered by an impermeable surface such as a structure or pavement, seasonal moisture fluctuation at the interior of the covered area tends to be reduced or eliminated due to the lack of exposure to natural wetting and drying conditions (i.e., wind, rain, sun, vegetative, etc.). At the perimeter of the structure, however, infiltration into the foundation soils from surface drainage could lead to local swelling of the clays (if they were dry at the start of construction) resulting in tilting or distortion of the foundation. Where areas immediately adjacent to the structure are paved both the risk of swelling due to excess moisture absorption and shrinkage due to moisture loss are reduced significantly.

The majority of materials found in the surficial 10 feet of soil are classified as non-plastic silts and sands (ML / SM) or low plasticity and sandy lean clay (CL). The potential for shrinkage or swelling due to moisture related change is considered low for the proposed structures if the subgrade is prepared as recommended in **Section 10.1** and the site is designed per **Section 9.0**.

6.3.1 VERTICAL HEAVE PREDICTIONS

The assessment of the impact of expansive soils given below is predicated on soil moisture change that is a result of normal climatological fluctuation only. Factors such as poor drainage and consequent ponding water, plumbing leakage, excavation details (e.g., permeable backfill in trenches or beneath structures), and vegetation can result in moisture changes (and consequent swelling or shrinkage) outside the ranges predicted herein. The predicted heave is also the predicted differential movement that could be experienced by a slab and/or foundation placed on grade.

6.3.1.1 Potential Vertical Rise (PVR)

One method for quantifying the potential for subgrade movement at any given location is to calculate the Potential Vertical Rise (PVR) (Tex 124 E Modified). This calculation considers the inter-relationship between depth, Plasticity Index (PI), and fluctuations in soil moisture. The maximum potential vertical rise, PVR, due to normal climatological fluctuations in soil moisture content, is predicted to be 1.0-inch at existing and final grade. These calculations are based on assumed dry conditions and an estimated seasonal moisture fluctuation zone of approximately 10 feet.

6.4 Seismic Site Classification

IBC 2015 requires density/shear modulus information extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100-foot soil profile with borings that are drilled to a maximum of 30 feet below the existing grade. Consequently, we have assumed that the density (blow count) of the soil/rock encountered at the terminal depth is representative of the profile to a depth of 100 feet. If the seismic site class definition is critical to

the design, this assumption should be confirmed by further geophysical testing. Contact ETTL for more information.

Based on the 2015 IBC, the seismic site class definition is predicted as **Class E "Soft Soil"** and we have assumed a **Risk Category is III** (assumed). California's Office of Statewide Health Planning and Development (OSHPD) provides an online tool that calculates the seismic design values based on the overall project and site information listed above. A printout of this report is provided in **APPENDIX C**. ETTL does not warrant the accuracy of this report and it is presented to the client for information purposes only.

For more insight regarding the information, we have provided please visit:
https://www.usgs.gov/natural-hazards/earthquake-hazards/hazards

7.0 FOUNDATION DESIGN RECOMMENDATIONS

Two independent design criteria must be satisfied in the selection of the type of foundation to support the proposed structure. First, the ultimate bearing capacity, reduced by a recommended minimum factor of safety of 3, must not be exceeded by the bearing pressure transferred to the foundation soils. Second, the total and differential vertical movements due to consolidation and/or expansion of the underlying soils during the operating life of the structure(s) must be within tolerable limits. For most structures, 1 inch or less of predicted total settlement or heave is widely considered an acceptable target for design. It is our understanding that the superstructure proposed can tolerate movements of approximately 1.0 inch (total) and 0.5 inches (differential).

7.1 General Foundation Considerations

Due to the magnitude of anticipated column loads and to meet the settlement criteria, either deep foundations (drilled piers / helical piles) or ground improvement for support of shallow foundations is recommended as the lowest risk options of foundation movements. The magnitude of the anticipated loading will result in excessive settlement (greater than 1") for heavily loaded shallow spread footings supported by the native subgrade. Because drilled shafts will penetrate loose sands and possible shallow groundwater, temporary surface casing and/or slurry drilling techniques may be required to keep the hole from caving (details below). Helical Piles may have an advantage over drilled shafts in that they can be installed without auguring through the loose sands as well as producing spoil piles that have to be removed. Ground improvements such as aggregate priers are typically the preferred method to improve bearing and limit settlement for sites with similar geologic and groundwater conditions. Over-excavating the loose problematic surficial sands and recompacting them would increase the bearing capacity and could prove sufficient for the design of shallow footings for the host structure. However, this would likely entail some form of dewatering in excavations of 4 feet or more.

Relatively light loads such as those outside the proposed structure (pads for equipment, entrance gates, signs, and short retaining walls) can be supported on shallow spread footings supported by the prepared native soils. The designer should be aware that where structures supported on

different foundation elements (shallow, deep, or ground improvements) adjoin, some differential movements should be expected.

Some conditions that may affect foundation and slab performance (e.g., plumbing leaks, poor drainage conditions, deep-seated heave, etc.) are difficult to account for in standard slab and foundation design procedures and are not considered elsewhere in this report. Such sources of moisture change could cause significant shrink/swell movements and lead to significant distress. If it is desired to virtually eliminate the risk of damage from vertical movement due to these conditions, an option incorporating deep foundations with a suspended slab is recommended.

With ground-supported foundation/floor systems, measures must be taken to help assure subgrade moisture stability (see **Section 10.0**) to enhance the chances of satisfactory structure performance. A proper site design that prevents the inordinate drying or wetting of the subgrade soils around the structures is essential to reduce the potential for excessive movement caused by shrinkage and/or swelling of the foundation soils.

7.2 Shallow Spread Footings

Utilization of shallow spread footings placed in native subgrade or properly compacted select fill is recommended only for relatively light loads (<64 kips) such as those outside the proposed storm shelters. If the host structure is constructed with shallow footings on prepared subgrade and the storm shelters are supported by aggregate piers, differential settlement between the two systems may be more than 0.5 inches. A more detailed analysis is required once design information on the aggregate piers is available. We do not recommend mixing deep foundations and shallow foundations within the same structure without a construction joint to allow for differential movements.

7.2.1 BEARING CAPACITY

Footings should be designed to bear in prepared native subgrade or properly compacted select fill at a minimum depth of 2 feet below the finished subgrade or adjacent exterior grade (whichever is deeper). Isolated footings should have a minimum width of 2 feet and strip footings should be at least 12 inches wide. Listed in the table below are the recommended gross allowable bearing pressures for the various types of subgrade modifications, footing widths, and soil bearing stratum. These allowable pressures incorporate a safety factor relative to shear failure of the soil of at least 3 and may be increased up to 33% for intermittent loads such as wind.

TABLE 7.2.1 - Bearing Capacity of Shallow Footings FS = 3

Bearing Material or Stratum	Bearing Capacity of Isolated footings (psf)	Bearing Capacity of Strip footings (psf)	Max footing width (ft) for 1 inch of Predicted Settlement
Prepared Native Subgrade, see Section 10.1	1,500	1,300	5.0’

TABLE 7.2.1 - Bearing Capacity of Shallow Footings FS = 3			
Bearing Material or Stratum	**Bearing Capacity of Isolated footings (psf)**	**Bearing Capacity of Strip footings (psf)**	**Max footing width (ft) for 1 inch of Predicted Settlement**
Footings on Improved Subgrade, see Sections 7.2.4.1 and 10.1	2,000	1,800	6’
Footing supported by (RAP), see Section 7.2.4.2	≈ 5,000	≈ 5,000	1” or less, design provided by others

Given the limitations listed above, the relatively immediate settlement is predicted to be less than 1.0 inch (total) and 0.50 inch (differential) for footings designed as recommended here provided the subgrade is properly prepared. Based on the soil types beneath the building, the relative density of the soil/rock observed groundwater levels, and the anticipated loads on the various foundation elements, the magnitude of long-term settlement is not anticipated to be significantly more than the immediate settlement. Because settlement is directly related to the size of the loaded area, we placed limits on the maximum footing widths assuming the footings have a demand-bearing pressure equal to the maximum allowable. The actual total settlement is calculated based on the unfactored working footing pressure (i.e., unfactored dead load plus unfactored sustained live load), it is often the case that the unfactored working pressure is much less than the factored demand loading and the maximum footing width recommended can be exceeded and still maintain settlements of 1 inch. However, it is impractical for ETTL to assess all footing sizes and loading combinations at this phase of the design. Large heavy-loaded footings would require a case-by-case analysis to better assess the total settlement.

7.2.2 ECCENTRICALLY LOADED FOOTINGS

Allowable loading for eccentrically loaded footings is proportional to the degree of eccentricity and is lower than for a concentrically loaded footing. Equivalent allowable vertical uniform pressure (i.e., ignoring the effects of overturning moments) on an eccentrically loaded footing may be computed in accordance with the following:

$$q_{ae} = q_a * R_{ex} * R_{ey}$$

Where:

q_a = allowable uniform pressure for a concentrically loaded footing as given above.

R_{ex} = reduction coefficient for eccentricity about the x axis

= $1 – 2 * e_x/B_x$ for cohesive soils (CL & CH)

= $1 – (e_x/B_x)^{0.5}$ for cohesionless soils (SM, SC, ML)

R_{ey} = reduction coefficient for eccentricity about the y axis

= $1 – 2 * e_y/B_y$ for cohesive soils (CL & CH)

= $1 – (e_y/B_y)^{0.5}$ for cohesionless soils (SM, SC, ML)

e_x, e_y = eccentricity in the x and y direction, respectively

B_x, B_y = footing dimension in the x and y direction, respectively

Use the predominant soil type in the zone which is one footing width beneath the footing to calculate the reduction coefficient. If no one type is predominant, then use a weighted average based on the relative thicknesses in this zone. Total allowable vertical load with eccentricities ex and ey may be found by multiplying the gross area of the eccentrically loaded footing by q_{ae} as determined above.

7.2.3 SLIDING RESISTANCE FOR FOOTINGS ON GRADE

Ultimate (nominal) sliding resistance (**R_T**) should be checked for both drained and undrained loading conditions using the parameters listed in **TABLE 6.2.1, APPENDIX E** for the appropriate bearing stratum and the following formulae for nominal (un-factored) resistance:

For drained loading:

$R_T = V * \tan \delta$

Where:

V = total un-factored vertical force on the footing base for the given loading condition

tan δ = tan φ (φ = drained friction angle of the soil for the case where concrete is cast against the soil. Use tan δ = 0.8 * tan φ for precast concrete)

For undrained loading:

$R_T = c$, or

where 6" (min) of compacted, well-graded granular material is placed beneath the footing (where suitable) use the lesser of:

$R_T = c$ and $R_T = 0.5 * V$

Where:

c = undrained shear strength (cohesion), also designated S_u

The nominal resistance should be factored in as appropriate.

Ultimate (nominal) passive resistance of the soil loaded by a footing block face should be computed by the following formula for both drained and undrained conditions and selecting the most critical condition:

P_p (drained) = $\gamma*(K_p)*z + 2*c' *(K_p)^{0.5}$ (second term often neglected)

P_p (undrained) = $\gamma*(K_p)*z + 2*c *(K_p)^{0.5}$ (usually reduces to: $\gamma*z + 2*c$)

Where:

γ = effective unit weight

K_p = Passive pressure coefficient = $(\text{Tan}(45+\varphi'/2))^2$ (equals 1 for undrained φ=0 condition)

φ' = Effective angle of internal friction.

φ = Undrained angle of internal friction, generally = 0

c', c = drained/undrained cohesion
z = depth where pressure is determined

The appropriate parameters to be used in the above equation are to be selected from **TABLE 6.2.1, APPENDIX E** for the appropriate loading condition that controls (i.e., long-term(drained) or short-term (undrained)) for the soil against the face of the footing. A significant amount of lateral movement is required to fully mobilize ultimate passive pressure (as much as 6% of the depth to the base of the loaded face). To limit the lateral movement to about 1% (of the depth to the base of the loaded face) a factor of about 0.5 is typically recommended to reduce the above-computed resistance to the available mobilized nominal (un-factored) passive resistance given lateral displacement restrictions.

Passive resistance as computed above assumes that the footing excavation can be constructed in such a manner as to provide solid contact of the side of the concrete with the undisturbed sides of the excavation (which may be impractical in some situations). *Caution*: Lateral resistance against a vertical face should only be assumed where construction can be controlled to assure that the footing is cast against undisturbed earth or backfill between the excavation face and the footing edge is placed under density-controlled conditions (backfill should be placed to 100% ASTM D698). It should be noted that such heavy compaction against a wall face will result in earth pressures against the wall exceeding the usually assumed active or at-rest pressures. Also, the temporary excavation face needs to be nearly vertical and extended to the bottom of the footing elevation. The portion of the sides of the excavation for the footing that is comprised of fat clay exposed to wetting or drying action and that is within 5' of the finished ground surface should be neglected with respect to computing passive resistance to account for possible softening or shrinkage of the zone.

7.2.4 GROUND IMPROVEMENTS

Due to the significant thickness of loose and soft soils found throughout the soil profile, heavily loaded shallow spread footings are not considered feasible because of predicted excessive settlement under normal working loads, see **TABLE 7.2.1 above**. However, the bearing capacity can be improved, and the settlement potential reduced by some form of ground improvement. The two most common ground improvement options are 1) undercutting the loose soils and replacing them with compacted select fill, or 2) installing a system of Rammed/Vibratory Aggregate Piers.

7.2.4.1 Improved Subgrade

Undercutting the existing subgrade to an elevation of 2 feet below the footing bearing depth and replacing it with select fill compacted to 98% D698 (standard compaction) will increase the allowable bearing capacity somewhat and while maintaining a total settlement of 1 inch for isolated footing widths less than 6 feet, see limitations in **TABLE 7.2.1**. When considering this option, it should be noted this option entails excavating near or below the anticipated groundwater elevation and will require some form of dewatering and possibly shoring of the excavations.

7.2.4.2 Aggregate Piers

The design of this type of ground improvement system is typically performance-based and proprietary to the specialty design-build contractor such as Geopier or Keller North America. These systems can be a cost-effective foundation solution to support settlement sensitive structures while providing increased allowable bearing. The process increases the lateral stress in the surrounding soil; thereby further stiffening the composite soil mass, increasing the bearing capacity, and reducing settlements. For the soil profile encountered at the site, we anticipate that aggregate piers can be provided to achieve bearing capacities up to and sometimes greater than 5,000 psf while maintaining predicted settlements of 1.0 inch. If this is an option the designer would like to consider, we recommend contacting the engineers at Geopier and/or Hayward Baker for further information.

7.3 Drilled Piers

Drilled shafts have the advantage of being single elements that can provide both large vertical and large lateral capacity. Drilled shafts will consist of cylindrical excavations that are filled with high-slump concrete that is reinforced with a steel cage. Steel should be adequate to resist drag loads as well as uplift loads and bending moments and shears from lateral loads (if any). The reinforcing cage should be fitted with heavy-duty spacers (e.g., "ShaftSpacer" by Foundation Technologies - light plastic wheels are unacceptable) to maintain clearance between the steel cage and the side of the hole. Steel spacers are also unacceptable due to the corrosion potential increase. Only straight shafts should be considered for deep shafts carrying heavy loads.

Sizes for which static vertical load design information is provided herein include 18" to 48", which are believed sufficient to adequately cover the anticipated loading ranges (A 72" diameter design curve is also included for group action calculations (See **Section 7.3.4.2**)). Contact ETTL for design curves for additional shaft sizes, if needed. In general, the loads suggested as "allowable" can be increased by 33% for transient loads such as wind and seismic (except for cases where these loadings result in a net uplift on a given shaft). The information provided in this report is based on that found in *Drilled Shafts: Construction Procedures and LRFD Design Methods – FHWA GEC 010* - Federal Highway Administration, 2010.

7.3.1 SHAFT EMBEDMENT CONSIDERATIONS

In general, shafts that are smaller in diameter and deeper are more economical than those which are larger in diameter and shallower due to the fact that the volume of concrete is less for the former and capacity in the deeper soils is often much greater than in the shallower soils. The minimum recommended embedment is determined by loading and the provided "**DRILLED SHAFT CAPACITIES**" included in **APPENDIX D**.

7.3.2 VERTICAL CAPACITY

Drilled piers mobilize both skin friction and end bearing to distribute the loads from the proposed structures to the subsoil. The amount of movement it takes to develop full ultimate skin friction is generally less than 0.5", whereas the amount of movement necessary to develop ultimate end bearing is on the order of 3% to 5% of the tip diameter (in sands capacity is even available at tip movements in excess of 5% of tip diameter). To limit the settlement of the shaft to a generally

accepted magnitude, the amount of end bearing that can be mobilized is limited (more so for larger shafts than for smaller ones). That is, a calculation of the "effective" ultimate capacity, or the mobilized ultimate capacity at a limited settlement, involves adding the full ultimate skin friction capacity to a reduced ultimate end bearing.

Because of the myriad possible combinations of sizes and loading conditions and the unknown constrictions at any given location, capacity curves are provided which can be used to select size and embedment *for individual, isolated shafts in select fill/native soil*.

Capacity curves titled "**DRILLED SHAFT CAPACITIES**" are included in **APPENDIX D**. There is an individual plot for each of the shaft sizes selected showing recommended allowable skin friction (so indicated in the legend of the plot) and total load (indicated by the curve labeled in the legend with the shaft diameter). Tip elevation is plotted against predicted allowable capacity with the assumption that the ground surface surrounding the pier will be at existing grade. Where the finished grade is lower than the existing, read the side resistance capacity at the grade equal to the finished grade and subtract that from the capacity indicated by the curve at the tip elevation of the shaft. The skin friction capacity per foot of embedment indicated by the initial portion of the side resistance curve is the amount of capacity to be added or subtracted to the capacity read from the curve per foot of change in finished grade (i.e., add for an increase in grade and subtract for decrease). If grade changes are significantly different than what we have assumed in Section 2.0, contact ETTL to further evaluate and revise the provided capacity curves.

The vertical capacity read from the applicable curve represents the "effective ultimate" (i.e., total ultimate reduced to limit predicted tip settlement of an isolated pile at ultimate load to 1" or less) divided by a safety factor (as noted on the curve). For the initial design, we have selected a factor of safety of 3 as is typically recommended where load testing is impractical, as is usually the case for drilled shafts.

It should be noted that the capacity read from the curve represents the geotechnical capacity of the shaft only. The designer needs to check whether other issues such as concrete/grout strength may limit the capacity to something less than the geotechnical capacity. If design tip elevations are significantly greater than the limit of exploration, additional exploration should be considered to confirm the capacities assumed on the curves (where curves have been extended beyond the depth of exploration).

7.3.2.1 Modification for Significant Lateral Loads

Where a shaft is subject to significant lateral load, the skin friction capacity of that portion of the top of the shaft that deflects laterally more than 1% of shaft diameter should be neglected (may be the case, especially for smaller diameter shafts). Information regarding the depth to be ignored can be readily obtained from the lateral analysis curves generated in an L-Pile analysis. The appropriate **CAPACITIES** curve should be examined to determine the skin friction capacity at the depth below the top of the pile where deflection determined in an L-Pile analysis is equal to 1% of shaft diameter and this value should be subtracted from the capacity at the embedment depth to determine the recommended design capacity for the shaft.

These results are for individual piers and will need to be modified for group action of shafts as indicated in **Section 7.3.4**, below.

7.3.3 SETTLEMENT OF PIER SHAFTS

Limiting working loads to the level indicated by the curves should limit the settlement of isolated piers not subject to drag load effects at working load (not the settlement at ultimate load) to something in the neighborhood of 0.5" or less. However, the settlement considered by the design curves is the tip settlement of the isolated pier, not the head. You will need to check the elastic compression on the pier (use say 67% of its actual length for "L" in the (P*L)/(A*E) formula for the approximate computation of elastic compression to see if it is a significant amount). As a rule of thumb, it should only be significant for very slender piers. The settlement of pier groups can be significantly greater than the settlement predicted for an isolated pier and, thus, requires a separate evaluation, outside the scope of this investigation.

7.3.4 GROUP EFFECTS

7.3.4.1 Cohesionless and Mixed Profiles

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, Section 10.8.3.6 recommendations specify a reduction in allowable pier capacity for piers in sandy soils and mixed soil profiles (as is representative of this site) when the center-to-center spacing of multiple row groups is less than 4 shaft diameters. The capacity modification factor varies linearly from a value of 1.0 for spacing of 4 diameters to a value of 0.8 for spacing equal to 3 diameters and to 0.67 for spacing of 2.5 diameters. For single-row groups, the reduction factor varies from 1.0 for spacing of 3 diameters to 0.9 for spacing of 2 diameters. This factor should be applied in addition to the safety factor and applies to both the allowable compression and tension loads as derived elsewhere in this report.

Where shaft groups are tipped in a strong soil overlying a soft cohesive soil, additional evaluation is required.

7.3.4.2 Group Settlement

The settlement of the group should also be evaluated as it can be significantly more than what would be anticipated for a single shaft. Generally, (but not always) speaking, however, if the perimeter of the pile group equals or exceeds the sum of the perimeters of the individual shafts, there should not need to be any reduction in vertical capacity for group action. Evaluation of group settlement was outside the scope of this investigation, but ETTL can assist in these evaluations if provided with specifics regarding configurations and loads.

7.3.5 UPLIFT

In this instance, a value of 70% is recommended to calculate the capacity *of an individual shaft* in uplift as a percentage of downward skin friction capacity. Read the skin friction curve from the chart at the embedment depth (which is the allowable skin friction (Ultimate/SF=3)). Multiply this value by 0.7. The resistance value calculated using this skin friction value is compared to the uplift load applied to the top of the shaft minus the shaft weight and, as long as the resistance is

greater, the predicted factor of safety against uplift failure is the factor of safety specified on the design curve for side resistance or greater.

The recommended allowable uplift resistance of a pier group should be determined in accordance with *AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS,* Section 10.7.3.11 which states that the nominal (unfactored) group uplift capacity should be determined as the lesser of:

1. The design allowable uplift capacity of a single pier (as specified above) times the modification factor for pile spacing (**Section 7.3.4.1**) times the number of piers in the group times the factor of safety listed on the design curve. The modification for spacing applies only to cohesionless and mixed soil profiles.
2. The effective (use buoyant weight for the portion below the groundwater level) weight of the group and soil contained within a block defined by the perimeter of the pier group at its base and with sides sloping up to the surface at a rate of 1H to 4V for cohesionless and mixed soil profiles.
3. For cohesive soil profiles: The effective (use buoyant weight as noted above) weight of the pier group and soil contained within a block defined by the perimeter of the pier group and the embedded pier length plus the total soil shear resistance on the peripheral surface of the pier group. To compute the average shear resistance on the peripheral surface of the group, take the uplift value computed above for the individual pier (*not* modified for group effects) and divide it by the surface area of the pier (the perimeter of the pier times the embedment depth). For purely cohesive soil profiles only, multiply this value times 1.8 to convert pier side shear to group side shear.

7.3.6 LATERAL LOAD

A lateral load analysis depends on soil properties as well as the stiffness of the drilled shaft being analyzed and, so, entails a cooperative process involving both the structural engineer and the geotechnical engineer that cannot be conducted until a preliminary pier design is selected for a given combination of vertical and lateral loads. Programs such as the L-Pile program by Ensoft calculate the stiffness of drilled shafts accounting for reinforcement as well as cracking (i.e., stiffness reduction) for each combination of loads. Soil parameter values that should be used in a lateral load analysis are listed in **TABLE 6.2.1, in APPENDIX E**. For piers embedded in fat clay that is exposed to drying action (e.g. piers at the edges of pier caps not beneath slabs where fat clay will be within 5' of an exposed ground surface), we recommend that the portion of the shaft that is 5' or shallower below the finished ground surface adjacent to the cap be neglected for lateral support in order to help account for possible shrinkage of the clay away from the sides of the shaft in the upper zone.

Analyses of both fixed-head and free-head conditions can be made. The analysis also depends on the percentage of steel reinforcement, as well as the magnitude of vertical load to use in conjunction with the maximum horizontal load. The critical combination of loads yielding the maximum horizontal deflection generally consists of the maximum horizontal load together with

the minimum vertical load. This combination results in the severest moment and least effective moment of inertia (due to the cracking of the section). The L-pile program considers the soil stiffness as well as the shaft stiffness under whatever combination of vertical load, lateral load, and the moment the user specifies.

7.3.7 GROUP ACTION OF LATERALLY LOADED PIERS

A group of piles or piers loaded laterally will generally have a total lateral capacity (for a given lateral deflection of the pile heads) less than the sum of the individual lateral capacities based on an isolated pile. This is due to the fact that a pile moving toward another pile that is also moving experiences reduced resistance because of the relaxation of the soil behind the leading pile as the leading pile moves away from the soil behind it. This reduction is accounted for in LPile analyses by incorporating a *p-multiplier* applied to the "average" pile in the group (also known as the "group reduction factor"). *AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS,* Table 10.7.2.4.1 provides suggested multipliers to be used for the leading row, second row, and trailing row piles in a group. However, a recent study by Fayyazi, et. al. titled: *Group Reduction Factors for Analysis of Laterally Loaded Pile Groups,* 2014, Canadian Geotechnical Journal indicates that AASHTO overestimates the group reduction factors and does not recognize that reduction factors are less for a fixed head (the reduction factor is lower as the reduction is greater). We have modified the recommended AASHTO factors (conservatively) to account for the recommendations of the Fayyazi study. The group reduction factors (p-multiplier for the average pile in the group determined on a weighted average basis) are:

TABLE 7.3.7 - Recommended *p-multipliers*

Row	Fixed	Free
1	0.68	0.95
2	0.58	0.81
3+	0.48	0.67

7.3.7.1 Lateral Load Resistance of Pier Caps

Resistance to lateral loads can be developed via a combination of passive earth pressure acting against the face of footings and pile/pier caps and lateral resistance developed by deep foundations. The resistance of piers to lateral loads is discussed elsewhere in this report. A portion of ultimate passive earth pressure can be applied to the face(s) of footings and pier caps to resist lateral loads. Full passive resistance assumes that the footing excavation can be constructed in such a manner as to provide solid contact of the side of the concrete with the undisturbed sides of the excavation (which may be impractical in some situations).

Caution: Lateral resistance against the vertical face of pier caps or spread footings should only be assumed where construction can be controlled to assure that the footing is cast against undisturbed earth or backfill between the excavation face (which needs to be nearly vertical and extended to the bottom of cap elevation) and the footing edge is placed under density-controlled conditions (backfill should be placed to 100% ASTM D698). It should be noted that such heavy

compaction against a wall face will result in earth pressures against the wall exceeding the usually assumed active or at-rest pressures.

The portion of the sides of the excavation for the footing that is comprised of fat clay exposed to wetting or drying action and that is within 5' of the finished ground surface should be neglected with respect to computing passive resistance to account for possible softening or shrinkage of the zone.

In determining the total resistance to lateral loads, the degree of lateral movement that can be tolerated must be considered. This is related to the fact that there is a direct relationship between lateral load and horizontal deflection for piers and there is also a direct relationship between the lateral movement of the vertical face of a pile cap or footing and the degree of passive resistance that can be mobilized. The magnitude of lateral movement needs to be consistent for each contributing element in computing total allowable resistance. (This relationship is rather complex and ETTL can provide further assistance when provided with specifics of a given situation). To determine the total allowable lateral load for a given lateral deflection limitation, the mobilized passive pressure on a pile cap should be added to the resistance from the individual piles (modified for group effects as detailed elsewhere in the report), and the sum reduced by an appropriate safety factor. Lateral support to the cap afforded by a floor slab or other rigid element placed in contact with the cap should also be considered.

The ultimate passive resistance of the soil loaded by a block (in the form of a triangular/trapezoidal distributed load) can be estimated by the following formulae for both drained and undrained conditions and selecting the most critical condition:

P_p (drained) = $\gamma*(K_p)*z + 2*c' *(K_p)^{0.5}$

P_p (undrained) = $\gamma*(K_p)*z + 2*c *(K_p)^{0.5}$ (usually reduces to: $\gamma*z + 2*c$)

Where:

γ = effective unit weight

K_p = Passive pressure coefficient = (Tan(45+φ'/2))^2 (generally equals 1 for undrained φ=0 condition)

φ' = Effective angle of internal friction.

φ = Undrained angle of internal friction, generally = 0

c', c = drained/undrained cohesion

z = depth where pressure is determined

The appropriate parameters to be used in the above equation are to be selected from **TABLE 6.2.1, APPENDIX E** for the appropriate loading condition that controls (i.e., long-term(drained) or short-term (undrained)) for the soil against the face of the footing. A significant amount of lateral movement is required to fully mobilize ultimate passive pressure (as much as 6% of the depth to the base of the loaded face). To limit the lateral movement to about 1% (of the least dimension of the loaded face) the above-calculated ultimate resistance should be reduced by 50% to determine the ultimate mobilized passive resistance.

7.3.8 DRILLED PIER LOAD TESTING PROGRAM

The information provided herein for the design of piers is based on a factor of safety of 3. If a design based on a lower factor of safety (e.g., 2 – 2.5) is to be considered, a load test program is recommended to assess capacity more accurately. Unless the project entails a very large number of piers, this approach will not generally be economical. ETTL can assist you in planning a test program should you desire to pursue this further.

7.3.9 DRILLED PIER CONSTRUCTION ISSUES

Construction of all drilled piers should be monitored by personnel familiar with their installation. As a minimum, it is recommended that a representative of this firm be present before and during drilled pier construction in order to monitor test piers and production pier installation procedures.

Groundwater observations indicate that shaft tip depth will be below the water table and that a dry auger method of construction will likely not be feasible. Temporary casing and/or slurry drilling procedures will be required in this case. Free water and/or loose material at the base of excavations should be removed with an approved “Muck Bucket” prior to the placement of concrete. Additional concrete can be pumped via a tremie pipe placed at the bottom of the shaft to displace any water accumulated in the bottom of the shaft to the surface if the bottom is determined to be sound. At no time should concrete free fall into a shaft that contains water. In any case, it is recommended that contract documents provide alternates with or without casing and dry or slurry displacement construction procedures.

Concrete *should* be designed and placed with a relatively high slump (7 to 9 inches) to provide solid contact of the shaft with the side of the hole. Close engineering supervision is essential during the installation of the foundation units in order to ensure that construction is performed in accordance with the plans and specifications. Also, to help ensure proper construction of the drilled piers, close coordination between the drilling and concrete operations is considered to be of primary importance. Concrete should be placed at each drilled pier location *immediately* after the completion of drilling. Concrete placement in the shaft should be at a rate of at least 40’ of the shaft per hour. *In no case should a shaft remain open overnight.*

Construction documents must specify that all foundation units should be constructed/installed in accordance with ACI 336.1 "Standard Specification for the Construction of Drilled Piers," latest edition. Only contractors familiar with and competent in the employment of these methods should be considered for the work. The actual capacity of the completed foundation is directly related to the degree of conformance to correct construction procedures.

7.4 Augered Cast-in-Place (ACIP) Piles

We do not recommend ACIP for this site. Due to the variation within the upper soil strata. The soil profile we are penetrating consists of loose silt, and sand submerged in groundwater over a stiffer clay. When you bore into these materials, there is a tendency for them to collapse from the sidewall of the pile and flow into any void (such as that created by the augers to a greater or lesser

degree) and be carried by the auger flights to the surface ("Flighting" or "mining") because they are loose/not bound together and subject to water pressure. Mining results in auger flights that are not full, and which do not support the sidewall of the hole, resulting in more potential for mining. How significant this caving is can't be predicted ahead of time, only those significant issues are possible, and the significance is highly dependent on the installation procedure. If the caving is significant enough, it can cause the soil to "relax" away from nearby piles, thus reducing their side resistance capacity. How much reduction is possible depends on installation techniques. If the client is still considering ACIP it is recommended to discuss the site with potential contractors who have experience drilling in these conditions.

7.5 Helical Piles

Helical piles are a viable alternative to drilled shafts. Allowable capacities in compression up to about 75 kips (and possibly significantly greater) are believed to be achievable for individual piles at this site (this should be confirmed during preliminary discussions with prospective helical pile suppliers). Capacity in tension is generally approximately 70% - 80% of capacity in compression. The final design of all piles will be provided by the Helical Pile Specialty Engineer (HPSE) who will be the engineer of record for the helical piles. We recommend that the structural designer consults with the prospective Helical Pile Specialty Engineer allied with helical pile suppliers to be provided with information regarding standard details, viable capacity, and other issues of concern. Large capacity helical piles are similar to open-web steel joists in that they are a structural element, the capacity of which is determined by the supplier rather than by the project structural engineer and the details of which are provided to the project structural engineers by the supplier.

7.5.1 HELICAL PILE SPECIFICATIONS

As recommended by the Helical Foundations and Tiebacks Committee of the Deep Foundation Institute (DFI) in their *Model Specification for Helical Pile Foundations Compression Applications*, (available from DFI and is on the web) provision of this type of deep foundation support system should be via a performance-based specification. Consequently, we recommend that the piles be designed, furnished, and installed by a specialty design-build helical pile contractor. The DFI Spec covers all the bases related to design, testing, and installation as well as field adjustments and verification of every pile placed on the job and is recommended for use with this project. We recommend the following information and amendments be incorporated into the DFI Spec:

1. Delete the recommendation that piles be evaluated and approved by ICC-ES to maximize the number of prospective bidders.
2. Piling should be designed by a helical pile specialty engineer registered in the state of Texas (HPSE), experienced in helical pile design who will be the engineer of record for the helical piles.
3. Capacity should be checked for both long-term (drained) and short-term (undrained) loading conditions. Adjustments to the standard interpretation of load tests may be necessary, depending on which load case controls the design.
4. Maximum spacing between piles of 3 times the diameter of the largest helix, measured at the depth of the helix, not necessarily at the pile head.

5. The recommended minimum factor of safety is 2.0 assuming that each pile will be evaluated based on a correlation of final installation torque to load capacity (as determined by a static load test). For critical structures, a higher safety factor may be appropriate.
6. Maximum tolerable axial deformation (elastic shortening plus settlement) of individual piles needs to be specified in keeping with the characteristics of the structure to be supported.
7. Corrosion service life needs to be specified (usually 50 years per most building codes (75 years for transportation and critical structures)). Note that corrosion potential for clay soils is generally high. It is almost always the case that soil bearing capacity is the controlling factor in the pile design. The size and thickness of the steel pile shaft are controlled by the torque necessary for installation, which usually produces a section much thicker than what is needed to transfer the load to the helix. As a result, potential thickness loss of the steel pile shaft due to corrosion (even where the pile is not treated for corrosion resistance) usually has a relatively minor impact on capacity during typical design life.
8. The potential number of piles warrants specific static verification load testing of each pile type to develop a correlation between installation torque and proven static load capacity.
9. We recommend that at least one static load test for each general pile type be conducted for each direction of the load to be considered (tension and/or compression, plus lateral if needed). The exact number and type of tests should be decided based on the final designs and after consultation with the HPSE.

7.6 Grade Beams and Load-Bearing Elements

All grade beams and load-bearing elements (columns and load-bearing walls) can be (but not required) supported by deep foundations with a minimum **4-inch void space** provided beneath all grade beams and pile caps to prevent contact with soils that may have some residual swell or settlement potential. This void will serve to reduce distress resulting from swell pressures that may be generated by the clays. In addition, the members should be designed for uplift pressures equal to the crushing strength of the void boxes in the event that they do not deteriorate before the soil begins to expand. Where the subgrade is prepared per **Section 10.1**, the void space can be eliminated, provided the element in contact with the grade can tolerate some uplift pressure generated by heaving soil.

Grade beams should be double formed. Earth forming beams below ground is not recommended because of the inability to control beam excavation width. Grade beams may be cast on cardboard carton forms or formed above grade. If cardboard carton forms are used, care should be taken to not crush the carton forms, or to allow the carton forms to become wet or otherwise degraded prior to or during concrete placement operations. A non-degradable soil retainer should be provided to help prevent in-filling of this void when the form decays.

Backfill around the structure perimeter and against the exterior face of grade beams or panels (especially where there is no pavement abutting the building) should be properly compacted native clays wide enough to cover the area of over-excavation (minimum of 5') and 2' thick. Compaction should be to a minimum of 95 percent of ASTM D 698, at optimum moisture content or above as determined by that test. This clay fill is intended to reduce surface water infiltration beneath the structure.

7.6.1 VOID BOXES

One method to create voids beneath grade beams is the use of 4-inch-thick void (carton) forms (placed in accordance with the manufacturer's recommendations). Care should be taken to ensure that the void boxes are not allowed to become wet or crushed prior to or during concrete placement and finishing operations. As a quality control measure during construction, "actual" concrete quantities placed should be checked against "anticipated" quantities. Significant concrete "overage" would be an early indication of a collapsed void, which should be remedied by replacing the collapsed form.

7.6.2 DRAINAGE OF VOID SPACES

A drainage system should be provided to intercept and prevent the collection of surface drainage (as well as other potential sources of water) in the void spaces beneath the structure. Landscape irrigation water and/or rainfall running down the face of the building can infiltrate the ground surrounding the structure (where there is no abutting moisture barrier such as a pavement sealed to the edge of the structure), collecting in the void beneath the perimeter beam and floor slab, possibly leading to excessive heave or other moisture-related problems (e.g., rupture of plumbing connections).

8.0 FLOOR SYSTEMS

Floor systems placed on native subgrade may be potentially subject to differential movements as noted in **Section 6.3** and which may result in unacceptable distress to the floor and elements supported thereon. Managing and/or mitigating this risk can be addressed in a number of ways including (in order of decreasing risk and increasing cost):

1. Removal and replacement of a portion of expansive clay from beneath the floor to reduce the degree of potential movement, generally to within a range of 1.0".
2. Isolation of the floor/structure from subgrade movements by structurally suspending it on deep foundations above a void or crawl space.

Option 1 is discussed in more detail below. If the risk from predicted potential vertical differential movements as noted in **Section 6.3** and as modified per the provisions of **Section 10.1** of this report is not considered tolerable, a structurally suspended floor slab or structural element (option 2) can be used to significantly reduce the risk of distress (recommendations provided upon request). We presume that an evaluation by others of risk vs. cost as discussed in **Section 6.3** will determine the appropriate design approach.

8.1 Slab on Grade

Floor slabs (and exterior flatwork, if desired – See **Section 9.2**) can be placed on a subgrade prepared as described in **Section 10.1**. Slab-on-grade construction should only be considered if the risk of slab movement (and potential consequent damage) as noted throughout this report can

be tolerated. The level of acceptable movement varies with the design and other requirements, but methods are normally selected with the goal of limiting predicted slab movements to about 1 or less. Reductions in anticipated movements can be achieved by using subgrade modification methods developed for that purpose. The more commonly used method in this area consists of undercutting and replacing the expansive soils. The use of this method will reduce, *but not eliminate* the risk of unacceptable movements.

8.2 Floor Loadings

8.2.1 MODULUS OF SUBGRADE REACTION

Design of Slabs on Ground, ACI 360R provides a methodology for the thickness design of floors subjected to concentrated wheel and post loads as well as area rack loads. That procedure requires a characterization of the subgrade support in the form of the modulus of subgrade reaction (MSR), k. This value represents the pressure applied to the subgrade surface on a 30" diameter plate that results in a deflection of 1" and is in units of psi/in (or PCI). Actual plate load testing of the finished subgrade to determine an appropriate value is not generally practical, so predictions are made based on published correlations of the modulus with soil properties (ACI 330R). Based on those correlations, the predicted MSR (k) at the top of the native subgrade for the various native soil layers as well as for select fill is provided in **TABLE 6.2.1, APPENDIX E**. The use of a well-graded crushed stone base material on top of the soil can be used to increase the modulus.

9.0 STRUCTURE PERIMETER AREA AND GENERAL SITE

Planting beds adjacent to the structure should be contained in leak-proof boxes or a horizontal moisture barrier sealed to the grade beam should be used in conjunction with them in order to isolate the building subgrade from water infiltration sources such as sprinkler systems. Backfill adjacent to the structure should be discussed in **Section 7.6** to help limit surface infiltration.

Vehicle or pedestrian ramps leading up to the building should be configured to avoid abrupt differential movement between the building slab and the ramps which could occur where such elements are supported on the untreated native subgrade while the building is supported on deep foundations and/or where a portion of the native soil beneath the building has been replaced with non-expansive fill. Transitioning details will be required at the points where ramps connect with paving and other slab-on-grade elements. In addition, ramp slabs should be constructed so that slopes sufficient for effective drainage of surface water are still provided should the potential differential movements discussed elsewhere herein occur.

Where the predicted potential differential heave (as discussed in **Section 6.3**) between elements supported on native subgrade and the structure which is supported on deep foundations is considered significant, "hinge" slabs that are doweled in into the structure grade beam to allow for some rotation but not separation and designed to span over a void below to native grade at

some distance from the building, allow the exterior slab to rotate about its joint with the grade beam without significant distress. Such hinge slabs also help to prevent moisture fluctuation in the perimeter zone of the structure where an effective seal is maintained at the joint of the exterior slab with the building foundation. Such slabs should be sloped sufficiently to prevent an eventual slope toward the building resulting from exterior subgrade heave. The void below these slabs should be drained to prevent the accumulation of surface drainage.

9.1 Perimeter Moisture Barrier

To reduce the risk that the native soils, which will remain beneath the building footprint, will experience significant fluctuation in moisture content, a moisture barrier that extends to a distance of at least 8 feet beyond the perimeter of the building can be placed. This barrier can be in the form of concrete (floor slab, sidewalk, or paving) abutting the building and with all joints sealed and maintained, or a synthetic sheet vapor barrier such as STEGO® WRAP VAPOR BARRIER (20-MIL), or equivalent that is sealed to the foundation edge and is buried sufficiently to prevent damage. Where 8 feet of extension beyond the building perimeter is not available, the vapor barrier can be turned into a trench the depth of which is equal to the remaining length of the barrier sheet, and which is backfilled with flowable fill. A 2' thick soil layer as described elsewhere herein can also serve as a moisture barrier.

9.2 Exterior Flat Work (Sidewalks, Patios, Etc.)

Flatwork placed on grade will be subject to movement due to subgrade swelling or shrinkage, the amount of which depends on the preparation of the subgrade (see **Sections 6.3 and 10.1**). The movement is usually most pronounced in the immediate vicinity of exposed edges of the slabs and is generally much less in the interior areas, provided that the surface is well maintained with joints and cracks sealed. Conditions at the edges of slabs on grade should be sufficient to provide for rapid drainage of surface water away from the edge. Shrubs, trees, and planting beds in the vicinity of pavement edges are often causes of excessive fluctuation of soil moisture leading to the distress of adjacent flatwork.

Consideration can be given to extending the recommended building subgrade preparation to include entrances, sidewalks, porticos, flatwork, or any other areas sensitive to movement and where the predicted potential movement is considered significant. Outside the zone treated for the building (i.e., outside an area including 5' outside of the building line), a minimum cover of 24 inches of select fill can be used to reduce the potential movement somewhat.

To reduce abrupt differential movements between exterior flatwork areas that are placed on prepared subgrade and those that are not where predicted potential movements are significant, consideration should be given to a transition zone whereby the depth of treatment or over-excavation is tapered from the full depth zone up to the ground surface at a slope of 1:1 or flatter.

Although movement potential can be reduced by the removal or moisture treatment of problematic soils, it may be more economical to maintain and repair the flatwork rather than to extensively remove or treat potentially expansive soil. Determining the optimum approach was beyond the scope of this investigation.

Irrigated landscaped areas often surround exterior flatwork areas. Moisture fluctuations in the landscaped areas surrounding relatively narrow flatwork areas can subject the soils underlying the flatwork to expansion and contraction. To reduce the risk of moisture fluctuations in the upper portions of the soil profile beneath the slab, consideration can be given to a vertical moisture barrier along the perimeter of the flatwork.

Flatwork should not be placed in a manner that could impound water adjacent to the structure should it be subject to heave (predictions of the degree of potential heave are discussed in **Section 6.3**) at some time in the future. Articulating joints in the flatwork can serve to lessen the extent of distress due to shrink/swell movements of the soil upon which it is placed. Such joints will require regular maintenance to maintain a sealed condition. The better the drainage and joint and crack maintenance, the lower the risk potential for distress.

9.3 Below Grade and Retaining Walls

Footings for below-grade walls should be designed in accordance with the recommendations provided in **Section 7.2.** In some cases, depending on the geometrical configuration, the nature and characteristics of the wall design, and loading, walls should be evaluated for global and compound stability. Walls retaining cut and/or fill slopes may be utilized to form the grade transitions throughout the site. An analysis of the global stability of the wall/slope configuration was outside the scope of this investigation but should be performed.

9.3.1 EARTH PRESSURE

Lateral earth pressures for the design of below-grade walls may be calculated based on active or at-rest conditions depending on how free the wall is to move under lateral load. Earth pressure magnitude is a function of the lateral movement of the wall, the hydrostatic (groundwater level), and the type and condition of the soil behind the wall. Active, passive, and at-rest earth pressures are the three conditions used to represent the loads imposed on or by retained soil masses.

For active earth pressure to develop, the supporting wall must deflect to a significant degree. This magnitude of deflection is usually present in flexible, cantilever-type retaining walls that are free to rotate, but walls such as basement and pit walls that are supported at the top and bottom, or are otherwise relatively rigid, are not generally sufficiently flexible to allow active earth pressure to develop. In such cases, at-rest conditions are usually assumed. At-rest earth pressure refers to the in situ lateral pressure in the soil mass and typically falls in the range between active and passive pressures.

The total lateral load can be calculated from the triangular distribution associated with equivalent hydrostatic pressure and, for cantilever-type walls, this resultant would be applied at a distance of two-thirds of the height of the soil placed against the wall below the top of the backfill. However, for more rigid walls such as basement walls, the actual pressure distribution is more parabolic than triangular, and the above-calculated resultant should be assumed to be acting at mid-height of the soil backfill.

Suggested values to be used as unfactored equivalent hydrostatic pressures may be obtained from **TABLE 6.2.1, APPENDIX E**, by multiplying the appropriate earth pressure parameter for the classification of backfill soil used times the moist unit weight. Active and at-rest pressures represent actual working loads, while the passive earth pressure, which is utilized as a resisting force, is an ultimate value and should be modified by a safety factor (commonly 1.5 - 2) in calculating allowable passive resistance. (The appropriate safety factor depends on the size and depth of the footing as well as the allowable horizontal movement. If this is critical further evaluation should be conducted). Allowable passive resistance also needs to be modified to account for conditions of the soil in the passive resistance zone (e.g., soaking, or drying shrinkage as well as construction methodology), which may alter the actual mobilized resistance (Re: **Section 7.3.7.1**). Drained conditions (i.e., where there is no water pressure against the wall due to saturated backfill) represent soils above the water table that are prevented from saturation by surface drainage. Undrained conditions (i.e., where water pressure should be considered in addition to earth pressure) are for cases where the soil behind the wall is below the water table, and/or is subject to saturation by surface drainage. We recommend that the top 2 feet of backfill consist of relatively impermeable clay compacted to at least 95% of ASTM D698 (standard proctor). If the backfill is loose or if the drainage conditions immediately behind the wall at the surface are not sufficient to keep surface water from penetrating the backfill, then undrained conditions should be assumed.

The design parameters for walls below grade do not include allowance for surcharge loads. Typically, concentrated loads should not be placed within a horizontal distance from the top of the wall equal to the height of the wall, unless allowances are made in the design by increasing the equivalent hydrostatic pressure to account for the surcharge. Also, if heavy construction equipment is used for compacting the backfill for the wall, this equipment may impose substantial surcharge effects on the wall. The magnitude of the increase depends on the amount and location of the surcharge(s).

9.3.2 BACKFILL

Backfill for below-grade walls may consist of any soil meeting the material and compaction requirements for Select Fill in **Section 10.2**. The top 2' of backfill should be relatively impermeable as mentioned above. However, clayey soils with a PI above 25 are not normally

recommended for backfill and under some circumstances could cause extremely high lateral pressures due to swelling. Also, soils that are not free draining (i.e., most of the above-referenced soils) should be considered as undrained unless appropriate measures are taken to ensure that they do not become saturated either by surface drainage or groundwater.

Equivalent fluid pressures predicted as recommended above assume that backfill immediately adjacent to the wall is placed in a moderately compact state (about 95% ASTM D 698) achieved with relatively light hand compaction equipment in thin lifts (about 6" loose or as required to achieve compaction). If the backfill is compacted to a higher density immediately behind walls using heavy equipment, the lateral pressures given above may need to be increased significantly. Heavy equipment should not operate closer to the wall than a distance equal to 60% of the height of the lift being compacted above the base of the wall. Backfill in the "reinforced zone" of a retaining wall should be specified by the wall designer. Backfill outside the reinforces zone should consist of select fill compacted to 95% D698.

9.3.3 DRAINAGE

The readings for the static water level taken during drilling operations indicated that the static water level is not likely to be above the proposed structure base elevations. However, occasional pockets of shallow perched water may be encountered. Variations may be experienced throughout the year as groundwater data usually reflect a seasonal condition. However, the precise nature of the seasonal fluctuation of groundwater level can only be determined via the installation of piezometers and a long-term monitoring program, which was outside the scope of this investigation. Significant dewatering effort may be necessary for the construction of some below grade structures and some measures may be needed to drain isolated pockets of perched water.

Surface drainage away from the structure should be designed to provide for rapid runoff and to prevent ponding adjacent to the structure which could result in subsequent infiltration and saturation of fill soils above native expansive soils, possibly resulting in detrimental heave. Details should be provided to capture all infiltration of surface drainage before it can infiltrate soils, especially those beneath movement sensitive items. Drainage should be collected and routed so as not to allow it to infiltrate fill and native soils beneath structures.

9.4 Site Design

The following recommendations are derived from years of experience with structures founded on non-expansive soils and are considered essential to satisfactory structure performance:

- Sidewalks should be sloped away from the building and not tied to the structure.

- The ground surface around the building and the paved areas should be sloped away from the building on all sides so that water will drain away from the structure. Water should not be allowed to pond near the structure during or after rainfall events.

- Adequate drainage should be provided to minimize any increase in moisture content of the foundation soils. Roof drainage should be conveyed by an appropriate means at least 10 feet from the building before it is allowed to drain into the subgrade.

Backfill for utility line ditches should be carefully controlled. It should be placed at a density similar to the surrounding soil. A density of 95 percent of ASTM D 698 (Standard Proctor) may be used as a rule of thumb.

10.0 EXCAVATION AND SITE WORK

10.1 Subgrade Preparation

In order to validate the design assumptions given above regarding allowable foundation loads, and, in order to provide a serviceable floor system (within the limitations stated above), it is imperative that the subgrade of the building be properly prepared. The following procedures are recommended as a minimum:

- Strip to remove all topsoil, crushed gravel, demolition debris, and other deleterious materials from the subgrade to a minimum depth of 6". Where trees are removed (or have been removed in the last year) from the structure footprint area, the entire root zone should be cut out and replaced with properly compacted select fill. Root zones tend to be comprised of highly desiccated soil, which, if left in place, is prone to significant swelling later on, resulting in the heaving of the slab or structure element. Verify that all stump holes are backfilled with properly compacted select fill.

- ETTL is only aware of records pertaining to the placement of fill during the construction of the existing structures. An evaluation of any fill placed during the original construction was outside the scope of this project. If there is any question regarding the adequacy of the previously placed fill it should be over excavated, tested for suitability as fill, and recompacted (if found suitable) per **Section 10.2**.

The following minimum over-excavation is recommended. Limits of over-excavation should extend beyond building and/or footing lines a distance of 5' and should taper up to the finished grade at a 1:1 slope. If perched groundwater is encountered (most likely in isolated areas) it will need to be managed appropriately, see **Section 10.3**.

Floor Slabs and Flatwork

- At a minimum undercut all floor slabs 2 feet from finish grade and replace with select fill compacted to a minimum density of 98% D698 (Standard Proctor).
    - Cuts more than 4 feet below existing grade will require dewatering. See S**ection 10.3.**

- At the completion of the over-excavation and/or prior to placing fill:
    - Under the supervision of a representative of this firm, perform a proof roll with a fully loaded dump truck or water truck. Yielding areas should be further investigated, cut out, and replaced with compacted select fill.

- Following a passing proof roll:
    - Scarify the exposed subgrade to a depth of 12 inches, adjust the moisture content to, and maintain it within a range of -2% optimum to optimum +2% and recompact to a minimum density of 98% of the maximum density defined by ASTM D 698 (Standard Proctor). A subgrade comprised of Lean or Fat Clay (CL/CH) should be compacted to a minimum of 95% density and above optimum moisture. Maintain specified moisture content until the subgrade is covered with fill or slab.

- Place select fill to finished slab subgrade. Maintain the finished subgrade in a moist condition until covered with a slab.

Shallow Footings on Improved Ground

- To improve the bearing capacity and reduce settlement of lightly loaded footings, see **Section 7.2.4.2 and TABLE 7.2.1**, at a minimum undercut all footings (isolated and strip) 2 feet below their bearing depth and replace with compacted select fill compacted to a minimum density of 98% D698 (Standard Proctor). The width of the excavation should be twice the maximum footing width B in both directions.
    - Cuts more than 4 feet below existing grade will require dewatering. **See Section 10.3**

- Prior to placing select fill:
    - All footing excavations should be inspected by qualified personnel to ensure that the subgrade is composed of firm, undisturbed native soil or properly compacted select fill as recommended in this report. Water and/or loose material in footing excavations should be removed prior to the final shaping of the footing excavation and placement of concrete.

    - Scarify the exposed subgrade to a depth of 12 inches, adjust the moisture content to, and maintain it within a range of -2% optimum to optimum +2% and recompact to a minimum density of 98% of the maximum density defined by ASTM D 698

(Standard Proctor). Maintain specified moisture content until subgrade is covered with fill or slab.

10.2 Select Fill

Select fill shall consist of homogeneous soils (i.e., not sand with clay lumps) classifying as SM, SC-SM, SC, or Sandy CL, free of organic matter and rocks larger than 3 inches in diameter and possessing an Atterberg plasticity index (PI) between 5 than 20, with a liquid limit of 45 or less and a percent passing the #200 less than 65%. Atterberg limits testing of the fill at a rate of 1 test per 500 cubic yards of fill placed (minimum 1 test per fill area per lift and as visual changes occur) is recommended to verify that fill specifications are met. The material should be placed in the following manner:

- Prepare the subgrade in accordance with the recommendations discussed elsewhere herein. Sites that slope more than about 15% should be benched with 8-foot-wide benches prior to placing fill.

- Place subsequent lifts of select fill in thin, loose layers not exceeding 9 inches in thickness to the desired rough grade and compact to ≥98% of the maximum density as defined by ASTM D 698 (Standard Proctor). Maintain moisture within a range of -1% optimum to optimum +3%.

- Conduct in-place field density tests at a rate of one test per 3,000 square feet of lift area for every lift with a minimum of 2 tests per lift. *Density testing is essential to ensure that the soil beneath the structure is properly placed.*

- Prevent the excessive loss of moisture during construction (periodic sprinkling may be required).

10.2.1 ON-SITE SELECT FILL SOURCE

Some of the soils encountered in the upper 5' of the borings (excluding the non-plastic sands (SM) and silts(ML)) will meet the requirements for select fill to be utilized under structures, floor slab, and pavement areas and to constructure slopes or embankments (within the stipulations noted in the report). It should be noted that the upper 5 feet of sandy soils may contain excess moisture due to perched water in areas. The fill will need to be excavated, blended, dried, and qualified before use.

10.2.2 COMMON FILL

Common fill may consist of any of the following soil classifications: SM, SC, CL, CH, and may be used as fill to bring the site to grade in areas where other specific preparation is not desired and where differential soil movement is not critical for both the current and future development. Proper

processing, placement, and testing of this material are essential. Poorly or Well Graded sandy soils that classify (SP, SW) should not be used as fill as they will likely become reservoirs for water and excessive erosion in the future. Listed below are several factors that must be considered if fat clay (CH) is to be used for fill:

- The material must be relatively uniform (homogeneous). It cannot be blocky or shaley or a mixture of various types of soils or even various types of clays.

- The clay must be processed to assure uniform moisture distribution (a good rule of thumb for gradation is 1" or less). Discing of the clay may not be adequate for this process. Sometimes the use of a pulvermixer is necessary. Processing and watering the clay in place prior to picking it up and moving it is typically more effective since it allows more time for the water to penetrate the soil “clods.” Some shaley clay cannot be effectively processed.

Place processed common fill in loose lifts not exceeding 9” in thickness and compact to a density $\geq$ 95% of ASTM D698 (Standard Proctor) and maintain moisture at -1% optimum to optimum +4% or above.

10.3 Control of Groundwater

As discussed in **Section 4.1**, excavations 4 feet below the existing grade will encounter local perched water or permeant groundwater and, if so, will experience infiltration that will need to be dealt with during construction.

Measures that will need to be taken will probably be as simple as excavating a trench to collect the seepage and pumping water from sumps adjacent to the excavation. In isolated areas, the saturated soil can be overexcavated and replaced with compacted select fill. Construction traffic should be excluded from the excavation virgin base area when it is wet as this traffic may seriously damage the bearing soils. What measures are appropriate to deal with excess water both during construction and permanently depends on the nature and extent of the groundwater and the permeability of the strata through which it flows. Such a characterization was outside the scope of this study.

Where the groundwater is "perched" or is a relatively minor flow through pervious soils on top of a relatively shallow impervious stratum (called an “aquiclude”), an upstream trench drain around the perimeter of the worksite or a system of ditches routing flow to sumps may be effective in intercepting some or all of the flow, provided interception trench drains penetrate the aquifer sufficiently and are not bypassed by local areas of artesian flow. Minor flows that occur in secondary features of the soil profile such as joints or cracks can also usually be managed by the

collection of the flow in a sump. Intercepted flow may either be pumped from the sump or trench or allowed to drain by gravity.

When the flow is not perched, a system of well-points often proves to be the most effective way of dewatering excavations. A system of temporary wells would be designed to provide sufficient drawdown of the groundwater below anticipated construction elevations. However, the design of such a system necessitates detailed knowledge of the quantity of groundwater flow and the permeability and extent of the aquifers. Obtaining this kind of data was beyond the scope of this investigation.

Groundwater that is not permanently lowered (i.e., maintained at a head level below foundations), will exert buoyancy forces on foundations, possibly resulting in heaving.

10.4 Excavation Safety

The Federal Register, Volume 54, No. 209 (Latest Revision), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) contain the "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". The contractor is solely responsible for designing and constructing stable, temporary excavations in accordance with these standards and should shore, slope, or bench the sides of the excavations as required to maintain the stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in CFR Part 1926, should evaluate the soil exposed in the excavation as part of the contractor's safety procedure. In no case should the height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. Testing to evaluate the stability of slopes created during excavations at this site was beyond the scope of this study.

11.0 PAVEMENT RECOMMENDATIONS

The following are general recommendations for the design of minimal pavement structures and are provided herein for your information. If requested, ETTL can review the civil drawings and specifications for compliance with our recommendations herein. NOTE: Minimal designs as included herein may not be adequate for significant heavy truck traffic. For such traffic, a specific design based on a numerical characterization of the traffic is recommended and was beyond the scope of this investigation. Both flexible and rigid pavement sections are presented. A summary of the proposed designs is provided in **TABLE 11.1**, **TABLE 11.2,** and **TABLE 11.3** below.

11.1 Pavement Subgrade Preparation

As a minimum, strip the native subgrade to remove topsoil and other deleterious materials. Tree root zones often contain highly desiccated soil that eventually results in heaving after a period of rewetting. The only way to limit this potential is to remove these zones and replace them with select fill. Verify that all stump holes as well as areas disturbed by demolition activity, if any, are

cut out and backfilled with properly compacted select fill. The heaving effect can be reduced with good pavement drainage and maintenance. If this is not feasible, then future additional pavement maintenance will probably be necessary.

Cut to the proposed subgrade elevation as required. The exposed subgrade should be proof rolled before compaction or treatment in accordance with TxDOT Item 216 with the exception of roller size. The use of a fully loaded dump truck is recommended. Areas, which prove unstable should be cut out and reworked. In areas that are below finished subgrade elevation, or which are to be lime treated, scarify the exposed subgrade to a depth of 8 inches, adjust the moisture content to within a range of optimum to optimum +3%, and recompact to a minimum of 98% of the density as defined by ASTM D 698 (Standard Proctor). For HMAC pavement sections, lime treatment of subgrade that consists of native clay, or native clay fill is recommended as set forth below. Positive surface drainage should be maintained during all phases of construction (especially in low areas) to help keep pavement subgrade in a dry and stable condition.

11.1.1 FILL CONSTRUCTION

Fill material to be used beneath areas to be paved may consist of any native soil and should be compacted to a minimum density of 98% ASTM D698 (standard proctor) at a moisture content within the range of optimum ±3% except for fat clay soils which should be placed at above optimum moisture contents. Lime treatment of the finished subgrade can be omitted where the top 18" of finished subgrade consist of select fill with the following properties: a PI ranging from 8 to 18, a liquid limit $\leq$40, and a percentage passing the #200 sieve <40% (this specification is slightly different than the building fill specification).

11.1.2 STABILITY OF FINISH SUBGRADE

The stability of the finished subgrade should be verified by proof rolling (as specified above) prior to placing base material or surfacing. Unstable areas will need to be cut out and reworked.

11.1.3 SPECIAL REQUIREMENTS

Islands and irrigated areas adjacent to pavement edges can be a source of pavement problems. Overwatering can lead to infiltration (and consequent destabilization) of flexible base material adjacent to the area. Where a flexible pavement option is chosen, areas subject to overwatering (especially islands with irrigation systems) should be designed to contain all irrigation water (i.e., prevent leakage out the bottom into adjacent stone base material). An alternate, but less desirable solution is to replace the flex base in the immediate vicinity of the potential infiltration with full depth Asphalt.

Where trees or shrubbery will be planted or will remain in close proximity to the pavement edge, or where the pavement edge is subject to extreme drying action, deep drying of the subgrade beneath the pavement edge (within root zones of vegetation where present) can lead to cracking of the subgrade and pavement in the vicinity. The only effective way to prevent this sort of distress is to undercut the active clay subgrade and replace it with select fill or prevent drying of the subgrade through the use of moisture/root barriers. The use of a geogrid between the crushed

stone base and the subgrade can limit the propagation of cracks from the subgrade up into the base. Additional details regarding these measures will be provided upon request.

11.1.4 SUBBASE / STABILIZED SUBGRADE

Subbase consists of treated native material or compacted fill that lies below the flexible road base (or surface pavement) and above the stable untreated native subgrade. The soils that are projected to be exposed at finished subgrade generally have a PI below 25. Stabilization is recommended due to the likelihood of the silts and sands will rut/pump when exposed to excess moisture. For subgrade soils with a Plasticity Index (PI) greater than 25, lime treatment is the preferred method for increasing the subgrade modulus. For soils, less than a PI of 25 cement treatment is the preferred method for increasing the subgrade modulus. Based on the findings of the exploratory borings cement treatment is the recommended stabilization treatment.

11.1.4.1 Cement Treated Subgrade

Cement treatment of subgrade should be constructed in accordance with Section 307, "Cement Treated Base Course", AHTD Standard Specifications for Highway Construction (2014 Edition) with the following exceptions:

- Under article 307.02, "Composition", the rate of cement to be applied will be 35 pounds per square yard worked into the top 6 inches, or 40 pounds per square yard worked into the top 8 inches of finished subgrade.

- The subgrade should be inspected by a representative of this firm prior to and during treatment. The cement should be placed and worked in two separate amounts if the subgrade is above optimum moisture content to limit the “clumping” of the cement and a reduction in the final strength.

- The modified subgrade should be compacted under article 307.04 (d), "Compaction and Surface Finish," using drum rollers, except that it shall be compacted to 95% of Standard Proctor Density (ASTM D698) within a range of moisture of optimum $\pm$ 2%.

- Curing procedures should be strictly followed. Traffic on the treated subgrade should be kept to a minimum during and after curing.

Testing for soluble sulfates was outside the scope of this project. Soils that contain a sufficient quantity of soluble sulfates can cause an adverse reaction when stabilized with hydrated lime or cement. This would lead to sulfate induced heave if lime (or cement) stabilization were to be used. Typically, the possibility of sulfate induced heave is when sulfate contents are above 3,000 mg/kg. However, at sulfate contents less than 8,000 mg/kg, stabilization is still feasible as long as the moisture content is mixed above optimum. If stabilization is use TxDOT recommendations should be strictly followed. Sulfates generally occur in veins that may or may not be intercepted by the procedures used to obtain samples for this study. Once the site is cut to grade the exposed

subgrade should be inspected by a qualified technician and samples obtained for sulfate testing per Tex 145E.

11.1.4.2 Alternatives to Subgrade Stabilization

For the flexible pavement option (only) placing a geogrid (Tensar TX5 or equivalent) on the native subgrade prior to placing base material or undercutting 18 inches and replacing will compacted select fill, will serve as a substitute for stabilized subgrade.

For the full depth HMAC section, stabilization of the subgrade or fill is required.

For the rigid pavement option (concrete) the recommended pavement thickness accounts for an untreated prepared native subgrade. Where the finished subgrade is sand (SP, SM, SP-SM, SC-SM), 4 inches of compacted Flex Base or 6" of cement stabilized subgrade will increase longevity by providing a non-erodible base. Especially desirable where the pavement is on a significant slope, where the pavement is subject to heavier truck traffic, and/or if the pavement is used to sheet flow surface water in concentrated drainage areas.

11.2 Light-Duty Pavements

11.2.1 FLEXIBLE PAVEMENT

The minimum pavement section (and a section commonly used) for light-duty driveways and parking areas consists of 6 inches of crushed stone base with 2 inches of hot mix asphaltic concrete (HMAC). Crushed stone base should comply with Type A, Grade 1/2, Item 247 of the *Texas Department of Transportation (TxDOT) 2014 Standard Specifications for Construction of Highways, Streets, and Bridges*. Compaction of the stone base should be to a minimum of 100 percent Tex 113E maximum density at optimum moisture ±3 percent. Asphaltic concrete surfacing should comply with the requirements of Type D, Item 340 of the TxDOT Specifications, and should be compacted to a density of 92 to 94 percent of maximum theoretical density.

11.2.2 FULL-DEPTH ASPHALT

The minimum full-depth asphalt pavement section consists of 3 inches of hot mixed asphaltic concrete binder course (Type B) with 2 inches of hot mixed asphaltic concrete surfacing (Type D). Asphaltic concrete surfacing should comply with the requirements of Type D, Item 340 of the TxDOT Specifications and the asphaltic concrete binder should comply with the requirements of Type B, Item 340. All HMAC should be compacted to a density of 92 to 94 percent of maximum theoretical density.

11.2.3 RIGID PAVEMENT

The performance of concrete pavement is dependent on many factors including weight and frequency of traffic, subgrade conditions, concrete quality (which itself is dependent on a host of factors), joint type and layout, jointing procedures, and numerous construction practices. A detailed discussion of all of these items is beyond the scope of this report. The designer is referred to the American Concrete Institute Publication No. ACI 330R, *Guide for Design and Construction of Concrete Parking Lots*, for more details. By way of general guidance, the following

recommendations are offered:

- The minimum concrete moment of rupture (MOR) = 540 psi at 28 days (approximately 3,600 psi) placed with a maximum slump of 4 inches. The mix should contain 4.5% - 6% entrained air for durability. The maximum aggerate size should be no greater than 1/3 the thickness of the slab. Allow a minimum of 7 days (in warm weather, longer in cold weather) curing time before permitting light traffic on the pavement.

- Minimum pavement thickness of 5.0 inches for an estimated CBR (Compacted to 95% ASTM D 698) of the subgrade equal to 3 and a traffic category of A (Average Daily Truck Traffic (ADTT=10)). All edges of pavement should be thickened to 7 inches (transitioning back to 5.0 inches over a minimum distance of 4 feet), see ACI 330R, Table 3.4. Treating the subgrade to a depth of 6 inches with 5% cement will increase the pavement lifespan.

ACI 330R, Table 3.3 – Traffic Categories		
Truck Type	**Parking Areas and Interior Lanes**	**Entrances and Exterior Lanes**
Cars (light Vehicles)	Category A	Category B
Busses and Panel Trucks	Category B	Category C
Single Units (bobtailed trucks)	Category B	Category C
Multiple Units (tractor-trailer units with one or more trailers	Category C	Category D

- *Sand cushions should not be used as a construction expedient, instead of proper subgrade preparation. Granular aggregate subbases are not normally used for concrete parking lots. If a subbase is specified for some special reason, it should be placed on the prepared subgrade, compacted, and trimmed to the elevation called for in project plans.*

- For information regarding the amount and type of reinforcement (if any), load transfer across the joints (Dowels), joint spacing, saw cutting, curing, and placement of the concrete, the reader is referred to ACI 330R, specifically Section 3.7 & 3.8.

11.3 Medium-Duty Pavements

11.3.1 FLEXIBLE PAVEMENT

For areas that will be subject to trash or delivery truck parking and traffic, the minimum recommended flexible pavement section consists of 8 inches of crushed stone base and 3 inches of asphaltic concrete surfacing. The 3 inches of surfacing may be composed of a fine-graded surface course (Type D) or coarse-graded surface course (Type C). Paving materials should be specified as discussed previously.

11.3.2 FULL DEPTH ASPHALT

For a medium-duty full-depth asphalt section, the minimum recommended section is 6 inches of HMAC paving consisting of 2 inches wearing surfacing (Type D) over 4 inches of asphaltic binder (Type B). Paving materials should be specified as discussed previously.

11.3.3 RIGID PAVEMENT

Recommendations for medium-duty concrete paving (traffic category B (ADTT=25)) are the same as for light-duty except that 6.0 inches of portland cement concrete should be the minimum pavement section and the edges should be thickened to 8 inches. Treating the subgrade to a depth of 6 inches with 5% cement will increase the pavement lifespan.

11.4 Heavy-Duty Pavements

11.4.1 FLEXIBLE PAVEMENT

For areas which will be subject to heavy truck parking and traffic, the *minimum recommended* flexible pavement sections consist of 7 inches of crushed stone base and 4.5 inches of asphaltic concrete surfacing. The 4.5 inches of surfacing may be composed of 2 inches of fine-graded surface coarse (Type D) wearing surfacing overlaying 2.5 inches of course-graded surface course (Type C). Paving materials should be specified as discussed previously.

11.4.2 FULL DEPTH ASPHALT

For a heavy-duty full-depth asphalt section, the minimum recommended section is 7.5 inches of HMAC paving consisting of 2 inches of hot mixed asphaltic concrete surfacing (Type C or D) over 5.5 inches of asphaltic concrete base course (Type A or B). Paving materials should be specified as discussed previously.

11.4.3 RIGID PAVEMENT

Recommendations for heavy-duty concrete paving (traffic category B (ADTT=25)) are the same as for light-duty except that 7.0 inches of portland cement concrete should be the minimum pavement section and the edges should be thickened to 8 inches. Treating the subgrade to a depth of 6 inches with 5% cement will increase the pavement lifespan.

TABLE 11.1 – Pavement Options – Light Duty

Type	Base/Surface Thickness		Subgrade Preparation
Flexible HMAC	2” Surface (Type D)	6” TxDOT Base	6” Cement Treated
Full Depth HMAC	2” HMAC Surface (Type D)	3” HMAC Base (Type A or B)	6” Cement Treated
Concrete	5.0”	No Base Required [6]	Compacted Native Subgrade [6]

TABLE 11.2 – Pavement Options – Medium Duty			
Type	**Base/Surface Thickness**		**Subgrade Preparation**
Flexible HMAC	3” Surface (Type C or D)	8” TxDOT Base	6” Cement Treated
Full Depth HMAC	2” Surface (Type C or D)	4” HMAC Base (Type A or B)	8” Cement Treated
Concrete	6.0”	No Base Required [6]	Compacted Native Subgrade [6]

TABLE 11.3 – Pavement Options – Heavy Duty			
Type	**Base/Surface Thickness**		**Subgrade Preparation**
Flexible HMAC	2” Surface (Type C or D)	2.5” HMAC Base 7” TxDOT Base	8” Cement Treated
Full Depth HMAC	2” Surface (Type C or D)	5.5” HMAC Base (Type A or B)	8” Cement Treated
Concrete	7.5”	No Base Required [6]	Compacted Native Subgrade [6]

Notes:

1) See alternative subgrade preparation options noted in **Section 11.1.4.2**
2) A visual inspection and proof roll of the exposed subgrade shall be made to determine areas to be undercut and replaced with select fill.
3) Recompact subgrade to a minimum density of 98% of ASTM D698 (Standard Proctor).
4) The stability of the finished subgrade should be verified by proof rolling in accordance with TxDOT.
5) Entry, exit, and trash receptacle areas should be a minimum of 7 inches of reinforced concrete, or per local city or county standards.

12.0 LIMITATIONS

Geotechnical design work is characterized by the presence of a calculated risk that soil and groundwater conditions may not have been fully revealed by the exploratory borings. This risk derives from the practical necessity of basing interpretations and design conclusions on a limited sampling of the subsoil stratigraphy at the project site. The number of borings and spacing is chosen in such a manner as to decrease the possibility of undiscovered anomalies while considering the nature of loading, size, and cost of the project. The recommendations given in this report are based upon the conditions that existed at the boring locations at the time they were drilled. The term "existing groundline" or "existing subgrade" refers to the ground elevations and soil conditions at the time of our field operations.

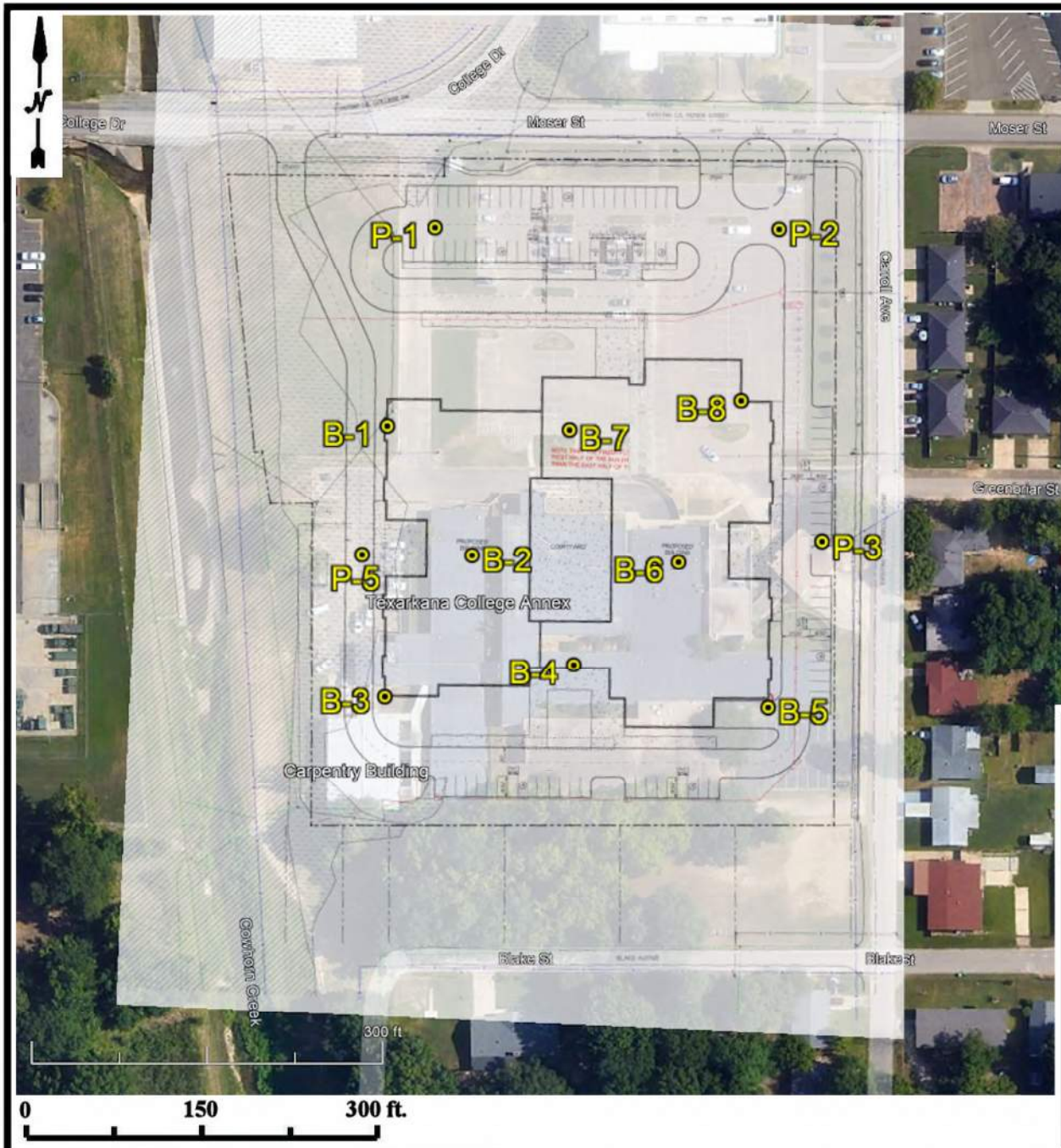
It is conceivable that soil conditions throughout the site may vary from those observed in the exploratory borings. If such discontinuities do exist, they may not become evident until

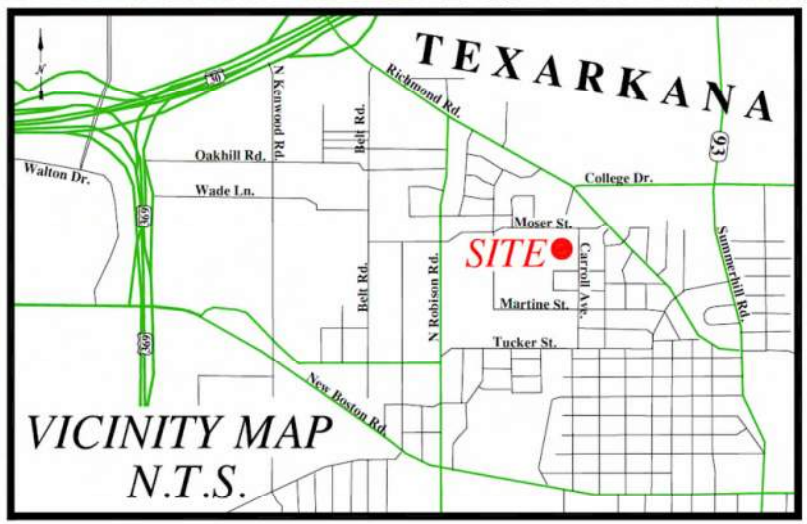
construction begins or possibly much later. Consequently, careful observations by the geotechnical engineer must be made of the construction as it progresses to help detect significant and obvious deviations of actual conditions throughout the project area from those inferred from the exploratory borings. Should any conditions at variance with those noted in this report be encountered during construction, this office should be notified immediately so that further investigations and supplemental recommendations can be made.

Construction plans and specifications should be submitted to ETTL for review prior to issuance for construction to help verify that the recommendations of this report have been correctly understood and implemented.

This company is not responsible for the conclusions, opinions, or recommendations made by others based on the contents of this report. The recommendations made in this report are applicable only to the proposed scope of work as defined in **SECTION 2.0 PROJECT DESCRIPTION** and may not be used for any other work without the express written consent of ETTL Engineers. The purpose of this study is only as stated elsewhere herein and is not intended to comply with the requirements of 30 TAC 330 Subchapter T regarding testing to determine the presence of a landfill. Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. No warranties are either expressed or implied.

APPENDIX A
Plan of Borings
Borings Logs





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P.L. DUNBAR
EARLY EDUCATION CENTER
TEXARKANA, TEXAS

PLATE I - PLAN OF BORINGS

JOB NO.: G6199-23

DATE: SEP. 2023 | **SCALE: AS SHOWN**

LOG OF BORING B-1

PROJECT: P.L. Dunbar Early Education Center
Texarkana, Texas

BORING TYPE: Flight Auger

PROJECT NO.: G6046-226

DRILL RIG: CME-75

DATE 9/5/23

SURFACE ELEVATION 304

ETTL Engineers & Consultants

MAIN OFFICE
1717 East Erwin Street
Tyler, Texas 75702
903-595-4421

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LL	PL	PI	SIEVE ANALYSIS MINUS #200 SIEVE (%)	PLUS #40 SIEVE (%)	PLUS #4 SIEVE (%)	SWELL TEST DRY DENSITY (pcf)	FREE SWELL (%)	ZERO SWELL PRESSURE (ksf)	MOISTURE CONTENT (%)
0		ML			SANDY SILT(ML) loose; brown with light brown; moist; roots	P=4.0											
		CL			SANDY LEAN CLAY(CL) very soft; light brown with gray; moist; mottled; with roots and iron oxide staining	N=2	18	27	13	14	61	4	0				
5					--medium stiff; light brown with gray and brown	N=8											
		SM			SILTY SAND(SM) medium dense; gray and light brown; moist; mottled; with iron oxide staining and gravel >0.25"	N=26	14	NP	NP	NP	22	27	11				
10				▼													
		CH	Qt		SANDY FAT CLAY(CH) very soft; reddish brown with light brown; moist to wet; mottled; with iron oxide staining	N=2											
15					--medium stiff; light brown and gray	N=8											
20																	
		CL			SANDY LEAN CLAY(CL) soft; dark gray with light brown; moist to wet; mottled; with iron oxide staining	N=4	26	43	14	29	65	4	0				
25					--medium stiff; dark gray	N=5											
30					Bottom of Boring @ 30'												

BLOW COUNT: 20 40 60 80
Qu (tsf): 1 2 3 4
PPR (tsf): 1.0 2.0 3.0 4.0
Torvane (tsf): 1.0 2.0 3.0 4.0

COMPRESSIVE STRENGTH — DRY DENSITY (pcf) | COMPRESSIVE STRENGTH (tsf) | MOISTURE CONTENT (%)

Natural Moisture Content and Atterberg Limits: Plastic Limit | Moisture Content | Liquid Limit; 20 40 60 80

Water Level Est.: ▽ Measured: ▼ Perched: ▼

Water Observations: Seepage @ 17' while drilling. Water level @ 20' and open upon completion. Water level @ 10' and caved 25' on 9/6/23.

Key to Abbrevations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:

GPS Coordinates: N33.446220°, W94.074290°

Drilled By: Dyirell White

Logger: Hunter Franks

LOG OF BORING B-2

PROJECT: P.L. Dunbar Early Education Center
Texarkana, Texas

BORING TYPE: Flight Auger

PROJECT NO.: G6046-226

DRILL RIG: CME-75

DATE 9/5/23

SURFACE ELEVATION 309

ETTL Engineers & Consultants

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1717 East Erwin Street
Tyler, Texas 75702
903-595-4421

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	MOISTURE CONTENT (%)	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LL	PL	PI	SIEVE ANALYSIS MINUS #200 SIEVE (%)	PLUS #40 SIEVE (%)	PLUS #4 SIEVE (%)	SWELL TEST DRY DENSITY (pcf)	FREE SWELL (%)	ZERO SWELL PRESSURE (ksf)	MOISTURE CONTENT (%)
0		ML			SANDY SILT(ML) very loose; brown with gray; moist; with roots and slightly iron oxide staining	P=1.75														
					--brown	N=3				13	NP	NP	NP	51	5	1				
5		CL			SANDY LEAN CLAY(CL) soft; light brown; moist to wet; mottled; with iron oxide staining	P=0.75	111	0.84	20	20	32	14	18	67	2	0	120	0.3	1.00	12
		SM	Qt		SILTY SAND(SM) dense; light brown with gray; moist to wet; with >0.5" gravel	N=43														
10																				
		CH			FAT CLAY WITH SAND(CH) stiff; light brown with reddish brown; moist; mottled; with iron oxide staining	P=2.5	96	1.25	27	28	53	18	35	81	1	0				
15																				
		ML			SILT WITH SAND(ML) dense; light brown with gray; moist; with iron oxide staining	N=33														
20					Bottom of Boring @ 20'															

BLOW COUNT: 20 40 60 80
Qu (tsf): 1 2 3 4
PPR (tsf): 1.0 2.0 3.0 4.0
Torvane (tsf): 1.0 2.0 3.0 4.0

COMPRESSIVE STRENGTH

Natural Moisture Content and Atterberg Limits: Plastic Limit | Moisture Content | Liquid Limit; 20 40 60 80

Water Level Est.: ▽ Measured: ▼ Perched: ▼

Water Observations: Seepage @ 8' while drilling. Water level @ 23' and open upon completion. Water level @ 5' and caved 7' after 4 hours.

Key to Abbrevations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:

GPS Coordinates: N33.445919°, W94.074052°

Drilled By: Dyirell White

Logger: Hunter Franks

LOG OF BORING B-3

PROJECT: P.L. Dunbar Early Education Center
Texarkana, Texas

PROJECT NO.: G6046-226

BORING TYPE: Flight Auger

DRILL RIG: CME-75

DATE 9/5/23

SURFACE ELEVATION 304

ETTL Engineers & Consultants

MAIN OFFICE
1717 East Erwin Street
Tyler, Texas 75702
903-595-4421

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	MOISTURE CONTENT (%)	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LL	PL	PI	SIEVE ANALYSIS MINUS #200 SIEVE (%)	PLUS #40 SIEVE (%)	PLUS #4 SIEVE (%)	SWELL TEST DRY DENSITY (pcf)	FREE SWELL (%)	ZERO SWELL PRESSURE (ksf)	MOISTURE CONTENT (%)
0		SM			SILTY SAND(SM) loose; brown with gray; moist; slightly mottled; with slightly iron oxide staining	P=3.0				12	NP	NP	NP	39	23	9				
		CL			SANDY LEAN CLAY(CL) medium stiff; brown and gray; moist; with slightly iron oxide staining	N=6														
5					--mottled	P=1.75														
		SM			SILTY SAND(SM) medium dense; gray with brown; moist; mottled; with iron oxide staining	P=1.75	121	0.79	13	13	NP	NP	NP	39	16	5	115			13
10																				
		CH	Qt		FAT CLAY WITH SAND(CH) stiff; reddish brown with brown; moist; slightly mottled; with iron oxide staining	N=10														
15																				
					--brown with gray	N=9														
20																				
		CL			LEAN CLAY(CL) medium stiff; brown with gray; moist; slightly mottled; with iron oxide staining	P=2.25	100	0.99	24	28	43	18	25	96	0	0				
25																				
					--stiff; brown	N=11														
30					Bottom of Boring @ 30'															

Natural Moisture Content and Atterberg Limits: Plastic Limit | Moisture Content | Liquid Limit (20 40 60 80)

Water Level Est.: ▽ Measured: ▼ Perched: ▼

Water Observations: Seepage @ 22' while drilling. Water level @ 17' and caved to 19' upon completion. Water level @ 7' and caved 19' after 4 hours.

Key to Abbrevations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:

GPS Coordinates: N33.445586°, W94.074297°

Drilled By: Dyirell White

Logger: Hunter Franks

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LOG OF BORING B-4

PROJECT: P.L. Dunbar Early Education Center
Texarkana, Texas

BORING TYPE: Flight Auger

PROJECT NO.: G6046-226

DRILL RIG: CME-75

DATE 9/5/23

SURFACE ELEVATION 311.5

MAIN OFFICE
1717 East Erwin Street
Tyler, Texas 75702
903-595-4421

MATERIAL DESCRIPTION

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA
0		SM			SILTY SAND(SM) very loose; brown; moist; with roots and iron oxide staining	N=3
		CL			SANDY LEAN CLAY(CL) stiff; brown with dark brown; moist; slightly mottled; with iron oxide staining	P=3.75
5		SC			CLAYEY SAND(SC) loose; brown; moist; with roots and fat clay clumps with loose sand	N=9
		CL	Qt	▽	SANDY LEAN CLAY(CL) stiff; light brown with gray; moist; mottled; with iron oxide staining	N=12
10						
		ML			SILT WITH SAND(ML) loose; light brown with gray; moist; with >0.25" gravel and medium to coarse-grained sand	N=10
15						
					--medium dense; brown	N=21
20					Bottom of Boring @ 20'	

FIELD STRENGTH DATA: BLOW COUNT (20 40 60 80); Qu (tsf) (1 2 3 4); PPR (tsf) (1.0 2.0 3.0 4.0); Torvane (tsf) (1.0 2.0 3.0 4.0)

COMPRESSIVE STRENGTH: DRY DENSITY (pcf); COMPRESSIVE STRENGTH (tsf); MOISTURE CONTENT (%)

Natural Moisture Content and Atterberg Limits (Plastic Limit — Moisture Content — Liquid Limit; 20 40 60 80)

MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	SIEVE ANALYSIS MINUS #200 SIEVE (%)	PLUS #40 SIEVE (%)	PLUS #4 SIEVE (%)	SWELL TEST DRY DENSITY (pcf)	FREE SWELL (%)	ZERO SWELL PRESSURE (ksf)	MOISTURE CONTENT (%)
14	40	14	26	60	4	1				
20	31	14	17	53	5	1				

Water Level Est.: ▽ Measured: ▼ Perched: ▼

Water Observations: Seepage @ 8' while drilling. Dry and caved to 7' upon completion. Dry and caved to 6' after 4 hours.

Key to Abbrevations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:

GPS Coordinates: N33.445662°, W94.073767°

Drilled By: Dyirell White

Logger: Hunter Franks

LOG OF BORING B-5

PROJECT: P.L. Dunbar Early Education Center
Texarkana, Texas

BORING TYPE: Flight Auger

PROJECT NO.: G6046-226

DRILL RIG: CME-75

DATE 9/5/23

SURFACE ELEVATION 311.5

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MATERIAL DESCRIPTION

DEPTH (ft)	USC	GEOLOGIC UNIT	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LL	PL	PI	SIEVE ANALYSIS MINUS #200 SIEVE (%)	PLUS #40 SIEVE (%)	PLUS #4 SIEVE (%)	SWELL TEST DRY DENSITY (pcf)	FREE SWELL (%)	ZERO SWELL PRESSURE (ksf)	MOISTURE CONTENT (%)
0	CL		SANDY LEAN CLAY(CL) medium stiff; brown with light brown; dry to moist; slightly mottled; with roots and iron oxide staining	N=8	13	27	15	12	54	9	5				
	SC		CLAYEY SAND(SC) medium dense; light brown and gray; moist; mottled; with roots and iron oxide staining	N=18											
5			--dark brown with brown; wet to moist	P=3.75	16	33	14	19	49	3	0				
			--slightly mottled; with iron oxide staining and >0.25" gravel	N=15											
	CL		SANDY LEAN CLAY(CL) stiff; light brown and gray; moist; slightly mottled; with iron oxide staining												
10															
	SM	Qt	SILTY SAND(SM) loose; reddish brown with gray; wet; medium to coarse-grained sand	N=6	24	NP	NP	NP	14	0	0				
15															
			--very loose	N=4											
20															
	CL		SANDY LEAN CLAY(CL) very stiff; reddish brown; moist; with iron oxide staining	N=21											
25															
			--hard; reddish brown with gray	N=33											
30			Bottom of Boring @ 30'												

Natural Moisture Content and Atterberg Limits: Plastic Limit, Moisture Content, Liquid Limit (20 40 60 80)

Water Level Est.: ▽ Measured: ▼ Perched: ▼

Water Observations: Seepage @ 10' while drilling. Water level @ 7' and caved to 12' upon completion.

Key to Abbrevations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:

GPS Coordinates: N33.445560°, W94.073222°

Drilled By: Dyirell White

Logger: Hunter Franks

LOG OF BORING B-6

PROJECT: P.L. Dunbar Early Education Center
Texarkana, Texas

BORING TYPE: Flight Auger

PROJECT NO.: G6046-226

DRILL RIG: CME-75

DATE 9/5/23

SURFACE ELEVATION 311.5

ETTL Engineers & Consultants

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Tyler, Texas 75702
903-595-4421

MATERIAL DESCRIPTION

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	MATERIAL DESCRIPTION
0		SM			SILTY SAND(SM) loose; brown; moist; with roots and slightly iron oxide staining
		CL		▼	SANDY LEAN CLAY(CL) medium stiff; brown; moist; with roots and slightly iron oxide staining
5		SC			CLAYEY SAND(SC) medium dense; light brown and gray; wet to moist; slightly mottled; with slightly iron oxide staining --medium dense; moist; slightly mottled; with iron oxide staining and roots
10			Qt		
		SM			SILTY SAND(SM) very loose; light brown and gray; wet to moist; with iron oxide staining
15					
		CH			FAT CLAY WITH SAND(CH) stiff; light brown and gray with reddish brown; moist; mottled; with iron oxide staining
20					Bottom of Boring @ 20'

FIELD STRENGTH DATA

BLOW COUNT: N=6, N=6, N=27, N=3, N=12

Qu (tsf) 1 2 3 4
PPR (tsf) 1.0 2.0 3.0 4.0
Torvane (tsf) 1.0 2.0 3.0 4.0

COMPRESSIVE STRENGTH

Natural Moisture Content and Atterberg Limits (Plastic Limit, Moisture Content, Liquid Limit; 20 40 60 80)

DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	MOISTURE CONTENT (%)	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	SIEVE ANALYSIS MINUS #200 SIEVE (%)	PLUS #40 SIEVE (%)	PLUS #4 SIEVE (%)	SWELL TEST DRY DENSITY (pcf)	FREE SWELL (%)	ZERO SWELL PRESSURE (ksf)	MOISTURE CONTENT (%)
			17	25	14	11	54	5	0				
			18	28	16	12	29	1	0				

Water Level Est.: ▽ Measured: ▼ Perched: ▼

Water Observations: Seepage @ 11' while drilling. Water level @ 7' and open upon completion. Water level @ 4' and caved to 6' on 9/6/23.

Key to Abbrevations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:

GPS Coordinates: N33.445902°, W94.073473°

Drilled By: Dyirell White

Logger: Hunter Franks

ETTL Engineers & Consultants

LOG OF BORING B-7

PROJECT: P.L. Dunbar Early Education Center
Texarkana, Texas

BORING TYPE: Flight Auger

PROJECT NO.: G6046-226

DRILL RIG: CME-75

DATE 9/5/23

SURFACE ELEVATION 308.5

MAIN OFFICE
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DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	MOISTURE CONTENT (%)	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LL	PL	PI	SIEVE ANALYSIS MINUS #200 SIEVE (%)	PLUS #40 SIEVE (%)	PLUS #4 SIEVE (%)	SWELL TEST DRY DENSITY (pcf)	FREE SWELL (%)	ZERO SWELL PRESSURE (ksf)	MOISTURE CONTENT (%)
0					0.5" HMAC															
		ML			SANDY SILT(ML) loose; dark brown; moist	N=5				13	NP	NP	NP	48	4	1				
		CL			SANDY LEAN CLAY(CL) very stiff; light brown with brown; moist; with slight iron oxide staining	N=19														
5		SM			SILTY SAND(SM) medium dense; light brown with gray; moist; with slight iron oxide staining and >0.25" gravel	N=16														
		SC	Qt		CLAYEY SAND(SC) medium dense; light brown with gray; moist; slightly mottled; with slight iron oxide staining	P=4.0				16	26	15	11	33	13	5				
10																				
		ML			SILT WITH SAND(ML) medium dense; gray with light brown; wet to moist; slightly mottled; with slight iron oxide staining	P=3.0	110	0.61	19	21	NP	NP	NP	83	0	0				
15																				
		CL			SANDY LEAN CLAY(CL) stiff; gray with light brown; moist; slightly mottled; with slight iron oxide staining	N=15														
20					Bottom of Boring @ 20'															

FIELD STRENGTH DATA: BLOW COUNT (20 40 60 80); Qu (tsf) (1 2 3 4); PPR (tsf) (1.0 2.0 3.0 4.0); Torvane (tsf) (1.0 2.0 3.0 4.0)

COMPRESSIVE STRENGTH

Natural Moisture Content and Atterberg Limits: Plastic Limit — Moisture Content — Liquid Limit (20 40 60 80)

Water Level Est.: ▽ Measured: ▼ Perched: ▼

Water Observations: Seepage @ 13' while drilling. Water level @ 12' and open upon completion. Dry and caved to 4' on 9/6/23.

Key to Abbrevations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:

GPS Coordinates: N33.446211°, W94.073779°

Drilled By: Dyirell White

Logger: Hunter Franks

LOG OF BORING B-8

PROJECT: P.L. Dunbar Early Education Center
Texarkana, Texas

BORING TYPE: Flight Auger

PROJECT NO.: G6046-226

DRILL RIG: CME-75

DATE 9/5/23

SURFACE ELEVATION 311.5

ETTL Engineers & Consultants

MAIN OFFICE
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Tyler, Texas 75702
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DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	MOISTURE CONTENT (%)	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LL	PL	PI	SIEVE ANALYSIS MINUS #200 SIEVE (%)	PLUS #40 SIEVE (%)	PLUS #4 SIEVE (%)	SWELL TEST DRY DENSITY (pcf)	FREE SWELL (%)	ZERO SWELL PRESSURE (ksf)	MOISTURE CONTENT (%)
0					0.5" HMAC															
		SM			SILTY SAND(SM) loose; dark brown; moist; slightly mottled; slight iron oxide staining and >0.25" gravel	N=5				14	NP	NP	NP	46	8	3				
		SM			SILTY SAND(SM) medium dense; brown and gray; moist; slightly mottled; with iron oxide staining and >0.25" gravel	N=13														
5						P=1.25	120	0.27	15	14	NP	NP	NP	24	17	3				
		SC			CLAYEY SAND(SC) medium dense; light brown with brown; moist; with slight iron oxide staining	N=14														
10					--loose; light brown	N=4														
15			Qt																	
		CL			SANDY LEAN CLAY(CL) very stiff; gray with light brown; moist; slightly mottled; with slight iron oxide staining	N=25				19	30	15	15	50	0	0				
20																				
		CH			SANDY FAT CLAY(CH) soft; reddish brown with gray; wet to moist; with iron oxide staining and >0.25" gravel	N=4														
25																				
		SM			SILTY SAND(SM) medium dense; reddish brown; moist; with iron oxide staining	N=13														
30					Bottom of Boring @ 30'															

Natural Moisture Content and Atterberg Limits: Plastic Limit | Moisture Content | Liquid Limit (20 40 60 80)

Water Level Est.: ▽ Measured: ▼ Perched: ▼

Water Observations: Seepage @ 17' while drilling. Water level @ 10' and caved to 13' upon completion. Water level @ 4' and caved to 9' on 9/6/23.

Key to Abbrevations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:

GPS Coordinates: N33.446279°, W94.073297°

Drilled By: Dyirell White

Logger: Hunter Franks

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LOG OF BORING P-1

PROJECT: P.L. Dunbar Early Education Center
Texarkana, Texas

BORING TYPE: Flight Auger

PROJECT NO.: G6046-226

DRILL RIG: CME-75

DATE 9/5/23

SURFACE ELEVATION 305

MAIN OFFICE
1717 East Erwin Street
Tyler, Texas 75702
903-595-4421

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	BLOW COUNT / Qu (tsf) / PPR (tsf) / Torvane (tsf)	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	MOISTURE CONTENT (%)	Natural Moisture Content and Atterberg Limits	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LL	PL	PI	SIEVE ANALYSIS MINUS #200 SIEVE (%)	PLUS #40 SIEVE (%)	PLUS #4 SIEVE (%)	SWELL TEST DRY DENSITY (pcf)	FREE SWELL (%)	ZERO SWELL PRESSURE (ksf)	MOISTURE CONTENT (%)
0		SM	Qt		SILTY SAND(SM) loose; brown; moist; slightly mottled; with slight iron oxide staining and >0.25" gravel	P=1.5						9	NP	NP	NP	48	10	5				
					--very dense; brown with gray; with >0.5" gravel	N=61																
5					Bottom of Boring @ 5'																	

BLOW COUNT: 20 40 60 80
Qu (tsf): 1 2 3 4
PPR (tsf): 1.0 2.0 3.0 4.0
Torvane (tsf): 1.0 2.0 3.0 4.0
Natural Moisture Content and Atterberg Limits: Plastic Limit — Moisture Content — Liquid Limit; 20 40 60 80

Water Level Est.: ▽ Measured: ▼ Perched: ▼

Water Observations: Dry and open while drilling.

Key to Abbrevations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:

GPS Coordinates: N33.446687°, W94.074156°

Drilled By: Dyirell White

Logger: Hunter Franks

ETTL Engineers & Consultants

LOG OF BORING P-2

PROJECT: P.L. Dunbar Early Education Center
Texarkana, Texas

BORING TYPE: Flight Auger

PROJECT NO.: G6046-226

DRILL RIG: CME-75

DATE 9/5/23

SURFACE ELEVATION 312

MAIN OFFICE
1717 East Erwin Street
Tyler, Texas 75702
903-595-4421

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	BLOW COUNT / Qu (tsf) / PPR (tsf) / Torvane (tsf)	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	MOISTURE CONTENT (%)	Natural Moisture Content and Atterberg Limits	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LL	PL	PI	SIEVE ANALYSIS MINUS #200 SIEVE (%)	PLUS #40 SIEVE (%)	PLUS #4 SIEVE (%)	SWELL TEST DRY DENSITY (pcf)	FREE SWELL (%)	ZERO SWELL PRESSURE (ksf)	MOISTURE CONTENT (%)
0					0.5" HMAC																	
		SC	Qt		CLAYEY SAND(SC) medium dense; light brown with brown; moist; mottled; with iron oxide staining and >0.25" gravel	P=4.25																
		CL			SANDY LEAN CLAY(CL) very stiff; light brown with gray; moist; mottled; with iron oxide staining and >0.5" gravel	N=19																
5					Bottom of Boring @ 5'																	

BLOW COUNT: 20 40 60 80
Qu (tsf): 1 2 3 4
PPR (tsf): 1.0 2.0 3.0 4.0
Torvane (tsf): 1.0 2.0 3.0 4.0
Natural Moisture Content and Atterberg Limits: Plastic Limit — Moisture Content — Liquid Limit; 20 40 60 80

Water Level Est.: ▽ Measured: ▼ Perched: ⧩

Water Observations: Dry and open while drilling.

Key to Abbrevations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:

GPS Coordinates: N33.446682°, W94.073191°

Drilled By: Dyirell White

Logger: Hunter Franks

ETTL Engineers & Consultants

LOG OF BORING P-3

PROJECT: P.L. Dunbar Early Education Center
Texarkana, Texas

BORING TYPE: Flight Auger

PROJECT NO.: G6046-226

DRILL RIG: CME-75

DATE 9/5/23

SURFACE ELEVATION 314

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DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	MOISTURE CONTENT (%)	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	SIEVE ANALYSIS MINUS #200 SIEVE (%)	PLUS #40 SIEVE (%)	PLUS #4 SIEVE (%)	SWELL TEST DRY DENSITY (pcf)	FREE SWELL (%)	ZERO SWELL PRESSURE (ksf)	MOISTURE CONTENT (%)
0		SM	Qt		SILTY SAND(SM) medium dense; brown; moist; with roots and >25" gravel	N=24														
		CL			SANDY LEAN CLAY(CL) very stiff; light brown with gray; moist to dry; mottled; with iron oxide staining	N=26				9	33	15	18	56	3	0				
5					Bottom of Boring @ 5'															

BLOW COUNT: 20 40 60 80
Qu (tsf): 1 2 3 4
PPR (tsf): 1.0 2.0 3.0 4.0
Torvane (tsf): 1.0 2.0 3.0 4.0

COMPRESSIVE STRENGTH

Natural Moisture Content and Atterberg Limits: Plastic Limit — Moisture Content — Liquid Limit; 20 40 60 80

Water Level Est.: ▽ Measured: ▼ Perched: ⧩

Water Observations: Dry and open while drilling.

Key to Abbrevations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:

GPS Coordinates: N33.445951°, W94.073070°

Drilled By: Dyirell White

Logger: Hunter Franks

ETTL Engineers & Consultants

LOG OF BORING P-5

PROJECT: P.L. Dunbar Early Education Center
Texarkana, Texas

BORING TYPE: Flight Auger

PROJECT NO.: G6046-226

DRILL RIG: CME-75

DATE 9/5/23

SURFACE ELEVATION 303

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Tyler, Texas 75702
903-595-4421

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	BLOW COUNT / Qu (tsf) / PPR (tsf) / Torvane (tsf)	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	MOISTURE CONTENT (%)	Natural Moisture Content and Atterberg Limits	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LL	PL	PI	SIEVE ANALYSIS MINUS #200 SIEVE (%)	PLUS #40 SIEVE (%)	PLUS #4 SIEVE (%)	SWELL TEST DRY DENSITY (pcf)	FREE SWELL (%)	ZERO SWELL PRESSURE (ksf)	MOISTURE CONTENT (%)
0					0.5" HMAC																	
		SM	Qt		SILTY SAND(SM) medium dense; brown; moist; with >0.25" gravel	N=13																
		CL			SANDY LEAN CLAY(CL) hard; brown with gray; moist to wet; with slight iron oxide staining	N=33																
5					Bottom of Boring @ 5'																	

BLOW COUNT: 20 40 60 80
Qu (tsf): 1 2 3 4
PPR (tsf): 1.0 2.0 3.0 4.0
Torvane (tsf): 1.0 2.0 3.0 4.0
Natural Moisture Content and Atterberg Limits: Plastic Limit — Moisture Content — Liquid Limit; 20 40 60 80

Water Level Est.: ▽ Measured: ▼ Perched: ▼

Water Observations: Dry and open while drilling.

Key to Abbrevations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:

GPS Coordinates: N33.445400°, W94.073777°

Drilled By: Dyirell White

Logger: Hunter Franks

Boring Log Descriptive Terminology

Key to Soil Symbols and Terms

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	Well-graded gravels, gravel sand mixtures, little or no fines.
				GP	Poorly graded gravels, gravel-sand mixtures, little or no fines.
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	Silty gravels, gravel-sand-silt mixtures.
				GC	Clayey gravels, gravel-sand-clay mixtures.
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	Well-graded sands, gravelly sands, little or no fines.
				SP	Poorly graded sands, gravelly sands, little or no fines.
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	Silty sands, sand-silt mixtures.
				SC	Clayey sands, sand-clay mixures.
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
				CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
				OL	Organic silts and organic silty clays of low plasticity.
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
				CH	Inorganic clays of high plasticity, fat clays.
				OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS				PT	Peat and other highly organic soils.

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

Order of Descriptors

- Group Name
- Consistency or Relative Density
- Moisture Condition
- Color
- Particle size descriptor(s) (coarse grained soils only)
- Angularity of coarse grained soils
- Other relevant notes

Criteria For Descriptors

Consistency of Fine Grained Soils

Consistency	N-Value (uncorrected)
Very Soft	< 2
Soft	2 - 4
Medium Stiff	5 - 8
Stiff	9 - 15
Very Stiff	16 - 30
Hard	> 30

Apparent Density of Coarse Grained Soils

Relative Density	N-Value (uncorrected)
Very Loose	< 4
Loose	4 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

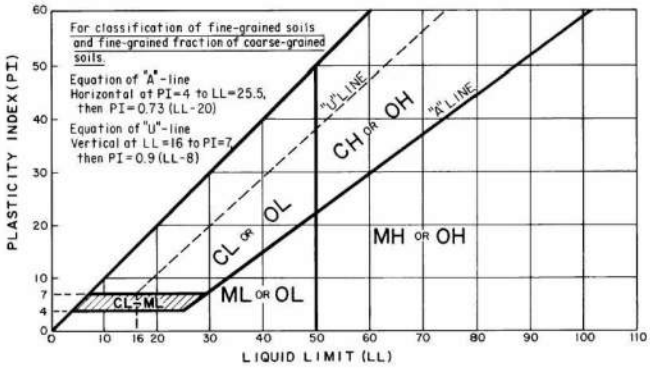
Moisture Condition

Dry	-Absence of moisture, dusty, dry to the touch.
Moist	-Damp, but no visible water.
Wet	-Visible free water.

Definition of Particle Size Ranges

Soil Component	Size Range
Boulder	> 12 in (300 mm)
Cobble	3 in (75 mm) - 12 in (300 mm)
Gravel	No. 4 Sieve (4.75 mm) to 3 in (75 mm)
Sand	No. 200 (0.075 mm) to No. 4 Sieves (4.75 mm)
Silt	< No. 200 Sieve (0.075 mm)*
Clay	< No. 200 Sieve (0.075 mm)*

*Use Atterberg limits and chart below to differentiate between silt and clay.



Notes

SPT (Standard Penetration Test-ASTM D1586):
The number of blows of a 140 lb (63.6 kg) hammer falling 2.5 ft (750 mm) used to drive a 2 in (50 mm) O.D. Split Spoon sampler for a total of 1.5 ft (0.45 m) of penetration.
Written as follows:
first 0.5 ft (0.15 m) - second 0.5 ft (0.15 m) - third 0.5 ft (0.15 m) (ex: 1-3-9)
Note: if the number of blows exceeds 50 before 0.5 ft (0.15 m) of penetration is achieved, the actual penetration follows the number of blows in parentheses (ex: 12-24-50 (0.09 m), 34-50 (0.4 ft), or 100 (0.3 ft)).
WR denotes a zero blow count with the weight of the rods only.
WH denotes a zero blow count with the weight of the rods plus the weight of the hammer.

Soil Classifications are Based on the Unified Soil Classification System, ASTM D2487 and D2488. Also included are the AASHTO group classifications (M145). Descriptions are based on visual observation, except where they have been modified to reflect results of laboratory tests as deemed appropriate.

Angularity of Coarse-Grained Particles

Angular	-Particles have sharp edges and relative plane sides with unpolished surfaces.
Subangular	-Particles are similar to angular description, but have rounded edges.
Subrounded	-Particles have nearly plane sides, but have no edges.
Rounded	-Particles have smoothly curved sides and well-rounded corners and edges.

APPENDIX B
Laboratory Test Results

LABORATORY TEST DATA SUMMARY SHEET

PROJECT: P.L. Dunbar Early Education Center
ETTL JOB NUMBER: G 6046-226
PROJECT LOCATION: Texarkana, TX
CLIENT: Texarkana ISD
PROJECT MANAGER.: Owen Sanderson

START DATE: 9/10/2023
FINISH DATE: 9/19/2023
TECHNICIAN(S): Jacob Collier
DATE SAMPLED: 9/5/2023

Boring No.	Depth (ft.) Top	Depth (ft.) Bott	Sample No.	Description of Sample	USCS Classification		Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Moisture Content (%)	(%) Passing No. 200 Sieve	(%) Retained No. 40 Sieve	(%) Retained No. 4 Sieve	Unit Weight / Compression Tests: Dry Unit Weight (pcf)	Moisture Content (%)	Compressive Strength (tsf)	Failure Strain (%)	Confining Pressure (psi)	Consol. / Swell Tests Results: Dry Unit Weight (pcf)	Moisture Content (%)	Free Swell (%)	Restraining Pressure (ksf)
B-1	3.0	5.0		Lt. Brown w/ Gray	CL	Sandy Lean Clay	27	13	14	18	61	4	0									
B-1	8.0	10.0		Gray w/ Lt. Brown	SM	Silty Sand	NP	NP	NP	14	22	27	11									
B-1	23.0	25.0		Dk. Gray w/ lt. Brown	CL	Sandy Lean Clay	43	14	29	26	65	4	0									
B-2	3.0	5.0		Brown	ML	Sandy Silt	NP	NP	NP	13	51	5	1									
B-2	5.0	7.0		Lt. Brown	CL	Sandy Lean Clay	32	14	18	20	67	2	0	110.5	20.2	0.835	8.87	6.2	119.6	11.8	0.3	1.00
B-2	13.0	15.0		Lt. Brown w/ Redd. Br.	CH	Fat Clay with Sand	53	18	35	28	81	1	0	95.9	27.4	1.25	9.04	6.3				
B-3	1.0	3.0		Brown w/ Gray	SM	Silty Sand	NP	NP	NP	12	39	23	9									
B-3	8.0	10.0		Gray w/ Brown	SM	Silty Sand	NP	NP	NP	13	39	16	5	121.3	13.4	0.792	6.26	6.2	114.7	12.6	Consol.	
B-3	23.0	25.0		Brown w/ Gray	CL	Lean Clay	43	18	25	28	96	0	0	99.7	23.9	0.986	14.5	15.1				
B-4	3.0	5.0		Brown w/ Dk. Brown	CL	Sandy Lean Clay	40	14	26	14	60	4	1									
B-4	8.0	10.0		Lt. Brown w/ Gray	CL	Sandy Lean Clay	31	14	17	20	53	5	1									
B-5	1.0	3.0		Brown w/ Lt. Brown	CL	Sandy Lean Clay	27	15	12	13	54	9	5									
B-5	5.0	7.0		Lt. Brown & Gray	SC	Clayey sand	33	14	19	16	49	3	0									
B-5	13.0	15.0		Redd. Brown w/ Gray	SM	Silty Sand	NP	NP	NP	24	14	0	0									
B-6	3.0	5.0		Brown	CL	Sandy Lean Clay	25	14	11	17	54	5	0									
B-6	8.0	10.0		Lt. Brown and Gray	SC	Clayey sand	28	16	12	18	29	1	0									
B-7	1.0	3.0		Dk. Brown	SM	Silty Sand	NP	NP	NP	13	48	4	1									
B-7	8.0	10.0		Lt. Brown w/ Gray	SC	Clayey sand	26	15	11	16	33	13	5									
B-7	13.0	15.0		Gray w/ Lt. Brown	ML	Silt with Sand	NP	NP	NP	21	83	0	0	109.6	19.2	0.612	10.1	9.3				
B-8	1.0	3.0		Dk. Brown	SM	Silty Sand	NP	NP	NP	14	46	8	3									
B-8	5.0	7.0		Dk. Brown w/ Brown	SM	Silty Sand	NP	NP	NP	14	24	17	3	120.1	15.2	0.274	1.51	4.3				
B-8	18.0	20.0		Gray w/ Lt. Gray	CL	Sandy Lean Clay	30	15	15	19	50	0	0									
P-1	1.0	3.0		Brown	SM	Silty Sand	NP	NP	NP	9	48	10	5									
P-3	3.0	5.0		Lt. Brown w/ Gray	CL	Sandy Lean Clay	33	15	18	9	56	3	0									

NT = Not Tested, Visual Classification

NP = Non Plastic, LL Attempted

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ASTM D 4546 One-Dimensional Swell or Settlement of Cohesive Soils, Method A/B Modified

Project Information

Project: P.L. Early Education Center
Client/Arch./Engr: Texarkana ISD
Project Location: Texarkana, Texas
ETTL Job No: G 6046-226

Sample Information

Location / Boring No: B-2
Sample No: Depth: 5.0-7.0 ft.
Material Origin:: Geotechnical Boring
Sampling Info. provided By: ETTL Engineers & Consultants, Inc.
Material Description: Lt. Brown Sandy Lean Clay, (CL)
Sample Type: Undisturbed Shelby Tube Dried Below In-situ M.C.
Sampled By: ETTL Drilling Date Sampled: 9/5/2023
Technician: Hunter Franks Test Date: 9/14/2023

Test Data

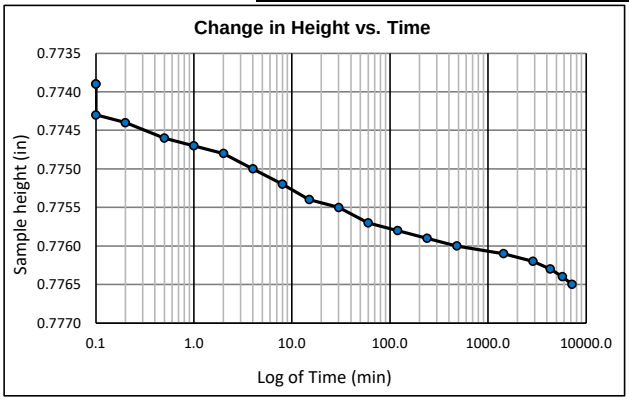
	Sample Data				
	Molded	Overburden Consol.	Restrain Swell	Free Swell	
Wt. of mold + Wet Wt.:	201.36	201.36	201.36	204.81	grams
Wt. of mold:	68.08	68.08	68.08	68.08	grams
Wet Wt. of sample:	133.28	133.28	133.28	136.73	grams
Dry Wt. of sample:	119.26	119.26	119.26	119.26	grams
Height of sample:	0.7770	0.7739	0.7739	0.7765	inches
Diameter of sample:	2.500	2.500	2.500	2.500	inches
Area of sample:	4.909	4.909	4.909	4.909	in^2
Volume of sample:	3.814	3.799	3.799	3.812	in^3
Degree of Saturation:	**78.7%**	**79.8%**	**79.8%**	**98.3%**	
Void Ratio e:	**0.399**	**0.393**	**0.393**	**0.398**	
Applied Pressure:	**125**	**754**	**1004**	**125**	psf
Assumed Specific Gravity:	2.67	2.67	2.67	2.67	
Wet Unit Weight:	133.1	133.7	133.7	136.7	pcf
Dry Unit Weight:	**119.1**	**119.6**	**119.6**	**119.2**	pcf
Moisture Content:	**11.8%**	**11.8%**	**11.8%**	**14.6%**	

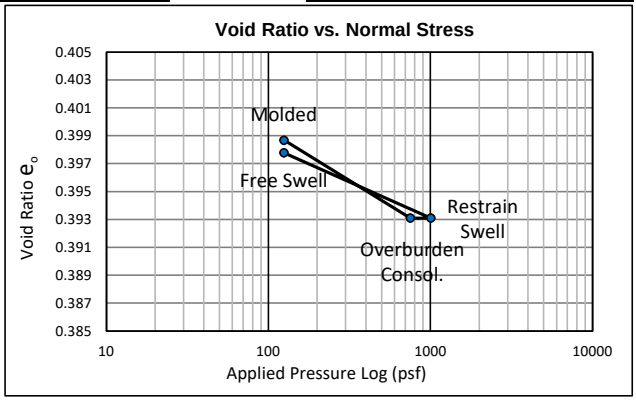
Atterberg Limits	
L.L.	P.L.
32	14
P.I.	-200%
18	67

*N/T = Not Tested

Pocket Penetrometer (tsf)	
Before Test	After Test
4.50	4.50

USACE Swelling Index - Cs
0.005
Percent Moisture Absorption
2.9%
Percent Free Swell
0.3%
Restrain Pressure (psf)
1004





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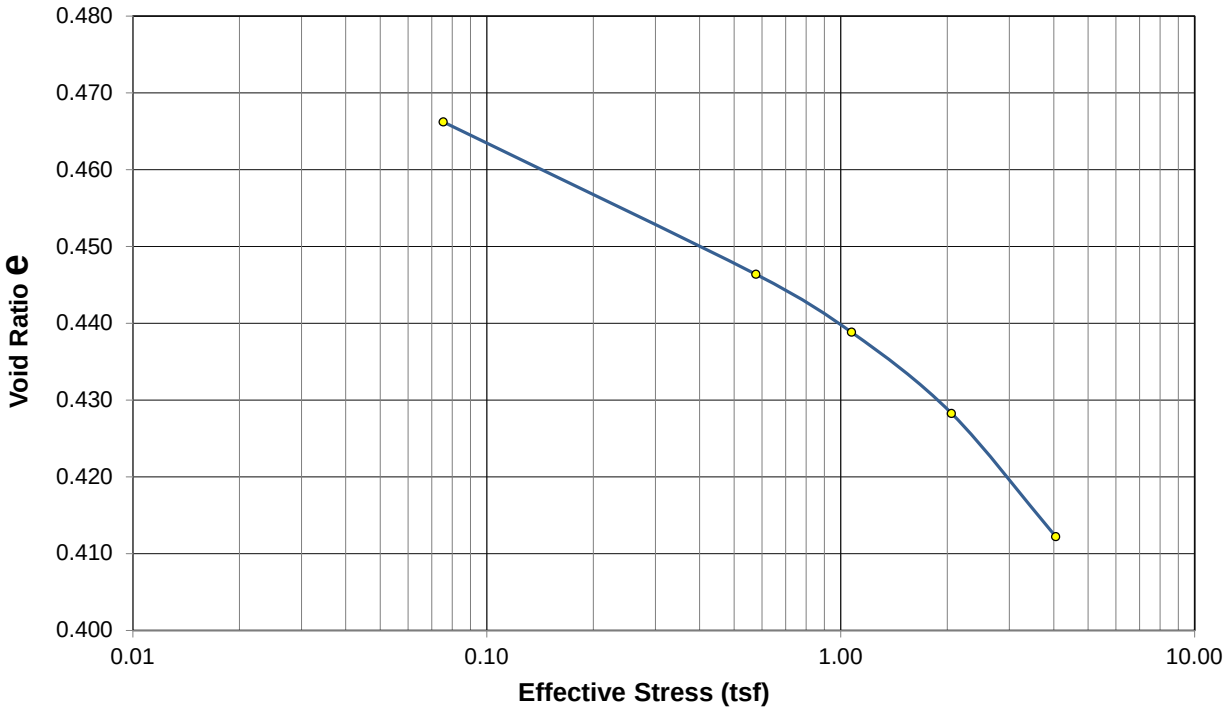
ASTM D 2435 - One-Dimensional Consolidation



C_c	Initial e_o	C_r (rebound)	C_r (rebound)	Preconsolidation Pressure (tsf)	Estimated OCR
NA	0.466	NA	NA	NA	NA

Effective Stress (tsf)	(%) Strain @ 24 Hrs.	Void Ratio e @ 24 Hrs.	Cv (ft^2/day) Log of Time @ EOP
0.00	-	0.466	-
0.08	0.000	0.466	-
0.58	1.353	0.446	
1.08	1.868	0.439	
2.06	2.589	0.428	
4.06	3.684	0.412	
0.00	0.000	0.000	0.000
0.00	0.000	0.000	0.000
0.00	0.000	0.000	0.000
0.00	0.000	0.000	0.000
0.00	0.000	0.000	0.000
0.00	0.000	0.000	0.000
0.00	0.000	0.000	0.000
0.00	0.000	0.000	0.000
0.00	0.000	0.000	0.000
0.00	0.000	0.000	0.000
0.00	0.000	0.000	0.000
0.00	0.000	0.000	0.000

Est. Insitu Effective Stress (psf)	Estimated Ground Water Depth (ft.)
1049	7.0

Sample and Test Data

Boring:	B-3		Depth / Spl#:	8.0-10.0'
Material Description:		Dk. Brownish Gray with Lt. Brown Lean Clay, (CL)		
LL	PL	PI	-200%	Assumed S.G.
NP	NP	NP	39	2.700
Initial MC	Final MC	Initial Dry Unit Weight (pcf):		114.7
12.6%	15.9%	Final Dry Unit Weight (pcf):		119.1
Initial Sat. %	Final Sat. %	Test method:		A
72.8%	100.0%	Test Condition:		Inundated
Initial e	Final e	Testing Consolidometer		
0.466	0.412	Soil Test		G314

Project Information

Project:	P.L. Dunbar Early Education Center		
Location:	Texarkana, Texas		
ETTL Job No.:	G 6046-226		
Client:	Texarkana ISD		
Technician:	Hunter Franks	Report Date:	9/25/2023

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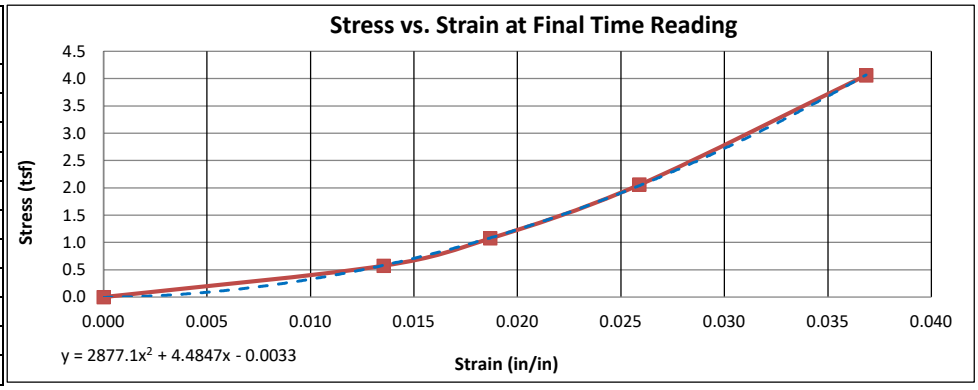
Project:	P.L. Dunbar Early Education Center	**Boring:** B-3	**Depth:** 8.0-10.0'
ETTL Job No.:	G 6046-226		
Client:	Texarkana ISD	**Technician (s):**	Hunter Franks
Location:	Texarkana, Texas	**Report Date:**	9/25/2023
Material description:	Dk. Brownish Gray with Lt. Brown Lean Clay, (CL)		

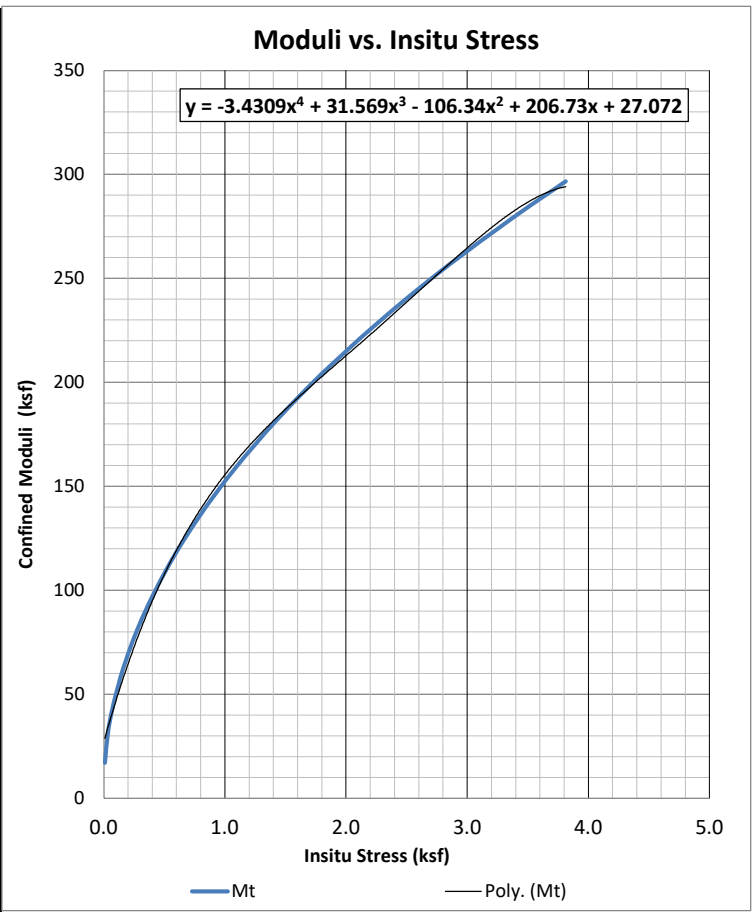
Calculation of the Confined Moduli at Final Strain due to Load Addition

Load Cycle	Applied Load (tsf)	Strain (in/in)
Seating	0.000	0.0000
0.5	0.577	0.014
1	1.076	0.019
2	2.060	0.026
4	4.062	0.037
0		
0		
0		
0		



* Input trendline equation in A30 and copy down

Stress (ksf)	Strain (in/in)	Mt	Et	Es
0.000	0.000	-	-	-
0.008	0.001	17	13	6
0.034	0.002	32	24	13
0.072	0.003	43	32	18
0.121	0.004	55	41	23
0.182	0.005	67	49	27
0.254	0.006	78	58	31
0.338	0.007	90	67	36
0.433	0.008	101	75	40
0.540	0.009	113	84	45
0.659	0.010	124	92	49
0.788	0.011	136	101	53
0.930	0.012	147	109	58
1.082	0.013	159	118	62
1.247	0.014	170	126	66
1.423	0.015	182	135	70
1.610	0.016	193	143	75
1.809	0.017	205	152	79
2.019	0.018	216	161	83
2.241	0.019	228	169	88
2.474	0.020	239	178	92
2.719	0.021	251	186	96
2.976	0.022	262	195	100
3.244	0.023	274	203	105
3.523	0.024	285	212	109
3.814	0.025	297	220	113
4.116	0.026	158	-	
Estimated Poisson's Ratio =			0.30	
		Et / Mt	0.74	



Mt = Confined Tangent Modulus
Et = Young's Tangent Modulus
Es = Young's Secant Modulus
All moduli are drained moduli

**Trendline equations are used for settlement Calculations

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Longview, TX 903-758-0402 ✶ **Arlington, TX** 817-962-0048 ✶ **Austin, TX** 512-519-9312 ✶ **Texarkana, AR** 870-772-0013

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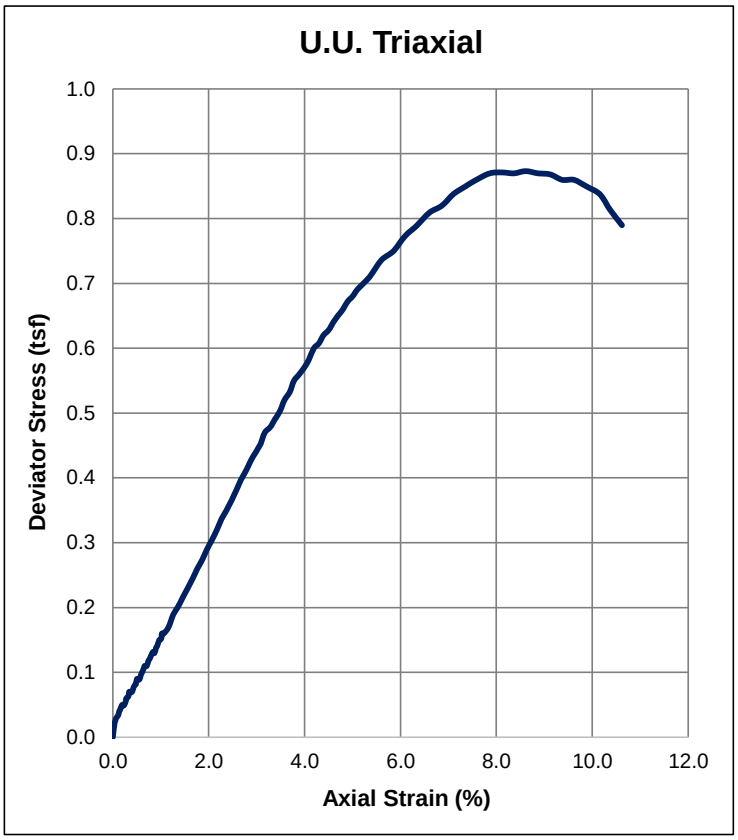
ASTM D 2850 Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils

Project:	P.L. Dunbar Early Education Center	ETTL Project No.:	G 6046-226
Client:	Texarkana ISD	Boring No.:	B-2
Location:	Texarkana, TX	Depth (ft.):	5.0 - 7.0
Material:	Lt. Brown Sandy Lean Clay, (CL)	Sample No.:	ST

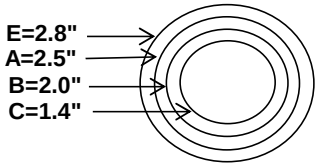


At Test Sample Properties

Height:	5.802	inches
Diameter:	2.756	inches
Height / Diameter Ratio:	2.11	
Initial Moisture Content:	20.2%	(trimmings)
Initial Dry Unit Weight:	110.5	lbs./ft^3
Initial Total Unit Weight:	132.7	lbs./ft^3
Specific Gravity:	2.67	(assumed)
Initial Void Ratio:	0.509	
Initial Saturation:	105.9	%
Pocket Pentronmeter:	0.75	tsf
Hand Torvane:	N/T	tsf
Rate of Strain:	0.8	%/min
Max. Deviator Stress (σ1-σ3):	**0.835**	**tsf**
Confining Pressure σ3:	**6.20**	**psi**
Strain At Failure:	**8.87**	**%**
Secant Modulus at 1/2 Peak Stress:	30	ksf
Strain at 50% Max Stress (e_{50}):	0.029	in/in
Atterbergs LL / PI:	32	18
Passing No. 200 Sieve:	67.0	%
Sampling Method:	2.8 in. Shelby Tube	
Type of Specimen:	Undisturbed	
Date Sampled:	9/5/2023	
Specimen Trimming ID:	E	(whole)

Testing Remarks:

Membrane Correction Factor Applied to Deviator Stress (psi) = 0.50



Technician: Hunter Franks Test Date: 9/14/2023 Report Date: 9/25/2023

Measured Angle of Fracture from Horizontal:

Sketch of Fracture:

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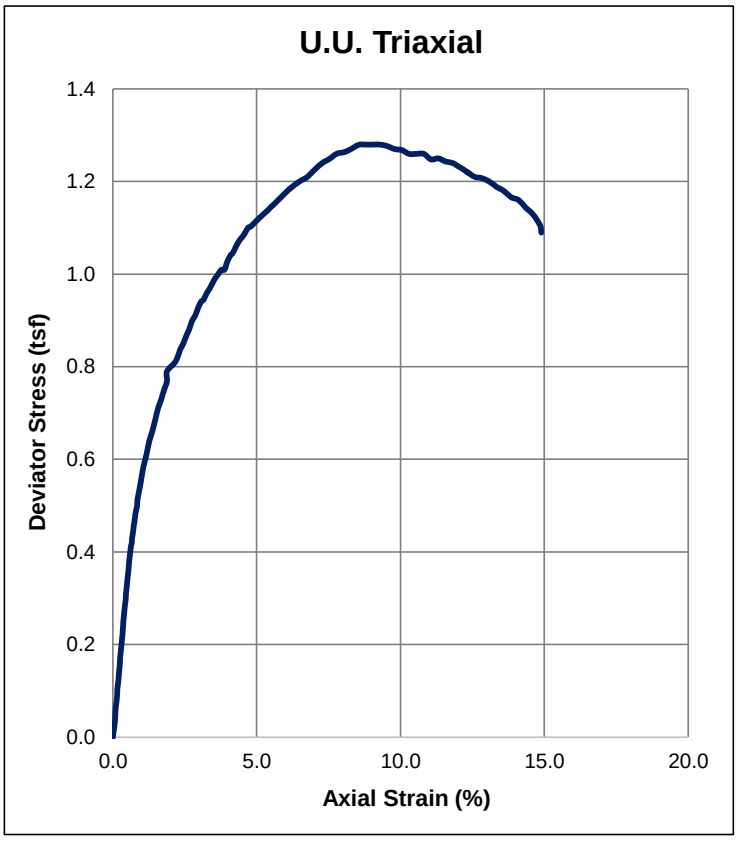
ASTM D 2850 Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils

Project: P.L. Dunbar Early Education Center
Client: Texarkana ISD
Location: Texarkana, TX
Material: Lt. Brown with Redd. Brown Fat Clay with sand, (CH)

ETTL Project No.: G 6046-226
Boring No.: B-2
Depth (ft.): 13.0 - 15.0
Sample No.: ST

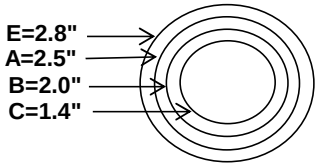


At Test Sample Properties

Height:	5.892	inches
Diameter:	2.767	inches
Height / Diameter Ratio:	2.13	
Initial Moisture Content:	27.4%	(trimmings)
Initial Dry Unit Weight:	95.9	lbs./ft^3
Initial Total Unit Weight:	122.1	lbs./ft^3
Specific Gravity:	2.67	(assumed)
Initial Void Ratio:	0.738	
Initial Saturation:	99.0	%
Pocket Pentronmeter:	2.50	tsf
Hand Torvane:	N/T	tsf
Rate of Strain:	0.8	%/min
Max. Deviator Stress (σ1-σ3):	**1.25**	**tsf**
Confining Pressure σ3:	**6.30**	**psi**
Strain At Failure:	**9.04**	**%**
Secant Modulus at 1/2 Peak Stress:	104	ksf
Strain at 50% Max Stress (e_{50}):	0.012	in/in
Atterbergs LL / PI:	53	35
Passing No. 200 Sieve:	81.0	%
Sampling Method:	2.8 in. Shelby Tube	
Type of Specimen:	Undisturbed	
Date Sampled:	9/5/2023	
Specimen Trimming ID:	E	(whole)

Testing Remarks:

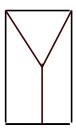
Membrane Correction Factor Applied to Deviator Stress (psi) = 0.51



Technician: Hunter Franks Test Date: 9/14/2023 Report Date: 9/25/2023

Measured Angle of Fracture from Horizontal: N/A

Sketch of Fracture:



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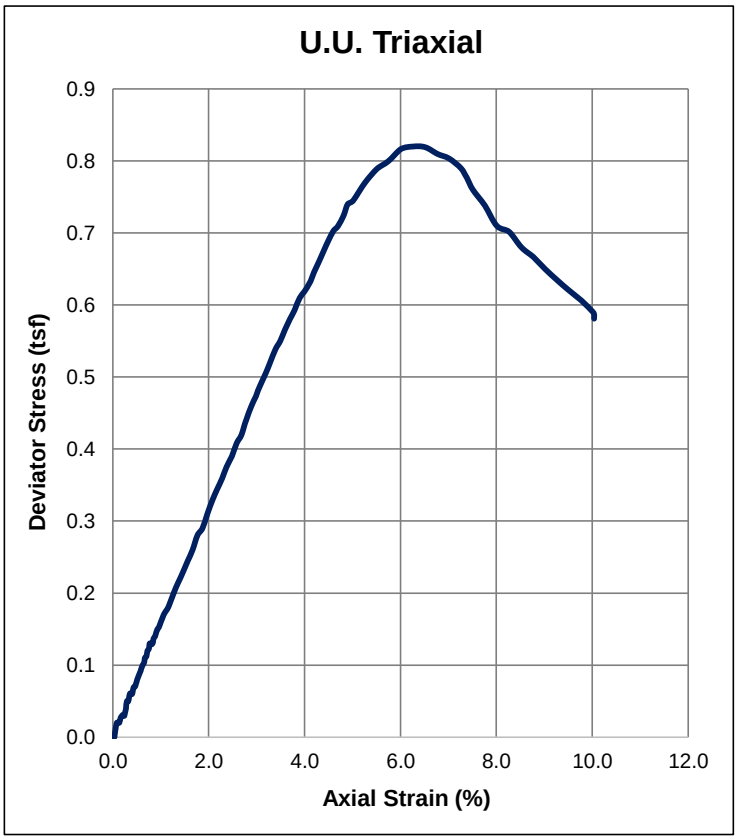
ASTM D 2850 Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils

Project: P.L. Dunbar Early Education Center
Client: Texarkana ISD
Location: Texarkana, TX
Material: Gray with Brown Silty Sand, (SM)

ETTL Project No.: G 6046-226
Boring No.: B-3
Depth (ft.): 8.0 - 10.0
Sample No.: ST



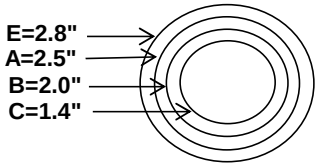
At Test Sample Properties

Height:	5.795	inches
Diameter:	2.737	inches
Height / Diameter Ratio:	2.12	
Initial Moisture Content:	13.4%	(trimmings)
Initial Dry Unit Weight:	121.3	lbs./ft^3
Initial Total Unit Weight:	137.6	lbs./ft^3
Specific Gravity:	2.67	(assumed)
Initial Void Ratio:	0.374	
Initial Saturation:	95.9	%
Pocket Pentronmeter:	0.75	tsf
Hand Torvane:	N/T	tsf
Rate of Strain:	0.8	%/min
Max. Deviator Stress (σ1-σ3):	**0.792**	**tsf**
Confining Pressure σ3:	**6.20**	**psi**
Strain At Failure:	**6.26**	**%**
Secant Modulus at 1/2 Peak Stress:	33	ksf
Strain at 50% Max Stress (e_{50}):	0.025	in/in
Atterbergs LL / PI:	NP	NP
Passing No. 200 Sieve:	39.0	%
Sampling Method:	2.8 in. Shelby Tube	
Type of Specimen:	Undisturbed	
Date Sampled:	9/5/2023	
Specimen Trimming ID:	E	(whole)

Testing Remarks:

Membrane Correction Factor Applied to Deviator Stress (psi) = 0.36

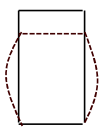
UU test Not Applicable for Non-cohesive soils



Technician: Hunter Franks Test Date: 9/14/2023 Report Date: 9/25/2023

Measured Angle of Fracture from Horizontal: NA

Sketch of Fracture:



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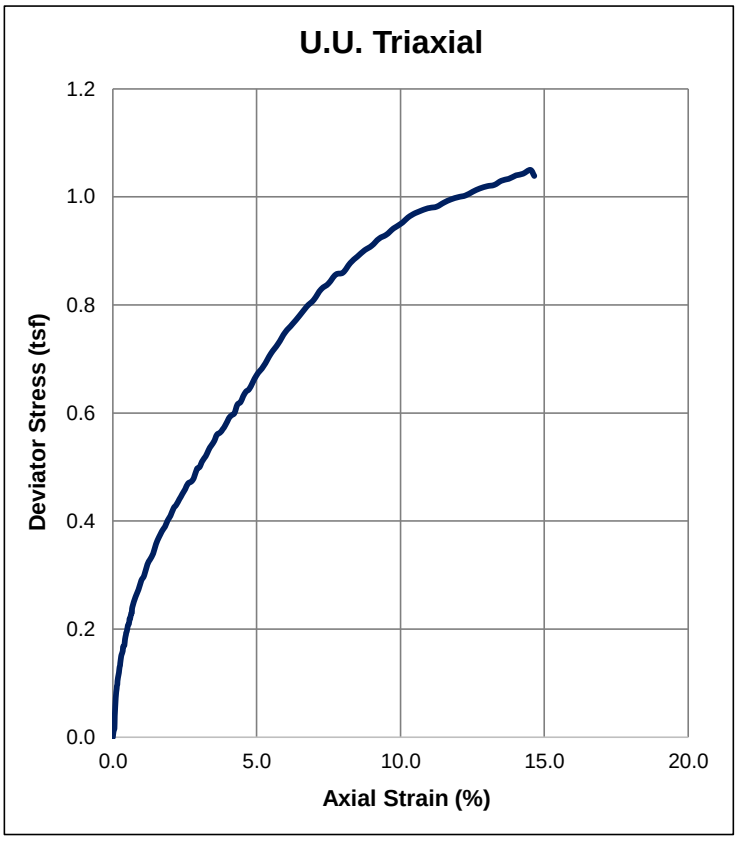
Project: P.L. Dunbar Early Education Center
Client: Texarkana ISD
Location: Texarkana, TX
Material: Brown & Gray Lean Clay, (CL)

ETTL Project No.: G 6046-226
Boring No.: B-3
Depth (ft.): 23.0 - 25.0
Sample No.: ST

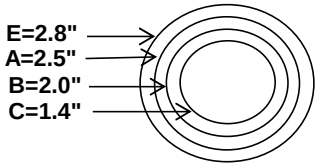


At Test Sample Properties

Height:	5.891	inches
Diameter:	2.780	inches
Height / Diameter Ratio:	2.12	
Initial Moisture Content:	23.9%	(trimmings)
Initial Dry Unit Weight:	99.7	lbs./ft^3
Initial Total Unit Weight:	123.6	lbs./ft^3
Specific Gravity:	2.67	(assumed)
Initial Void Ratio:	0.672	
Initial Saturation:	95.2	%
Pocket Pentronmeter:	1.75	tsf
Hand Torvane:	N/T	tsf
Rate of Strain:	0.8	%/min
Max. Deviator Stress (σ1-σ3):	**0.986**	**tsf**
Confining Pressure σ3:	**15.1**	**psi**
Strain At Failure:	**14.5**	**%**
Secant Modulus at 1/2 Peak Stress:	33	ksf
Strain at 50% Max Stress (e_{50}):	0.032	in/in
Atterbergs LL / PI:	43	25
Passing No. 200 Sieve:	96.0	%
Sampling Method:	2.8 in. Shelby Tube	
Type of Specimen:	Undisturbed	
Date Sampled:	9/5/2023	
Specimen Trimming ID:	E	(whole)

Testing Remarks:

Membrane Correction Factor Applied to Deviator Stress (psi) = 0.82

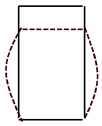


Technician: Hunter Franks Test Date: 9/14/2023 Report Date: 9/25/2023

NA

Measured Angle of Fracture from Horizontal:

Sketch of Fracture:



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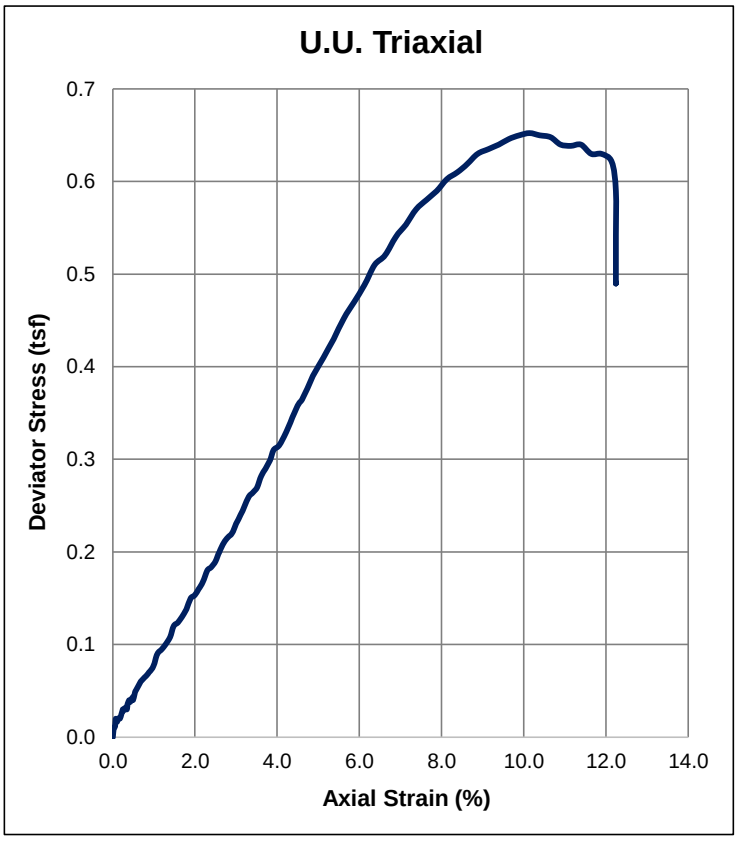
ASTM D 2850 Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils

Project: P.L. Dunbar Early Education Center
Client: Texarkana ISD
Location: Texarkana, TX
Material: Gray with Lt. Brown Silty with sand, (ML)

ETTL Project No.: G 6046-226
Boring No.: B-7
Depth (ft.): 13.0 15.0
Sample No.: ST



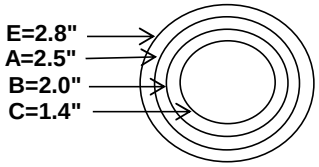
At Test Sample Properties

Height:	5.824	inches
Diameter:	2.785	inches
Height / Diameter Ratio:	2.09	
Initial Moisture Content:	19.2%	(trimmings)
Initial Dry Unit Weight:	109.6	lbs./ft^3
Initial Total Unit Weight:	130.7	lbs./ft^3
Specific Gravity:	2.67	(assumed)
Initial Void Ratio:	0.520	
Initial Saturation:	98.8	%
Pocket Pentronmeter:	1.75	tsf
Hand Torvane:	N/T	tsf
Rate of Strain:	0.7	%/min
Max. Deviator Stress (σ1-σ3):	**0.612**	**tsf**
Confining Pressure σ3:	**9.30**	**psi**
Strain At Failure:	**10.1**	**%**
Secant Modulus at 1/2 Peak Stress:	16	ksf
Strain at 50% Max Stress (e_{50}):	0.041	in/in
Atterbergs LL / PI:	NP	NP
Passing No. 200 Sieve:	83.0	%
Sampling Method:	2.8 in. Shelby Tube	
Type of Specimen:	Undisturbed	
Date Sampled:	9/5/2023	
Specimen Trimming ID:	E	(whole)

Testing Remarks:

Membrane Correction Factor Applied to Deviator Stress (psi) = 0.57

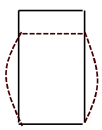
Failed at Clay seam



Technician: Hunter Franks Test Date: 9/14/2023 Report Date: 9/25/2023

Measured Angle of Fracture from Horizontal: NA

Sketch of Fracture:



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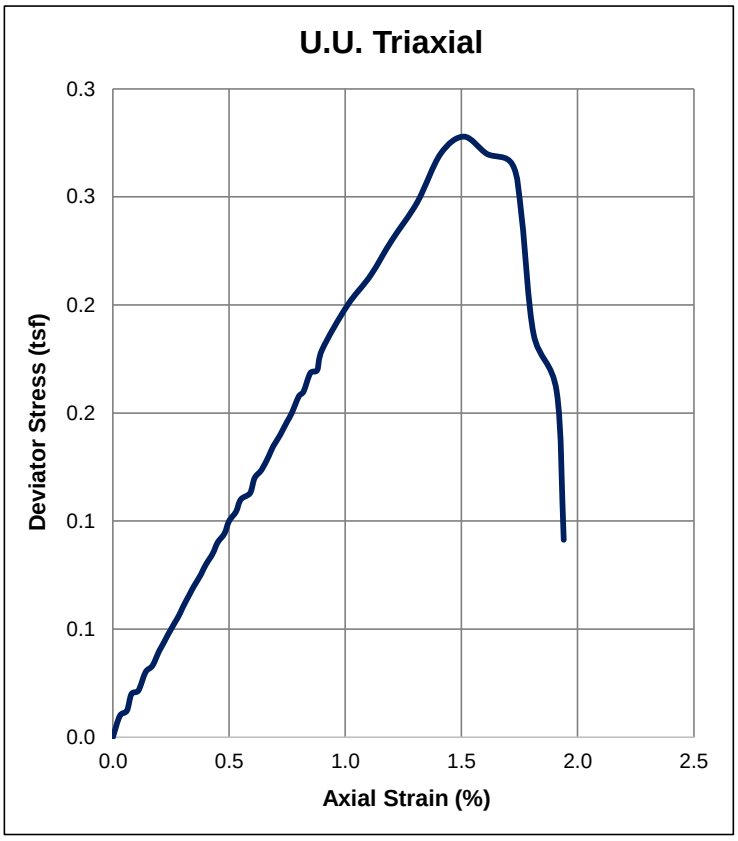
ASTM D 2850 Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils

Project: P.L. Dunbar Early Education Center
Client: Texarkana ISD
Location: Texarkana, TX
Material: Dk. Brown with Brown Silty Sand, (SM)

ETTL Project No.: G 6046-226
Boring No.: B-8
Depth (ft.): 5.0 - 7.0
Sample No.: ST



At Test Sample Properties

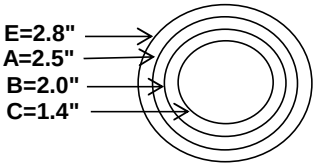
Height:	5.791	inches
Diameter:	2.767	inches
Height / Diameter Ratio:	2.09	
Initial Moisture Content:	15.2%	(trimmings)
Initial Dry Unit Weight:	118.6	lbs./ft^3
Initial Total Unit Weight:	136.7	lbs./ft^3
Specific Gravity:	2.65	(assumed)
Initial Void Ratio:	0.395	
Initial Saturation:	102.3	%
Pocket Pentronmeter:	0.75	tsf
Hand Torvane:	N/T	tsf
Rate of Strain:	0.8	%/min
Max. Deviator Stress (σ1-σ3):	**0.274**	**tsf**
Confining Pressure σ3:	**4.30**	**psi**
Strain At Failure:	**1.51**	**%**
Secant Modulus at 1/2 Peak Stress:	39	ksf
Strain at 50% Max Stress (e_{50}):	0.007	in/in
Atterbergs LL / PI:	NP	NP
Passing No. 200 Sieve:	24.0	%
Sampling Method:	2.8 in. Shelby Tube	
Type of Specimen:	Undisturbed	
Date Sampled:	9/5/2023	
Specimen Trimming ID:	E	(whole)

Testing Remarks:

Membrane Correction Factor Applied to Deviator Stress (psi) = 0.09

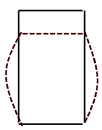
UU Test Not Applicable for cohesionless soils

Technician: Hunter Franks Test Date: 9/14/2023 Report Date: 9/25/2023



Measured Angle of Fracture from Horizontal: NA

Sketch of Fracture:



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APPENDIX C
Seismic Design Parameters

USGS web services were down for some period of time and as a result this tool wasn't operational, resulting in *timeout* error.
USGS web services are now operational so this tool should work as expected.

Dunbar Early Childhood Center, Texarkana, TX

Latitude, Longitude: 33.445560, -94.073222

Date	9/28/2023, 3:11:57 PM
Design Code Reference Document	IBC-2015
Risk Category	III
Site Class	E - Soft Clay Soil

Type	Value	Description
S_S	0.144	MCE_R ground motion. (for 0.2 second period)
S_1	0.079	MCE_R ground motion. (for 1.0s period)
S_{MS}	0.361	Site-modified spectral acceleration value
S_{M1}	0.277	Site-modified spectral acceleration value
S_{DS}	0.241	Numeric seismic design value at 0.2 second SA
S_{D1}	0.185	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	C	Seismic design category
F_a	2.5	Site amplification factor at 0.2 second
F_v	3.5	Site amplification factor at 1.0 second
PGA	0.069	MCE_G peak ground acceleration
F_{PGA}	2.5	Site amplification factor at PGA
PGA_M	0.172	Site modified peak ground acceleration
T_L	12	Long-period transition period in seconds
SsRT	0.144	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	0.164	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.079	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.094	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.6	Factored deterministic acceleration value. (Peak Ground Acceleration)

Type	Value	Description
PGA_{UH}	0.069	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C_{RS}	0.882	Mapped value of the risk coefficient at short periods
C_{R1}	0.842	Mapped value of the risk coefficient at a period of 1 s
C_V		Vertical coefficient

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APPENDIX D
Drilled Shaft Capacity Curves

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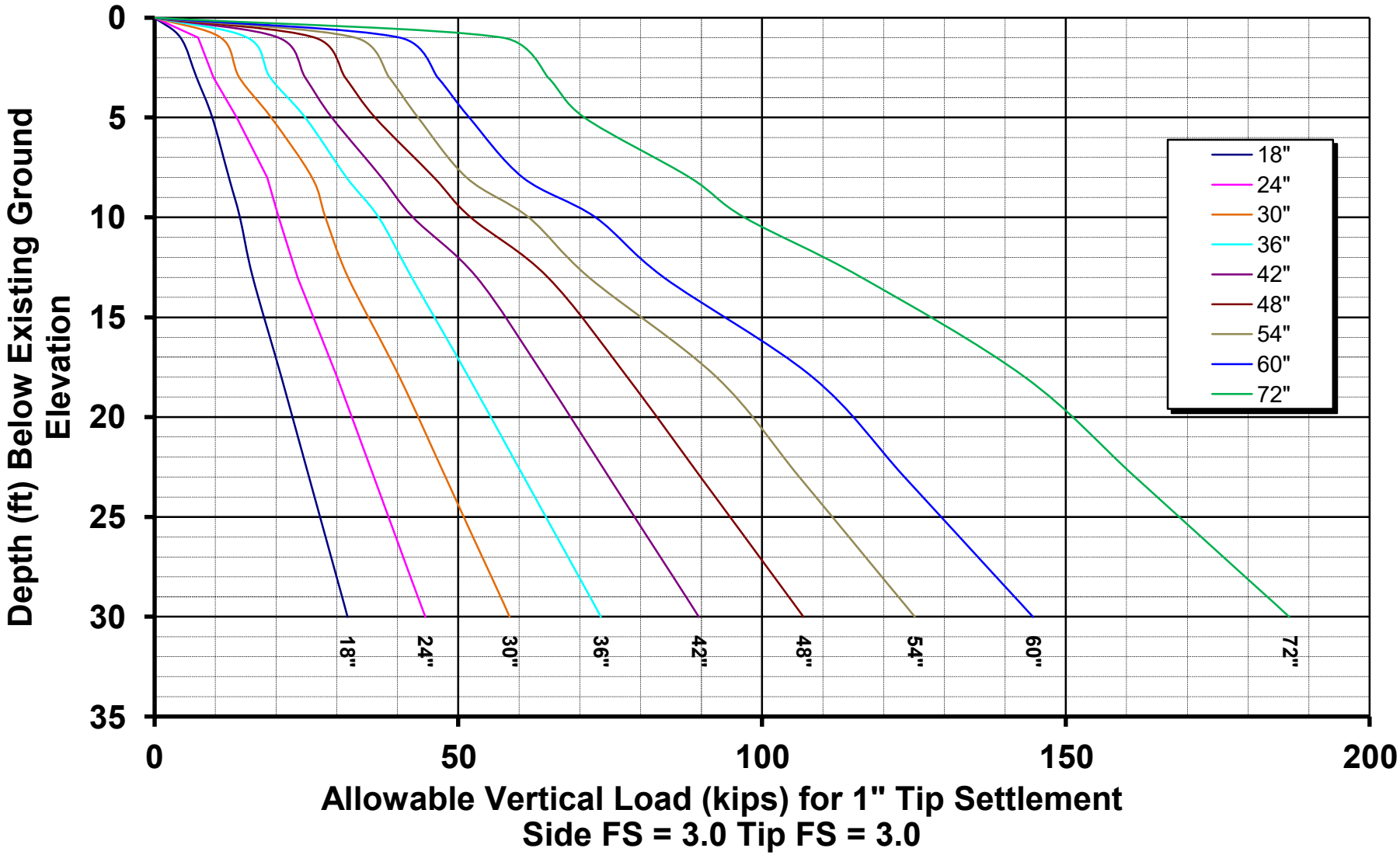
DRILLED SHAFT CAPACITIES



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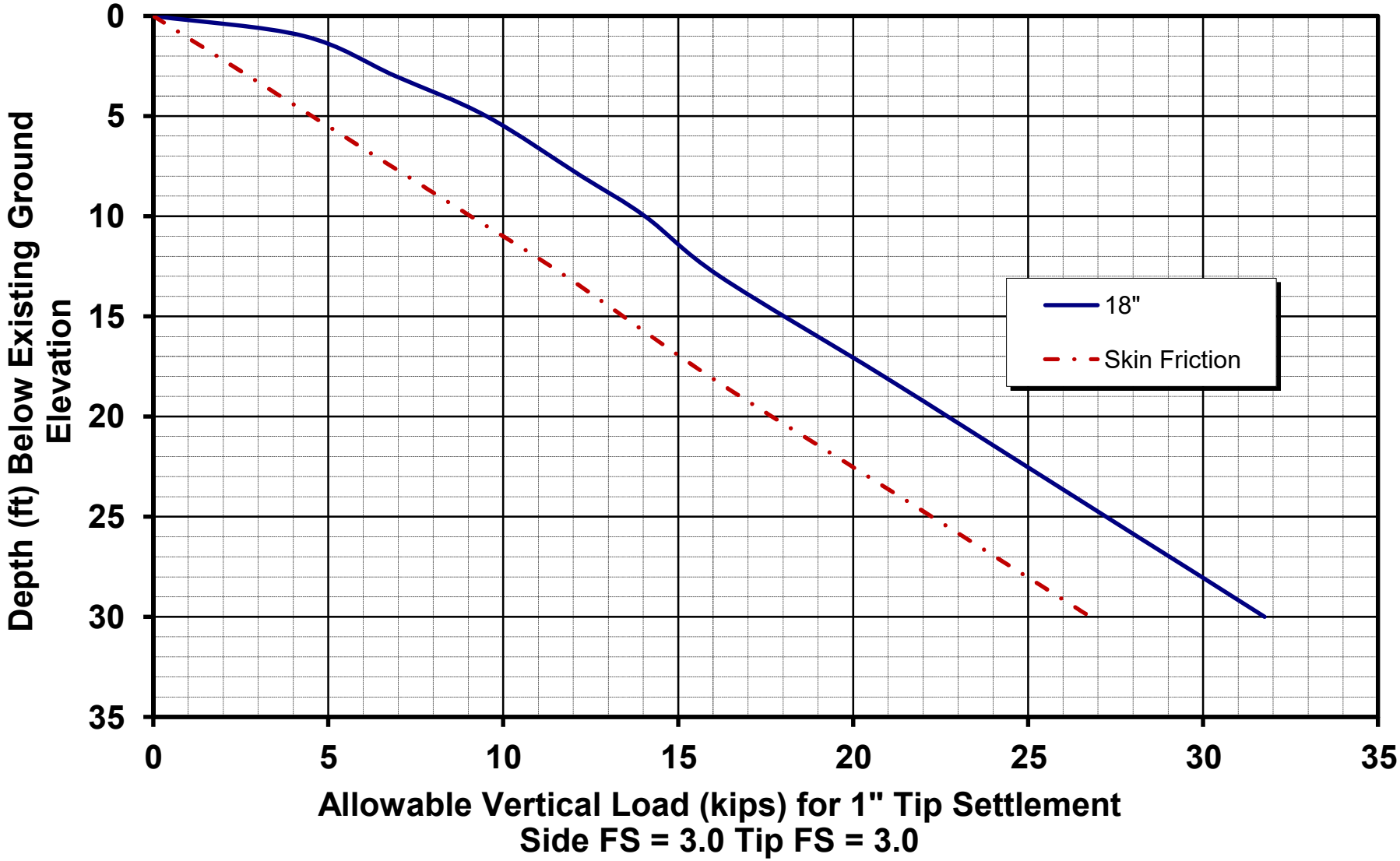
DRILLED SHAFT CAPACITIES



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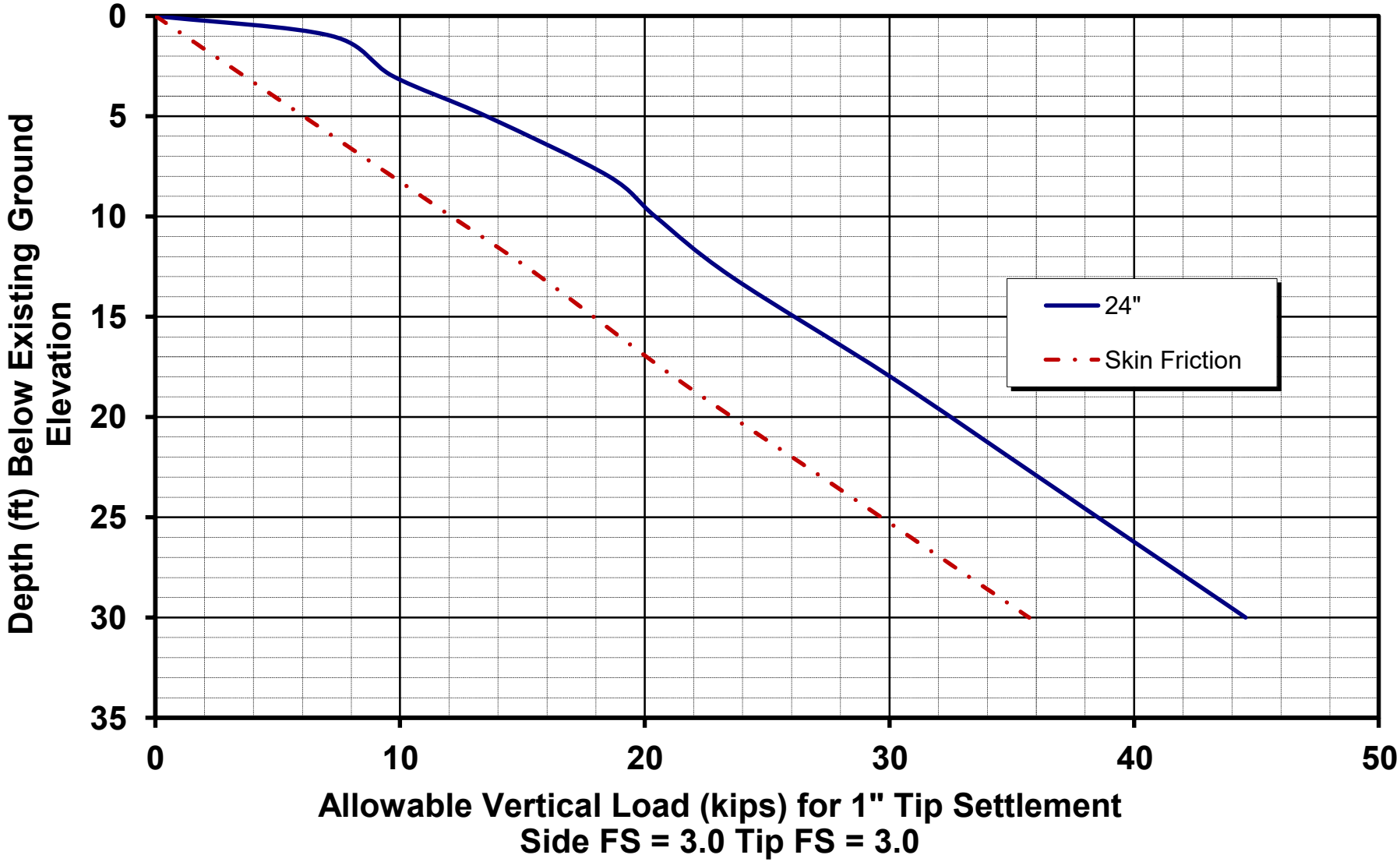
DRILLED SHAFT CAPACITIES



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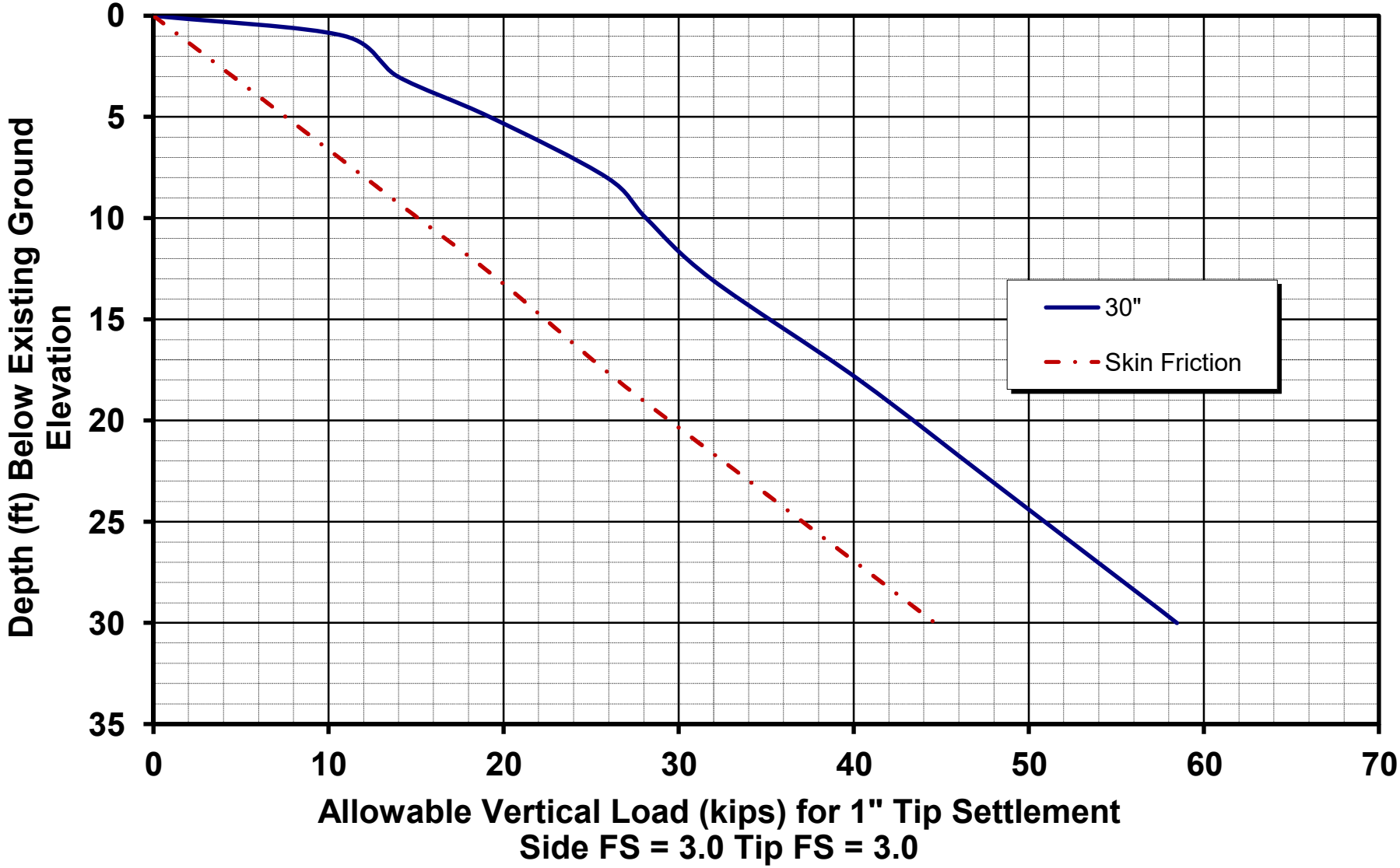
DRILLED SHAFT CAPACITIES



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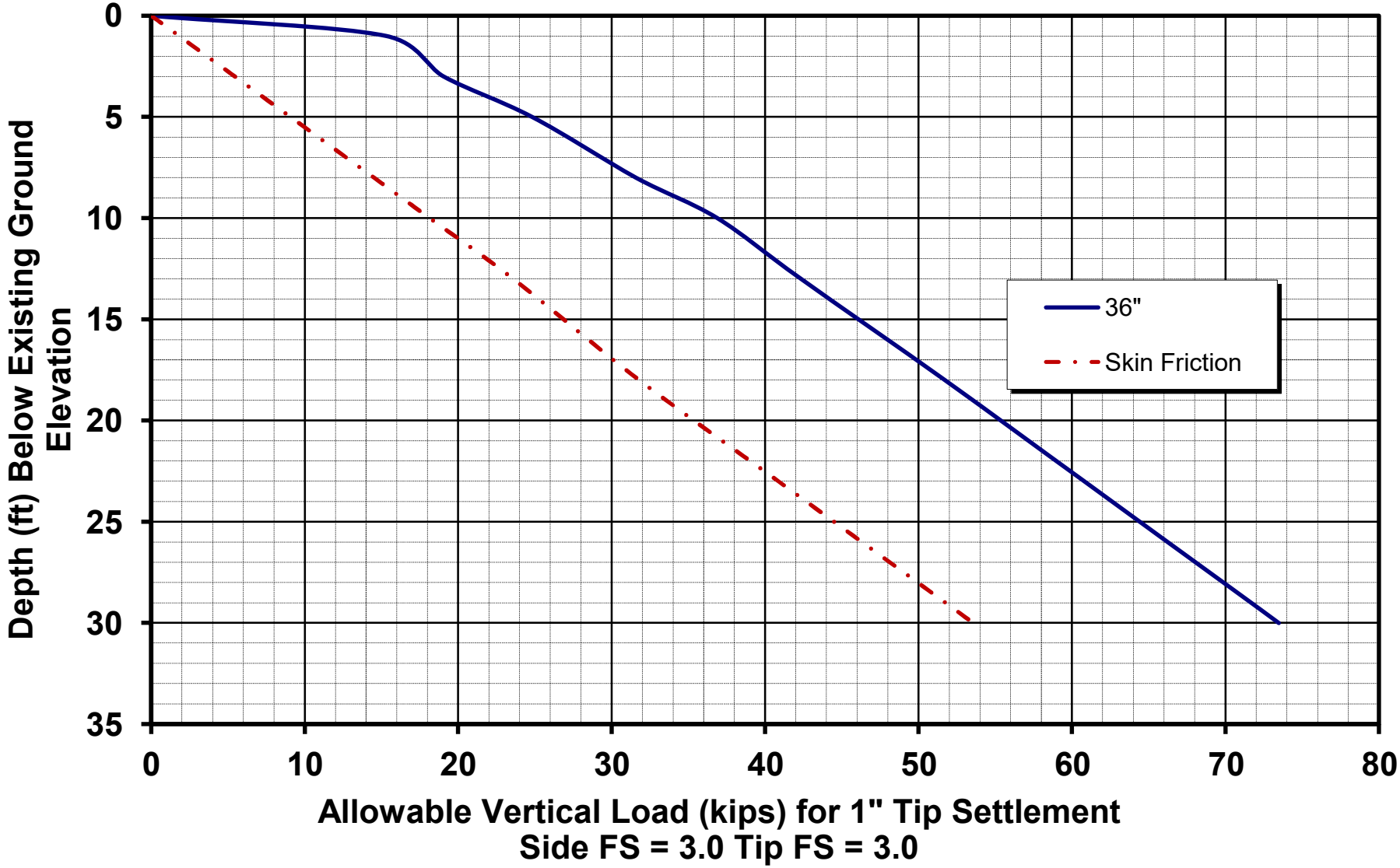
GEOTECHNICAL ✶ MATERIALS ✶ ENVIRONMENTAL ✶ DRILLING ✶ LANDFILLS

DRILLED SHAFT CAPACITIES



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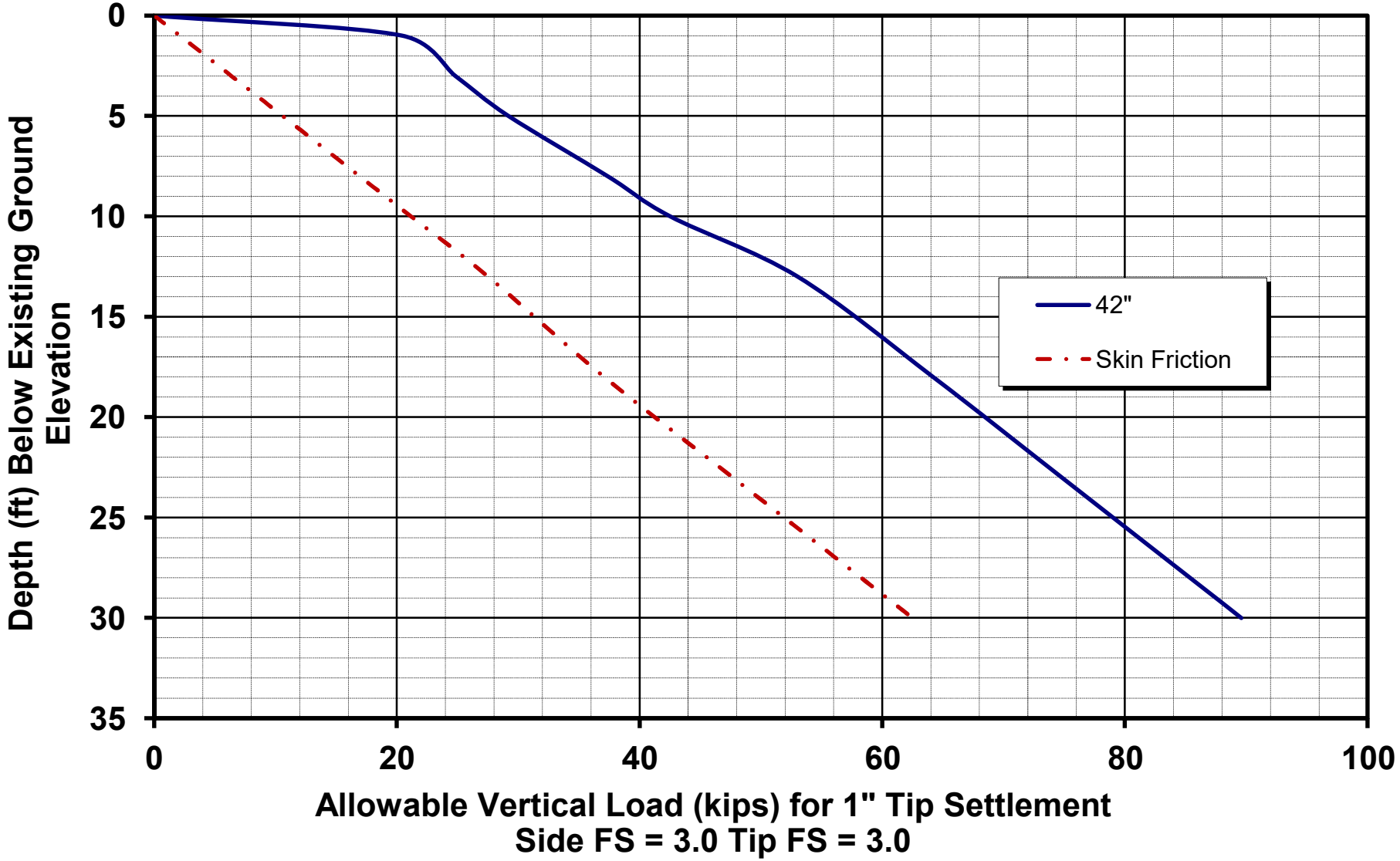
DRILLED SHAFT CAPACITIES



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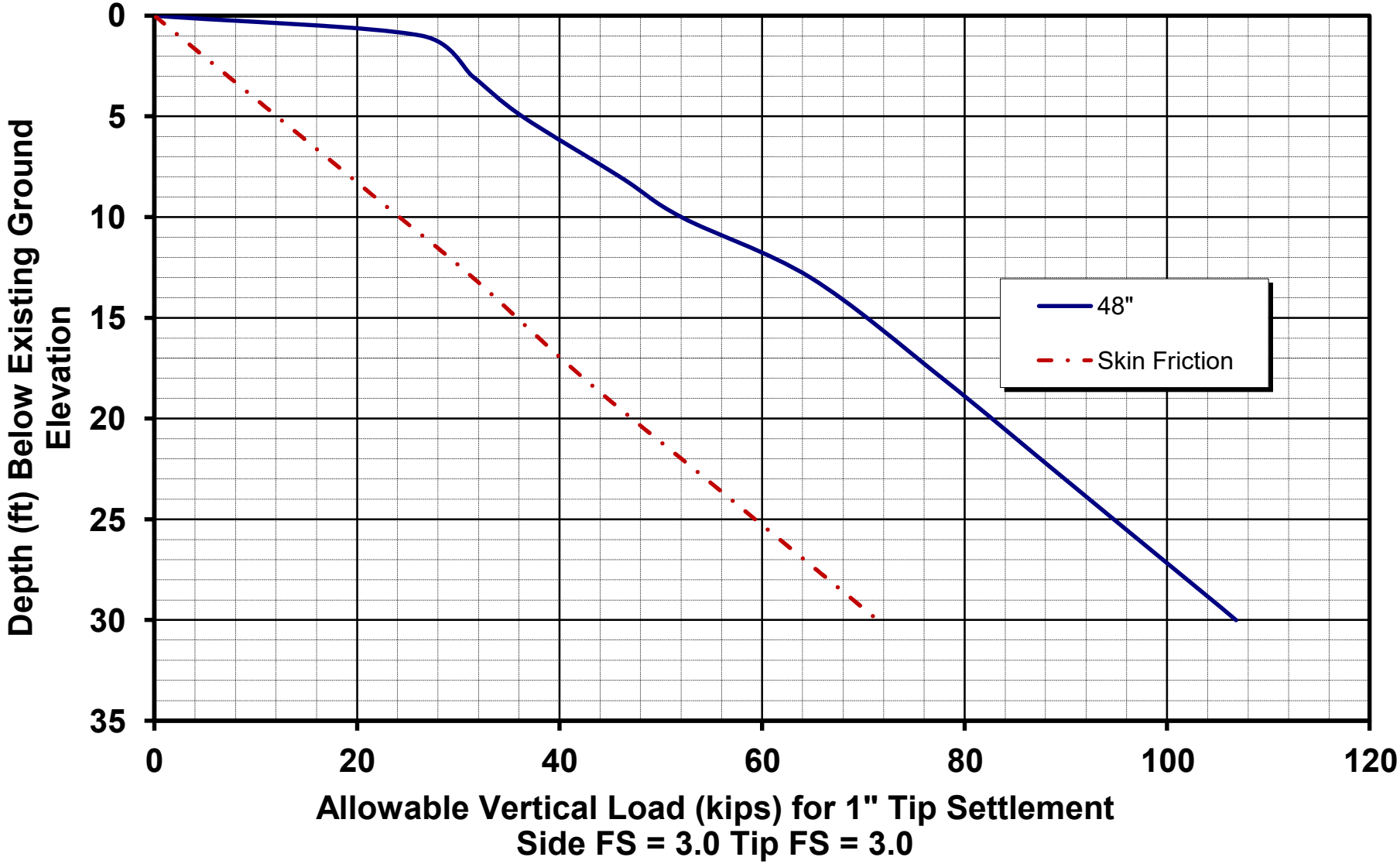
DRILLED SHAFT CAPACITIES



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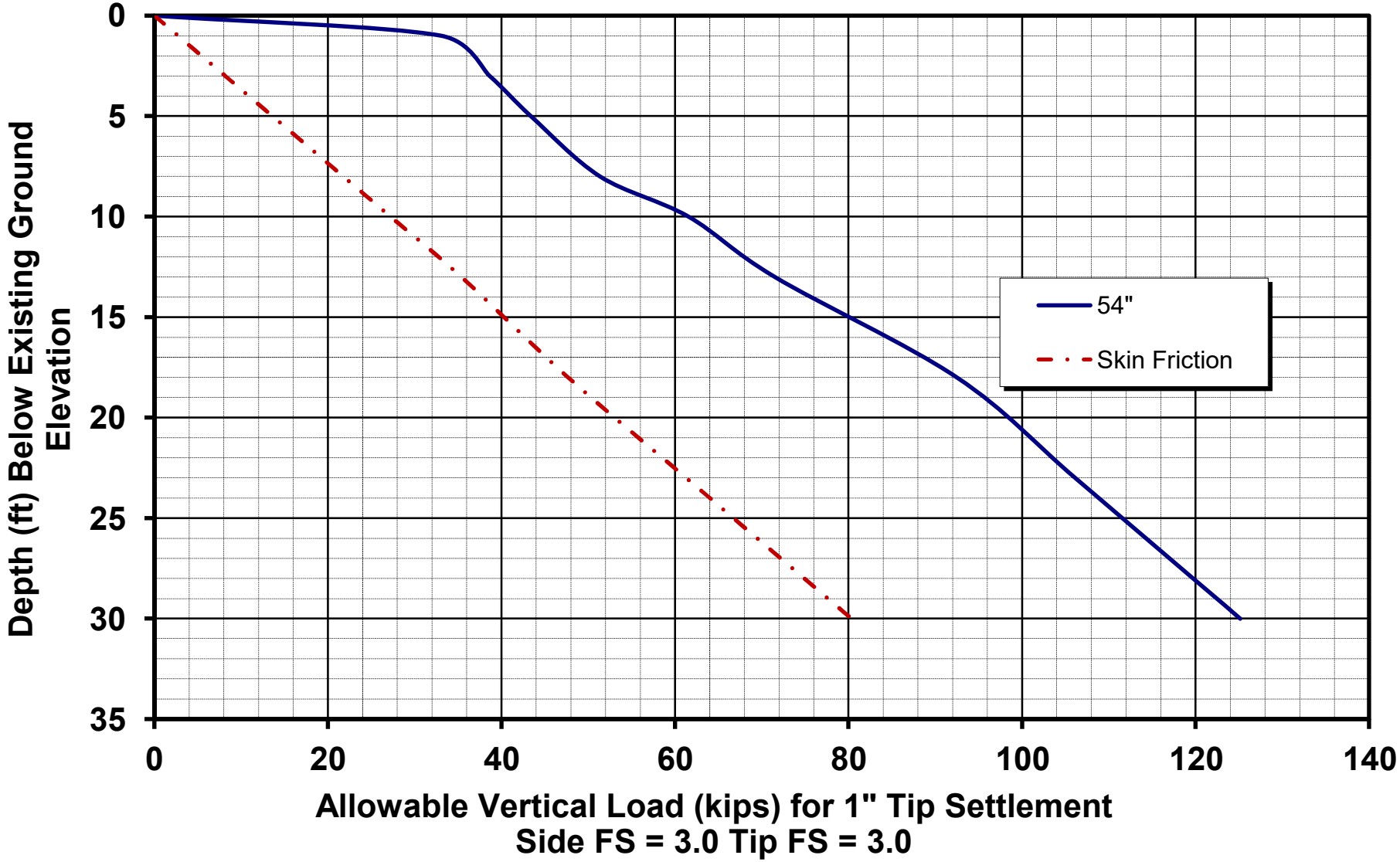

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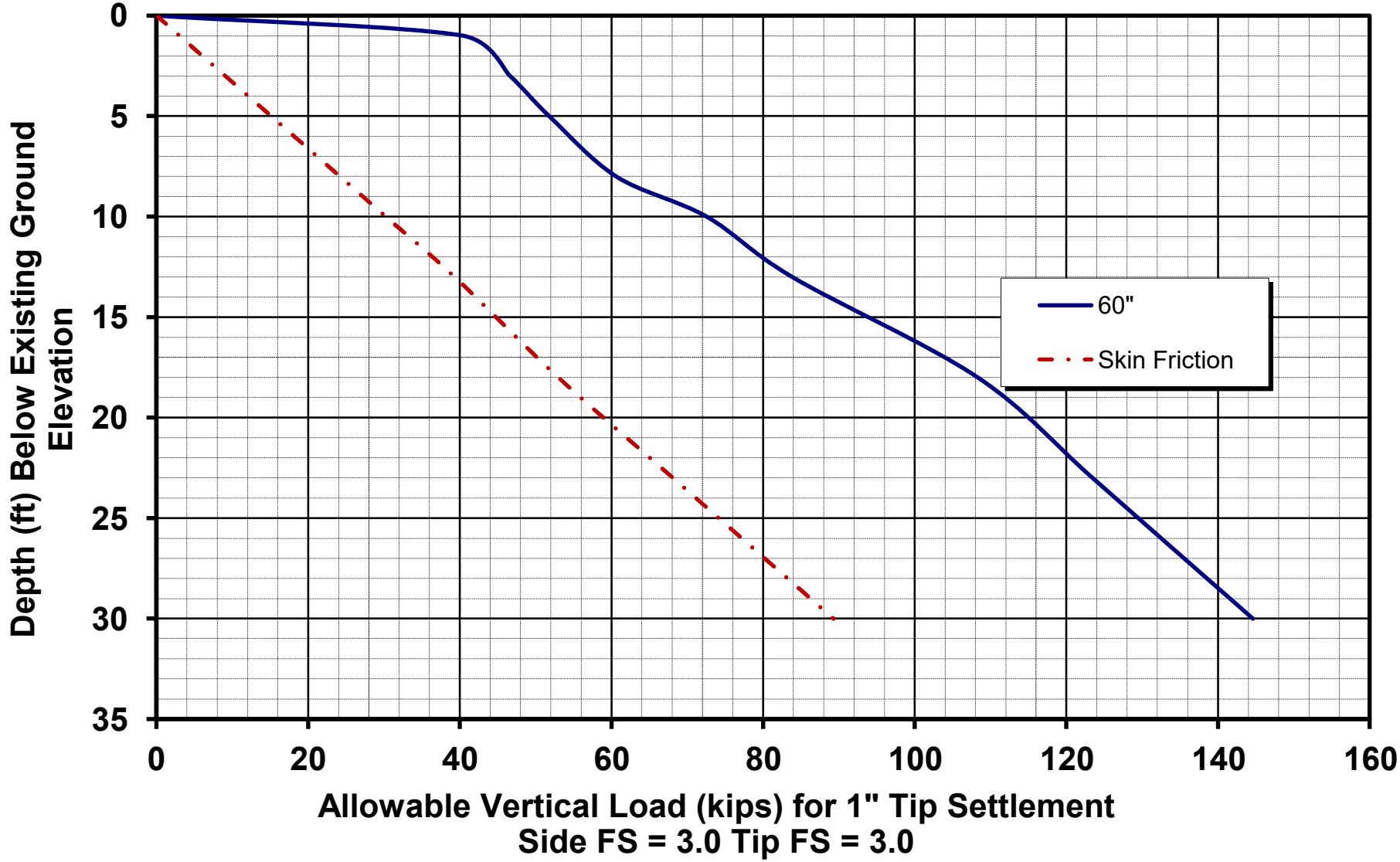

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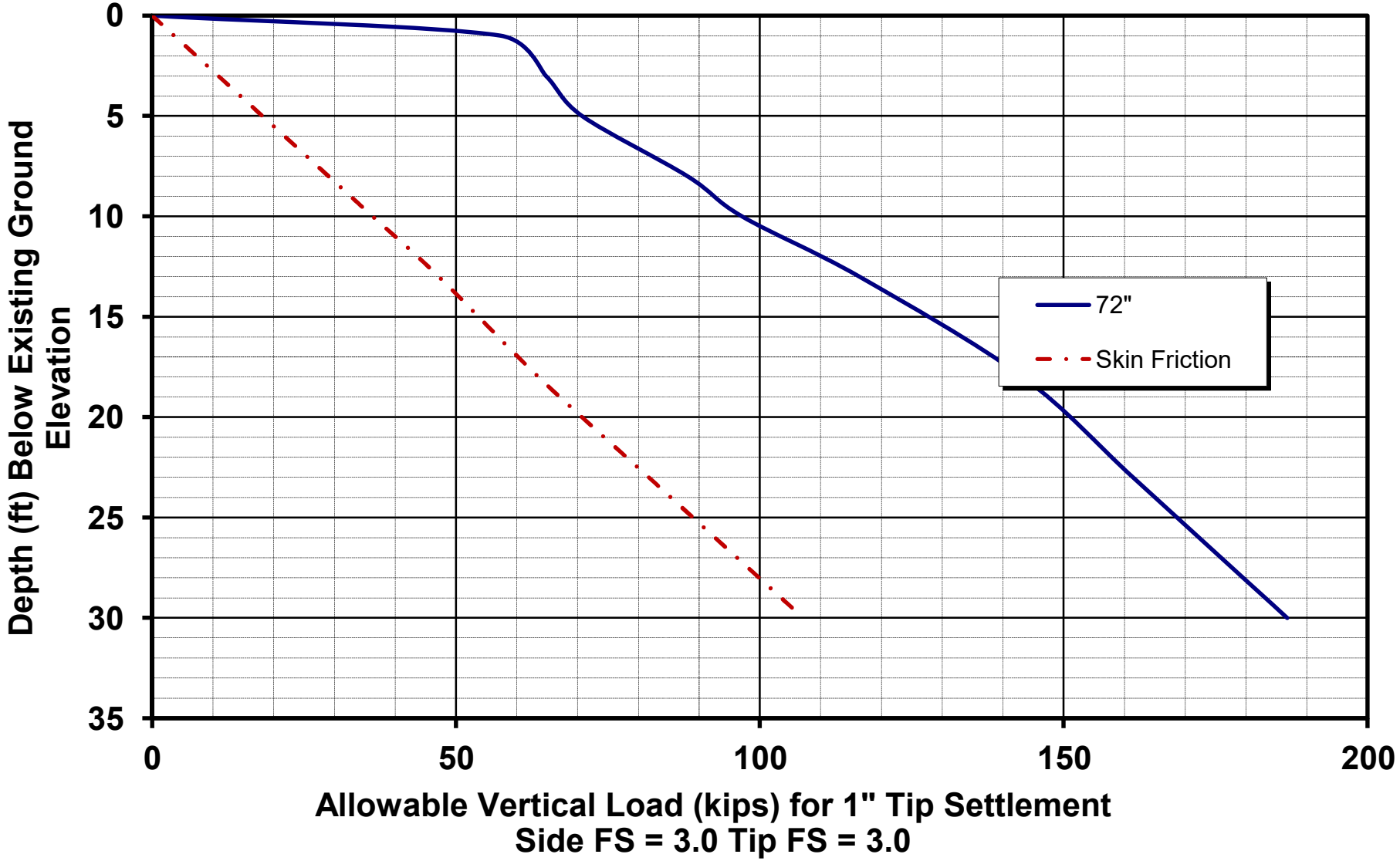
DRILLED SHAFT CAPACITIES



APPENDIX E

TABLE 6.2.1 – Predicted Engineers Soil Properties

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Depth Below Exisitng Grade (ft)	**< 13**	**<13**	**>13 < 30**	**Compacted ASTM C33 Size #57 or #67 Crushed Stone**	**Select Fill Compacted 98% D698**	**Compacted TxDOT Base**
Moist/Sat Unit Weight (pcf) [1]	125 / 130	125 / 130	125 / 130	90 - 105	125	135
Soil Classification - USCS	SM/ ML	SC /Sandy CL	SC /Sandy CL	GP	Sandy CL / SC	GW
Peak Shear Strength Parameters [3]						
Drained Cohesion c' (psf) [2]	-	50	75	-	-	-
Drained Friction Angle ϕ' [2]	28	23	25	39	30	36
[3] Unconsolidated / Undrained Cohesion c (psf)	-	800	1000	-	1300 (PI > 8) Only	-
Lateral Loading Parameters						
Rankine – Kp (passive)	2.77	2.28	2.46	4.40	3.00	3.85
Rankine – Ka (active)	0.36	0.44	0.41	0.23	0.33	0.26
Rankine – Ko (at rest)	0.53	0.61	0.58	0.37	0.50	0.41
Ɛ 50 [4]	-	-	0.005	-	-	-
Soil Type (For L-Pile Analysis) [4]	Sand (Reese)	Stiff Clay w/o Free Water	Stiff Clay w/o Free Water	-	Stiff Clay w/o Free Water (Pi > 8)	-
Compressibility Parameters						
Initial Void Ratio – e_o	0.40	0.55	0.60	-	0.45	-
Poisson's Ratio	0.3	0.3	0.35	0.35	0.30	0.3
Modulus of Subgrade Reaction k (30" diameter plate, pci)	10	16	30	269	81	162
Modulus of Subgrade Reaction k (1' square plate, pci)	22	36	67	595	179	359
Confined Tangent Modulus (Drained) – Mt (ksf) [5]	30	50	90	800	250	500

Notes:

1) Use buoyant unit weight where applicable

2) Estimated drained friction angle (Phi' = degrees) and cohesion (c' = psf), measured by CU triaxial and CD direct shear, or correlated values. Not Applicable for slope Stability or Final Wall Stability Checks

3) Peak Unconsolidated/Undrained shear strength (psf) at in-situ moisture content, measured by U.U. triaxial test or estimated from SPT field data.

4) Use default L-Pile values for K and e50, as applicable where values not otherwise indicated

5) M_t = Confined (1D) Tangent Modulus (ksf) estimated from consolidation testing or UU tests