BID DOCUMENTS

CITY OF COPPERAS COVE

Copperas Cove

TECHNOLOGY BUILDING SITE WORK

Prepared for:
City of Copperas Cove
INFORMATION SYSTEMS
914 S. MAIN STREET STE. A
Copperas Cove, Texas 76522

BID NO. **2016-15-35**
DUE **July 21, 2016 @ 2:00pm**

STATE OF TEXAS
MIKE W. KRIEGEL
83017
LICENSED
PROFESSIONAL ENGINEER

Prepared by:
Mitchell & Associates, Inc.
102 N. College
Killeen, Tx 76541
TBPE Firm Registration No. 3241
Mike W. Kriegel, P.E., R.P.L.S.

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SECTION 00100 - ADVERTISEMENT FOR BIDS

City of Copperas Cove
BID #2016-15-35
Technology Building Site Work

Notice is hereby given that sealed bids will be received until 2:00 P.M., July 21, 2016, and then publicly opened and read aloud at the City of Copperas Cove City Hall Conference Room at 914 South Main Street, Suite B, Copperas Cove, Texas 76522.

Digital copies of the Plans and Specifications can be obtained beginning, June 28, 2016 by contacting the office of the Engineer, Mitchell and Associates, Inc., (see contact information below). Hard copies of Plans and Specifications can be obtained on request from the office of the Engineer. Hard copies will be printed once requested. Hard copies may be obtained for a non-refundable fee of $50. Digital copies may be obtained at no cost from the Engineer by either download or on CD. Contact Mitchell and Associates for more information.

The project is located at 508 South 2nd street, Copperas Cove, Texas. The project will consist of subgrade preparation for a single-story building with a footprint area of approximately 8,140 square feet, with site grading, concrete parking. and concrete sidewalks. The proposed project will be built in 2 phases, Phase 1 being to excavate and place select fill to a depth of 4 feet for the building contractor, and the remainder of site work to be performed after the building contractor has erected the building, (presumed to be 30 days).

The Project shall be substantially complete within 110 calendar days and final completion within 120 calendar days from the Notice to Proceed.

Mitchell and Associates, Inc.
102 N. College Street
Killeen, TX 76541
Engineer: Mike Kriegel
254-634-5541

City of Copperas Cove

BID #2016-15-35
Technology Building Site Work

Sealed bids in envelopes addressed to City of Copperas Cove, attention Tracy Molnes – Purchasing Technician, will be received until 2:00 P.M., July 21, 2016, and then publicly opened and read aloud at the City of Copperas Cove City Hall Conference Room at 914 South Main Street, Suite B, Copperas Cove, Texas 76522, for furnishing all work required for the construction of the Technology Building Site Work. The proposal shall be submitted on the bidding forms, which are included in the Bid Documents, and shall be enclosed in a sealed envelope addressed to City of Copperas Cove, City Secretary's Office, 914 S. Main Street Suite C, Copperas Cove, TX 76522.

Any questions or requests for clarification must be submitted to the Purchasing Technician, in writing, prior to 12:00 Noon, July 18, 2016 via email to Tracy Molnes, tlmolnes@ci.copperascovetx.gov, subject line containing bid number and description,

Digital copies of the Plans and Specifications can be obtained beginning, June 28, 2016 by contacting the office of the Engineer, Mitchell and Associates (see contact information below). Hard copies of Plans and Specifications can be obtained on request from the office of the Engineer. Hard copies will be printed once requested. Hard copies may be obtained for a non-refundable fee of $50. Digital copies may be obtained at no cost from the Engineer by either download or on CD. Contact Mitchell and Associates for more information. Bid documents can also be downloaded from the City's website at www.copperascovetx.gov. The prospective bidder's attention is directed to the bid documents where detailed instruction and provisions are contained concerning bonds, insurance and other performance requirements

The project will be a phased construction in 2 phases. Phase I includes excavating a footprint of approximately 8,140 sf to a depth of 4 feet and replacing with engineered fill. Contractor will then leave the site and allow for the installation of a concrete slab by others along with building erection, considered to take 30 days as part of the contract time. Once the building is erected, Phase II will be to complete site improvements to include site grading, concrete parking, and concrete sidewalks. Utility service connections will be installed by the City of Copperas Cove.

The Project shall be substantially complete within 110 calendar days and final completion within 120 calendar days from the Notice to Proceed.

Mitchell and Associates, Inc.
102 N. College Street
Killeen, TX 76541
(254) 634-5541

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor or other person doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 1491, 80th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code by a person who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the person 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 person becomes aware of facts that require the statement to be filed. *See* Section 176.006, Local Government Code.

A person commits an offense if the person knowingly violates Section 176.006, Local Government Code. An offense under this section is a Class C misdemeanor.

OFFICE USE ONLY

Date Received

1 **Name of person 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 the originally filed questionnaire becomes incomplete or inaccurate.)

3 **Name of local government officer with whom filer has employment or business relationship.**

_____

Name of Officer

This section (item 3 including subparts A, B, C & D) must be completed for each officer with whom the filer has an employment or other business relationship as defined by Section 176.001(1-a), Local Government Code. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer named in this section receiving or likely to receive taxable income, other than investment income, from the filer of the questionnaire?

☐ Yes ☐ No

B. Is the filer of the questionnaire receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer named in this section AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

C. Is the filer of this questionnaire employed by a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership of 10 percent or more?

☐ Yes ☐ No

D. Describe each employment or business relationship with the local government officer named in this section.

4

_____ _____

Signature of person doing business with the governmental entity Date

SECTION 00200 - INSTRUCTIONS TO BIDDERS

City of Copperas Cove – Technology Building Site Work

PROPOSAL

The Proposal (or copies of the proposal) shall be submitted on the bidding forms, which are included herein, and shall be enclosed in a sealed envelope addressed to:

CITY OF COPPERAS COVE
Attn: Tracy Molnes,
Purchasing Technician
City Secretary Office
914 S. Main Street, Suite C
Copperas Cove, Texas 76522

and shall be identified as follows:
"Bid #2016-15-35 for Technology Building Site Work, to be opened at 2:00 P.M. July 21, 2016."

Any questions or requests for clarification must be submitted to the Purchasing Technician, in writing, prior to 12:00 Noon July 18, 2016 via email to Tracy Molnes, tlmolnes@copperascovetx.gov , subject line containing bid number and description. There will be no exceptions. All responses to the questions will be sent to all bidders.

Bidders desiring further interpretation of the Plans or Specifications must make request for such information to the Engineer prior to 12:00 Noon July 18, 2016. Any requests received after this date and time will not be responded to. Bidders' information requests shall be directed to:

Mitchell and Associates, Inc.
102 College Street
Killeen, TX 76541
Engineer: Mike Kriegel
254-634-5541

A Proposal will not be accepted unless prepared on the bidding form provided. The sealed Proposals will be publicly opened and read at the time and place stated in the Notice to Contractors. Bidders or their authorized agents are invited to be present. Unauthorized conditions, limitations or provisions attached to a Proposal will render it informal and may cause its rejection. The complete Proposal forms shall be without additions, alternations or erasures. Alternative proposals will not be considered unless called for. No oral, telegraphic or telephonic proposals or modifications will be considered. The Proposal may be withdrawn upon request by the Bidder without prejudice to himself prior to, but not after, the time fixed for opening of bids, provided that the request is in writing, has been executed by the Bidder or his duly authorized representative, and is filed with the OWNER.

BIDDING FORMS REQUIRED

Bidders shall submit one (1) complete original copies of the Proposal. Complete Proposals shall consist of the following forms:

- Acknowledgement of Addendum Receipt
- Proposal Bidding Sheets
- Bid Bond or Proposal Guarantee
- Information Required of Bidder

DISQUALIFICATION OF BIDDERS

More than one Proposal from an individual, firm, partnership, corporation or association under the same or different names, will not be considered. Reasonable grounds for believing that any Bidder is interested in more than one Proposal for the work contemplated will cause the rejection of all Proposals in which such Bidder is interested. If there is reason for believing that collusion exists among Bidders, all bids will be rejected and none of the participants in such collusion will be considered in future proposals.

RETURN OF PROPOSAL GUARANTEES

Within twenty-five (25) days after an award of the Contract, the OWNER will return the proposal guarantees accompanying each of the proposals as are not considered in making the award. All other proposal guarantees will be held until the contract has been finally executed. They will then be returned to the respective Bidders whose Proposals they accompany.

AWARD OF CONTRACT - RESERVATION OF RIGHTS

The Contract, if awarded, will be awarded to a responsible Bidder if his Proposal complies with all the requirements prescribed. Award, if made, will be made within ninety (90) calendar days after the opening of the Proposals. The OWNER reserves the right to reject any or all bid Proposals, to accept the lowest responsible Bidder's Proposal, and to waive any informality in any Proposal.

EXECUTION OF CONTRACT

A Bidder to whom award is made shall execute a written Contract with the OWNER on the form of Agreement provided. Failure or refusal to enter into a Contract as herein provided, or to conform to any of the stipulated requirements in connection therewith shall be a just cause for the annulment of the award. If the successful Bidder refuses or fails to execute the contract, the OWNER may award the Contract to the second lowest responsible Bidder. If the second lowest responsible Bidder refuses or fails to execute the Contract, the OWNER may award the Contract to the third lowest responsible Bidder. On the failure or refusal of such second and third lowest responsible Bidder to execute the contract, the work may be bid again at a later date.

PROPOSAL GUARANTEE

Each Proposal shall be accompanied by a certified or cashier's check or bid bond in the amount of not less than 5% of the amount named in the Proposal. Said check or bond shall be made payable to the Owner and shall be given as a guarantee that the Bidder, if awarded the work, will enter into a Contract within ten (10) days after the award and will furnish the necessary bonds as hereinafter provided. In case of refusal or failure to enter into said Contract, the check or bond as the case may be, shall be cased as liquidated damages. No Bidder's bond will be accepted unless it conforms substantially to the form furnished by the OWNER, which is bound herein, and is properly filled out and executed.

PROPOSAL SIGNATURE

If the Proposal is made by an individual, it shall be signed and his full name and is address shall be given; if it is made by a firm it shall be signed with the co-partnership name by a member of the firm, who shall sign his own name, and the name and address of each member shall be given; and if it is made by a corporation the name of the corporation shall be signed by its duly authorized officer or officers attested by the corporate seal, and the names and titles of all officers of the corporation shall be given.

COMPETENCY OF BIDDERS

In selecting the lowest responsible Bidder, consideration will be given not only to the financial standing, but also to the general competency of the Bidder for the performance of the work covered by the Proposal. To this end each Proposal shall be supported by a statement of the bidder's experience, on the form entitled "Information Required of Bidder," bound herein. Unsatisfactory safety records or past performance will be grounds for bid rejections.

BIDDER'S EXAMINATION OF SITE

Each Bidder shall examine carefully the site of the proposed work and the Contract Documents therefore. It will be assumed that the Bidder has investigated and is satisfied as to the conditions to be encountered; as to the character, quality and quantity of materials to be furnished and as to the requirements of the Contract, Specifications and Drawings.

CONTRACT TIME

If awarded the Contract, the undersigned agrees that the base bid shall be substantially complete within 90 calendar days and final completion of the base bid work within 100 calendar days of Notice to Proceed.

ADDENDA

Bidders desiring further information or interpretation of the Plans or Specifications must make request for such information in writing to Engineer prior to 48-hours before the bid opening. Answers to all such requests will be given in writing to all Bidders, in Addendum form, and all Addenda will be bound with, and made a part of the Contract Documents. No other explanation of interpretation will be considered official or binding. Should a Bidder find discrepancies in, or omissions from the Plans, Specifications or other Contract Documents, or should he be in doubt as to their meaning, he should at once notify the Engineer in order that a written Addendum may be sent to all Bidders. Any Addenda issued prior to twenty-four (24) hours of the opening of bids will be mailed or delivered to each Contractor contemplating the submission of a proposal on this work. The Proposal as submitted by the Contractor will be so constructed as to include any Addenda if such are issued by the Engineer prior to twenty-four (24) hours of the opening of bids.

Acknowledgment of Addendum Receipt

Addendum No.	Date

SECTION 00400 - PROPOSAL BIDDING SHEETS

City of Copperas Cove – Technology Building Site Work

Job Name: TECHNOLOGY BUILDING SITE WORK
Job Location: COPPERAS COVE, TEXAS
Owner: CITY OF COPPERAS COVE

Gentlemen:

Pursuant to the foregoing Notice to Contractors and Instructions to Bidders, the undersigned BIDDER hereby proposes to do all the work, to furnish all necessary supervision, labor, machinery, equipment, tools, materials, insurance and miscellaneous items, to complete all the work bid as provided by the attached supplemental specifications, and as shown on the TECHNOLOGY BUILDING SITE WORK for the construction of the project and binds himself on acceptance of this proposal to execute a contract and bonds for completing said project within the time slated for the following process, to wit: City of Copperas Cove, Texas.

TECHNOLOGY BUILDING SITE WORK

ITEM NO.	QUANITY UNIT	DESCRIPTION AND UNIT PRICE IN WORDS	TOTAL PRICE
1	1 LS	Bonding, Mobilization and Insurance: Not to exceed 5% of the total Base Bid contract price, at the lump sum cost of _____ _____ Dollars	$_____
2	1 LS	Environmental Protection / Storm Water Pollution Prevention Plan (SWPPP): Including preparation, implementation, required inspections, and weekly reports, at the lump sum cost of _____ _____ Dollars	$_____
3	1 LS	Construction Staking, and Materials Testing Including all construction staking and re-staking, and all testing by a third-party testing facility, complete and in place, at the lump sum cost of _____ _____ Dollars	$_____
4	370 LF	Silt Fence Including all materials, installation & maintenance, complete and in place, at the per linear foot cost of _____ _____ Dollars	$_____

5	1 LS	Phase I – Excavate an approximate pad area of 8,140 SF to a depth of 4 feet, replace with select fill meeting requirements of Geotech Report, at the lump sum cost of _____ _____Dollars	$_____
6	1 LS	Phase II – complete all site grading, concrete parking lot construction, concrete curb and gutter, sidewalk construction, and striping at the lump sum cost of _____ _____Dollars	$_____
7	1 LS	Revegetation - Including replacement of any damaged bushes, trees, grass, soil and all materials, installation, watering and maintenance until established, complete and in place, at the lump sum cost of _____ _____ Dollars	$_____

TOTAL BID (Items 1-7):	$_____

SUBMISSION OF PROPOSAL:

In accordance with the Contract Documents, the above Proposal is hereby respectfully submitted by:

_____

NAME OF CONTRACTOR DATE

_____

EXECUTED BY TITLE / POSITION

_____

BUSINESS ADDRESS TELEPHONE NUMBER

_____

CITY COUNTY STATE ZIP

SECTION 00430 - BID BOND

City of Copperas Cove – Technology Building Site Work

THE STATE OF TEXAS §
§
COUNTY OF_____ §

KNOW ALL MEN BY THESE PRESENTS, that we_____ as PRINCIPAL and _____as SURETY, are held and firmly bound unto CITY OF COPPERAS COVE, hereinafter referred to as the "OWNER," in the penal sum of five percent (5 %) of the total amount of the bid of the PRINCIPAL submitted to the OWNER, for the work described below; for the payment of which sum is lawful money of the United States of America, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents. In no case shall the liability of the SURETY hereunder exceed the sum of THE CONDITIONS OF THIS OBLIGATION ARE SUCH, THAT WHEREAS, said PRINCIPAL has submitted the above-mentioned bid to the OWNER, for construction of the work under the “CONSTRUCTION OF CITY OF COPPERAS COVE TECHNOLOGY BUILDING SITE WORK,” for which bids are to be opened on _____, 2016.

NOW THEREFORE, if the PRINCIPAL is awarded the Contract, and within the time and manner required under the heading "Instruction to Bidders," after the prescribed forms are presented to him for signature, enters into a written Agreement, substantially in the form contained in the Specifications, in accordance with the bid and files the two bonds with the OWNER, one to guarantee faithful performance and the other to guarantee payment for labor and material, then this obligation shall be null and void, otherwise, it shall be and remain in full force and effect.

In the event, suit is brought upon this bond by the OWNER and judgment is recovered, said SURETY shall pay all costs incurred by the OWNER in such suit, including a reasonable attorney's fee to be fixed by the court.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, 2016.

_____	_____
Principal	Surety
By: _____	By:_____
Title: _____	Title:_____
Address:_____	Address:_____
_____	_____

The name and address of the Resident Agent of Surety is:

_____

_____

_____

SECTION 00450 - INFORMATION REQUIRED OF BIDDER

City of Copperas Cove – Technology Building Site Work

The Prospective Bidder is required to supply the following information. Additional sheets and/or information may be attached if necessary.

(1) Name_____

(2) Address_____

(3) Phone Number_____

(4) Type of firm:

__ Individual, __ Partnership, __ Corporation

(5) Corporation organized under the laws of the State of _____.

(6) Payment of taxes by Bidder is to the State of _____.

(7) List the names and address of all members of the firm or names and titles of all officers of the corporation:

_____ _____

_____ _____

_____ _____

(8) Number of years experience _____

(9) Has the Bidder ever defaulted on a Contract? _____

(10) Are there any currently pending judgments, claims, or lawsuits against the Bidder? _____

(11) Does Bidder currently have any pending judgments, claims, or lawsuits against any prior client? _____

(12) Is the Bidder or its Principals involved in any bankruptcy or reorganization proceedings? _____

(13) Experience with site improvement projects in particular, valued at $1,000,000 or more is desired. List at least three (3) projects completed by Bidder of comparable scope in the last four (4) years.

Name of Project	
Project Location	
Brief Description or Class of Work	
Owner Name	
Owner Contact Information	
Initial Contract Price	
Final Contract Price	
Date Completed	

Name of Project	
Project Location	
Brief Description or Class of Work	
Owner Name	
Owner Contact Information	
Initial Contract Price	
Final Contract Price	
Date Completed	

Name of Project	
Project Location	
Brief Description or Class of Work	
Owner Name	
Owner Contact Information	
Initial Contract Price	
Final Contract Price	

Date Completed	

(14) List the name and address of each subcontractor who will perform work in or about the work or improvements in excess of one-half (1/2) of one percent (1%) of the total bid price and indicate what part of the work will be done by each such subcontractor.

NAME	ADDRESS	WORK TO BE PERFORMED

(15) If requested by the OWNER, the Bidder shall submit a notarized financial statement, financial data or other information and references sufficiently comprehensive to permit an appraisal of his current financial conditions.

(16) Additional information may be requested after receipt of this completed form in order to complete evaluation.

SECTION 00500 - CONTRACT AGREEMENT

City of Copperas Cove –Technology Building Site Work

THE STATE OF TEXAS §
§
COUNTY OF_____ §

THIS AGREEMENT, made and entered into this ____ day of _____, 2016, by and between CITY OF COPPERAS COVE, COPPERAS COVE, TEXAS hereinafter termed OWNER, and _____ of the City of _____, County of _____, and State of Texas, hereinafter termed CONTRACTOR.

WITNESSETH: That for and in consideration of the payments and agreements herein after mentioned, to be made and performed by the OWNER, the CONTRACTOR hereby agrees with the OWNER to commence and complete the construction of certain improvements described as follows:

CITY OF COPPERAS COVE
Technology Building Site Work

Further described as the work covered by these Specifications consists of furnishing all the materials, supplies, machinery, equipment, tools, supervision, labor, insurance, and other accessories and services necessary to complete the said construction, in accordance with the conditions and prices stated in the Proposal attached herein, and in accordance with the Notice to Contractors, Instructions to Bidders, General Conditions of the Agreement, Special Conditions of the Agreement, Technical Specifications, Plans and other drawings and printed or written explanatory matter thereof, and the Specifications and addenda therefore, as prepared by Mitchell and Associates, 102 College Street, Killeen, Texas 76542 herein entitled the ENGINEER, each of which has been identified by the CONTRACTOR'S written Proposal, the General Conditions of the Agreement, and the Performance and Payment Bonds hereof and collectively evidence and constitute the entire Contract.

The CONTRACTOR hereby agrees to commence work within seven (7) calendar days after the date written notice to do so shall have been given to him, and to reach final completion of the Technology Building Site Work work within 120 calendar days of the written Notice to Proceed, subject to such extensions of time as are provided by the General and Special Conditions.

The OWNER agrees to pay the CONTRACTOR in current funds the price or prices shown in the Proposal, which forms a part of this Contract, such payments to be subject to the General and Special Conditions of the Contract.

IN WITNESS WHEREOF, the parties of these presents have executed this Agreement in the year and day first above written.

ATTEST

CONTRACTOR:	OWNER: CITY OF COPPERAS COVE
_____	_____
Name	Name
_____	_____
Title	Title
_____	_____
Address	Address
WITNESS:	SECRETARY:
_____	_____
Name	Name
_____	_____
Title	Title
_____	_____
Address	Address

SECTION 00610 - PERFORMANCE BOND

City of Copperas Cove – Technology Building Site Work

THE STATE OF TEXAS §
§
COUNTY OF_____ §

KNOW ALL MEN BY THESE PRESENTS, THAT _____ of the City of _____, County of _____ and State of _____, as PRINCIPAL, and _____ authorized under the laws of the State of Texas to act as SURETY on bonds for PRINCIPALS, are held and firmly bound unto CITY OF COPPERAS COVE, COPPERAS COVE, TEXAS in the penal sum of _____ _____ Dollars ($_____) for the payment whereof, the said PRINCIPAL and SURETY bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents:

WHEREAS, the PRINCIPAL has entered into a certain Contract with the OWNER dated the ___ day of _____, 2016 to which Contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH, that if the said PRINCIPAL shall faithfully perform said Contract and shall in all respects duly and faithfully observe and perform all and singular the covenants, conditions and agreements in and by said Contract agreed and covenanted by the PRINCIPAL to observed and performed, and according to the true intent and meaning of said Contract and the Plans and Specifications thereto annexed, then this obligation shall be void; otherwise to remain in full force and effect;

PROVIDED HOWEVER, that this bond is executed pursuant to the provisions of Article 5160 of the Revised Civil Statutes of Texas as amended and all liabilities on this bond shall be determined in accordance with the provisions of the said Articles to the same extent as if it were copied at length herein.

SURETY, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the work performed there under, or the Plans, Specifications or drawings accompanying the same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed hereunder.

IN WITNESS WHEREOF, the said PRINCIPAL and SURETY have signed and sealed this instrument this _____ day of _____, 2016.

_____	_____
Principal	Surety
By:_____	By:_____
Title:_____	Title:_____
Address:_____	Address:_____
_____	_____
_____	_____

The name and address of the Resident Agent of Surety is:

_____

_____

_____

_____

SECTION 00620 - PAYMENT BOND

City of Copperas Cove – Technology Building Site Work

THE STATE OF TEXAS §
§
COUNTY OF_____ §

KNOW ALL MEN BY THESE PRESENTS, THAT _____of the City of _____, County of _____ and State of _____, as PRINCIPAL, and _____ authorized under the laws of the State of Texas to act as SURETY on bonds for PRINCIPALS, are held and firmly bound unto CITY OF COPPERAS COVE (OWNER) in the penal sum of _____ _____ Dollars ($_____) for the payment whereof, the said PRINCIPAL and SURETY bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents:

WHEREAS, the PRINCIPAL has entered into a certain Contract with the OWNER dated the _____ day of _____, 2016, to which Contract is hereby referred to and made a part hereof a fully and to the same extent as if copied at length herein.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Article 5160 of the Revised Civil Statutes of TEXAS as amended and all liabilities on this bond shall be determined in accordance with the provisions of said Article to the same extent as if it were copied at length herein.

SURETY, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the work performed thereunder, or the Plans, specifications or drawings accompanying the same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the term of the Contract, or to the work to be performed thereunder.

IN WITNESS WHEREOF, the said PRINCIPAL and SURETY have signed and sealed this instrument this _____ day of _____, 2016.

_____	_____
Principal	Surety
By:_____	By:_____
Title:_____	Title:_____
Address:_____	Address:_____
_____	_____
_____	_____
_____	_____

The name and address of the Resident Agent of Surety is:

_____

_____

_____

_____

SECTION 00630 - CERTIFICATION OF INSURANCE

City of Copperas Cove – Technology Building Site Work

TO: CITY OF COPPERAS COVE
914 S. Main Street, Suite C
Copperas Cove, TX 76522

Date:_____

THIS IS TO CERTIFY THAT _____
is, at the date of this certificate, insured by this company with respect to the business operations hereinafter described, for the types of insurance and in accordance with the provisions of the standard policies used by this company, and further hereinafter described. Exceptions to standard policies are noted on the reverse side hereof.

TYPE OF INSURANCE	POLICY NO.	EFFECTIVE DATE	EXPIRATION DATE	LIMITS OF LIABILITY
Worker's Compensation				Statutory, State of Texas _____
Employer's Liability				Bodily Injury
Comprehensive General Liability				$_____ each person $_____
_____ Included Contractual Liability Covers				
_____ Independent Contractors				Property Damage $_____each accident $_____ aggregate
Owner's Protective				Bodily Injury $_____ each person $_____ each person Property Damage $_____ each accident $_____ aggregate
Comprehensive Automobile Liability				Bodily Injury $_____ each person $_____ each accident
____ Owned Vehicles				Property Damage $_____each accident
____ Hired Vehicles				
____ Non-owned Vehicles				
____ Contractual Liability				

The above policies either in the body thereof or by appropriate endorsement provide that they may not be changed or concealed by the insurer in less than ten (10) days after the insured has received written notice of such change or cancellation.

This Certificate of Insurance neither affirmatively or negatively amends, extends or alters the coverage afforded by policy of policies indicated by this certificate.

_____
(Name of Insurer)

By:_____
Title:_____
Address:_____
_____

SECTION 00640 - CONTRACTOR'S AFFIDAVIT OF BILLS PAID

City of Copperas Cove – Technology Building Site Work

STATE OF TEXAS §
§
COUNTY OF _____ §

I, _____, being the legal representative of, _____ _____hereby certify that all bill for materials, apparatus, fixtures, machinery, and labor used in connection with the construction of_____ _____, have been fully paid.

Signed: By:

_____ _____
Company Name

Title:_____

STATE OF TEXAS

COUNTY OF _____

Before me, the undersigned, a Notary Public in and for said County and State, personally appeared_____ _____
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledgement to me that he executed the same for the purposes and consideration therein expressed and in the capacity therein stated.

Given under my hand and seal of office this_____day of _____20___.

_____
Notary Public in and for

_____ County, Texas My Commission Expires: _____

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City of Copperas Cove –Technology Building Site Work

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1. DEFINITIONS

1.01 Calendar Day. A calendar day shall be the 24-hour period from one midnight to the next consecutive midnight.

1.02 Contract Documents. The Contract Documents shall consist of the Notice to contractors; the Instructions to Bidders; the proposal and Bidding Sheets; the executed Agreement; the Performance and Payment Bonds; the General Conditions of the Agreement; the Special Conditions of the Agreement; the Specifications; the Plans; the Standard Drawings; Addenda; and duly authorized Change Orders. The Contract Documents are complementary, and what is called for by any one shall be as binding as if called for by all. In case of conflict between the contract Documents, priority of interpretation shall be in the following order: Signed Agreement, Performance and Payment - Bonds, Addenda, Proposal, Special Conditions of the Agreement, Notice to Addenda, Proposal, Special Conditions of the Agreement, Notice to Contractors, Specifications, Plans, and General Conditions of the Agreement.

1.03 Contractor. "Contractor" shall mean the business organization or individual named and designated in the Contract Agreement as the "party of the Second Part," who has entered into this contract for the performance of the work covered thereby, and its, his, or their duly authorized agents and other legal representatives.

1.04 Engineer. "Engineer" shall mean Mitchell and Associates, Inc., or such other Engineer, supervisor, or inspector who has been designated, appointed, or otherwise employed or delegated by the OWNER for this work, or their duly authorized agents, such agents acting within the scope of the particular duties entrusted to them in each case.

1.05 Extra Work. The term "extra work" as used in this contract shall be understood to mean and include all work that may be required by the Engineer or OWNER to be done by the Contractor to accomplish any change, alteration, or addition to the work shown on the Plans, or reasonably implied by the Specifications, and not covered by the Contractors Proposal, except as provided under "Changes and Alterations," herein.

1.06 OWNER. "OWNER" shall mean CITY OF COPPERAS COVE, named and designated in the Agreement as the "Party of the First Part" acting through its duly authorized officers and agents.

1.07 Plans. "Plans" shall mean and include (a) all drawings prepared by the OWNER as a basis for proposal, (b) all supplementary drawings furnished by Engineer as and when required to clarify the intent and meaning of the drawings submitted by the OWNER to the Contractor, and (c) drawings submitted by the Contractor to the OWNER when and as approved by the Engineer.

1.08 Specifications. "Specifications" shall mean (a) all written descriptions, methods and instructions prepared by the OWNER as a basis for proposals, (b) all supplementary written material furnished by the Engineer as and when required to clarify the intent or meaning of all written descriptions, methods and instructions submitted by the OWNER to the contractors, and (c) written descriptions submitted by the Contractor to the OWNER when and as approved by the Engineer.

1.09 Subcontractor. "Subcontractor" shall mean and refer only to a business organization or individual having a direct contract with the Contractor for (a) performing a portion of the Contract work, of (b) furnishing material worked to a special design according to the Contract plans or specifications; it does not, however, include one who merely furnishes material not so worked.

1.10 Substantially Completed. The term "substantially completed" shall mean that the structure or facility has been made suitable for use and is in condition to serve its intended purpose, but still may require minor miscellaneous work and adjustments.

1.11 Work. "Work" shall mean the work to be done and the equipment, supplies, material, and services to be furnished under the Contract unless some other meaning is indicated by the context.

1.12 Working Day. A "working day" is defined as any day not including Sundays or legal holidays, in which weather or other conditions, not under the control of the Contractor, will permit construction of the principal units of the work for a continuous period of not less than seven (7) hours between 7:00 a.m. and 6:00 p.m.

1.13 Written Notice. "Written Notice" shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by certified or registered mail to the last business address known to him who gives the notice.

2. GENERAL PROVISIONS

2.01 Engineer's Status and Authority. It is mutually agreed by and between the parties to this Contract that the engineer shall have general supervision and direction of the work included herein. In order to prevent delays and disputes and to discourage litigation it is further agreed by and between the parties of this Contract that the Engineer shall in all cases determine the amounts and quantities of the several kinds of work which are to be paid for under the Contract; that he shall determine all questions in relation to said work and the construction thereof, that he shall in all cases decide every question which may arise relative to the execution of the Contract on the part of the contractor, that his decisions and findings shall be the conditions precedent to the right of the parties hereto to arbitration or to any action on the Contract and to the rights of the Contractor to receive any money under this Contract; provided, however, that should the Engineer render any decision or give any direction which in the opinion of either party hereto is not in accordance with the meaning and intent of this Contract, either party may file with the Engineer within 30 days a written objection to the decision or direction so rendered. It is the intent of this Agreement that there shall be no delay in the execution of the work, and the decision or directions of the Engineer as rendered shall be promptly carried out.

2.02 Right of Engineer to Modify Methods and Equipment. If at any time the methods or equipment used by the Contractor are found to be unsafe or inadequate to secure the quality of the work or the rate of progress required under this Contract, the Engineer may direct the Contractor in writing to increase their safety or improve their character and efficiency and to cease operations under this Contract until such direction is complied with. No claims shall be made against the OWNER for damages caused by any delay resulting from such order.

2.03 Changes and Alterations. The Contractor agrees that the OWNER, through the Engineer, may make such changes and alterations as the OWNER may see fit in the line, grade, form, dimensions, plans, or materials for the work herein contemplated or any part thereof either before or after the beginning of the construction without affecting the validity of this Contract and the accompanying bonds. If such changes or alterations diminish the quantity of the work to be done, they shall not constitute the basis for a claim for damages or anticipated profits on the work that may be dispensed with. If they increase the amount of work and the increased work can fairly be classified under the specifications, such increase shall be paid for according to the quantity actually done and at the unit price established for such work under this contract; otherwise such work shall be paid for as provided under Section 2.12 "Extra Work." In the event the OWNER shall make such changes or alternations which will make useless any work already done or material already furnished or used in said work, then the OWNER shall compensate the Contractor for any materials or labor so used, for any actual loss occasioned by such change, and for the actual expense incurred in preparation for the work as originally planned.

2.04 Damages. The right of general supervision by the OWNER shall not make the Contractor an agent of the OWNER, and the liability of the Contractor for all damages to persons, firms, and corporations arising from the Contractor's execution of the work shall not be lessened because of such general supervision. The Contractor is an independent contractor in regard to work under this Contract, and as such is solely liable for all damages to any persons, firms, corporations, or their property as a result of the execution of the work.

2.05 Losses from Natural Causes. All loss or damage arising out of the nature of the work to be done or from the action of the elements or from any unforeseen circumstances in the prosecution of the work or from unusual obstructions or difficulties which may be encountered in the execution of the work shall be sustained and borne by the Contractor at his own costs and expense.

2.06 Laws and Ordinances. The Contractor shall at all times observe and comply with all Federal, State, and local laws, ordinances, rules and regulations which in any manner affect the Contract or the work and shall indemnify and save harmless the OWNER against any claim arising from the violation of any such laws and ordinances whether by the Contractor or his employees or his subcontractors and their employees.

2.07 Licenses, Permits and Certificates. Except as hereinafter stipulated, all licenses, permits, certificates, etc. required for and in connection with the work to be performed under the provisions of these Contract Documents shall be secured by the Contractor at his own expense. In the event a building permit is required, such permit will be obtained by the OWNER at no cost to the Contractor.

2.08 Royalties and Patents. The Contractor shall protect and save harmless the OWNER from all and every demand for damages, royalties, or fees on any patented invention used by him in connection with the work done or material furnished under this Contract; provided, however, that if any patented material, machinery, application, or invention is clearly specified in this Contract, the cost of procuring the rights of use and the legal release or indemnity shall be borne and paid by the OWNER direct unless such cost is determined and directed to be included in the bid price at the time the Proposal is submitted.

2.09 Keeping of Plans and Specifications Accessible. The Engineer shall furnish the Contractor with three (3) sets of executed Plans and Specifications without expense to him, and the Contractor shall keep one (1) copy of the same constantly accessible on the work, with the latest revisions noted thereon.

2.10 Discrepancies and Omissions. It is further agreed that it is the intent of this Contract that all work must be done and all material must be furnished in accordance with the generally accepted practice, and in the event of any discrepancies between the separate contract documents, the priority of interpretation defined under "Contract Documents" shall govern. In the event that there is still any doubt as to the meaning and intent of any portion of the Contract, Specifications or Drawings, the Engineer shall define which is intended to apply to the work.

2.11 Contractor's Understanding. It is understood and agreed that the Contractor has, by careful examination, satisfied himself as to the nature and location of the work, the conformation of the ground, the character, quality and quantity of the materials to be encountered, the character of equipment and facilities needed preliminary to and during the execution of the work, the general and local conditions, and all other matters which can in any way affect the work under this Contract. No verbal agreement or conversation with any officer, agent, or employee of the OWNER, either before or after the execution of this Contract, shall affect or modify any of the terms or obligations herein contained.

2.12 Extra Work. There term "extra work" as used in this Contract shall be understood to mean and include all work that may be required by the OWNER through the Engineer to be done by the Contractor to accomplish any change, alteration, or addition to the work shown by the Plans or reasonably implied by the Specifications and not covered by the contractor's Proposal, except as provided in Section 2.03 - "Changes and Alterations."

It is agreed that the Contractor shall perform all extra work under the direction of the Engineer when presented with a written Change Order signed by the OWNER.

No claim for extra work of any kind will be allowed unless ordered in writing by the OWNER. In case any orders

or instructions, either oral or written, appear to the contractor to involve extra work for which he should receive compensation, he shall make a written request to the OWNER for a written Change Order authorizing such extra work. Should a difference of opinion arise as to what does or does not constitute extra work or concerning the payment thereof and the OWNER insists upon its performance, the Contractor shall proceed with the work after making a written request for a written Change Order and shall keep an accurate account of the "actual field cost" thereof as provided under Method "C" below.

2.13 Payment for Extra Work. It is agreed that the compensation to be paid the Contractor for performing extra work shall be determined by one or more of the following methods:

Method "A" - By agreed unit prices;
Method "B" - By agreed lump sum; or
Method "C".If neither Method "A" nor Method "B" can be agreed upon before the extra work is commenced, then the Contractor shall be paid the "actual field cost" of the work plus 15%.

Where extra work is performed under Method "C", the term "actual field cost" of such extra work is hereby defined to be and shall include: (a) the payroll cost for all workman, such as foreman, mechanics, craftsmen, and laborers; (b) the cost of all materials and supplies not furnished by the OWNER; (c) rental for all power-driven equipment at agreed-upon rates for the time actually employed or used in the performance of the extra work; (d) transportation charges necessarily incurred in connection with any equipment authorized by the Engineer for use on said extra work and which is not already on the job; (e) all power, fuel, lubricants, water, and similar operating expenses; (f) all incidental expenses incurred as a direct result of such extra work including sales or use taxes on materials, payroll taxes, and the additional premiums for construction bonds, workmen's compensation, public liability and property damage, and other insurance required by the Contract where the premiums therefore are based on payroll and material costs. The Engineer may direct the form in which accounts of the "actual field costs" shall be kept and may also specify in writing before the work commences the method of doing the work and they type and kind of machinery and equipment to be used; otherwise these matters shall be determined by the Contractor. Unless otherwise agreed upon, the prices for the use of machinery and equipment shall be incorporated in the written extra work Change Order. The 15% of the "actual field cost" to be paid the Contractor shall cover and compensate him for his profit, overhead, and general superintendence.

2.14 Assignment and Subletting. The Contractor shall not assign or sublet the work or any part thereof without the previous written consent of the OWNER, nor shall he assign, by power of attorney or otherwise, any of the money payable under this Contract unless by and with the consent of the OWNER to be signified in like manner. If the Contractor assigns all or any part of any monies due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to all prior liens of all persons, firms, and corporations for services rendered or materials supplied for the performance of the work called for in this Contract.

2.15 Subcontractors. The Contractor shall be as fully responsible to the OWNER for the acts and omissions of his subcontractors and of persons either directly or indirectly employed by him. Should any subcontractor fail to perform the work undertaken by him in a satisfactory manner, his subcontract shall be immediately terminated by the Contractor upon written notice from the OWNER.

2.16 OWNER's Status. Nothing contained in this Contract shall create any contractual relation between any subcontractor and the OWNER.

2.17 Completed Portions of Work. The OWNER shall have the right to take possession of and to use any completed or partially completed portions of the work prior to completion of the entire work, but such use shall not constitute an acceptance of any of the work not completed in accordance with the Contract Documents. If the Engineer determines that taking possession of and using partially completed work substantially increases the cost of or delays construction, the Contractor shall be entitled to extra compensation, extension of time or both as determined by the Engineer.

2.18 Materials. All materials furnished by the contractor shall be a required by the Plans and Specifications or as otherwise stipulated. The Contractor shall not start delivery of materials which he is to furnish until the Engineer has approved the source of supply of such materials.

2.19 Receiving and Storage of Materials. The Contractor shall make arrangements for receiving and storing materials. The OWNER will not sign for or receive shipments of materials consigned to the Contractor. The OWNER will not furnish storage space for materials except where the written permission of the Engineer is given.

2.20 "Or Equal" Clause. Whenever a material, product, or article is specified or shown on the Plans by using the name of the proprietary product or of a particular manufacturer or vendor and is followed by the term "or equal," the Contractor may submit a written request to the Engineer requesting approval of the use of a material, product, or article he feels is truly equal to the one specified. The Engineer will evaluate the request to determine if the material, product, or article is of equal substance and function and if it will perform identically the duties imposed by the general design. Written approval of an "or equal" material, product, or article must be obtained from the Engineer before it may be incorporated into the work as a substitute for that specified in the contract Documents.

2.21 Completed Work. The Contractor shall maintain continuous adequate safeguards to protect all completed work from damage, loss, or the intrusion of foreign elements.

2.22 Materials Furnished by the OWNER. The contractor shall assume responsibility for and safeguard against loss or injury, any and all materials supplied by the OWNER. This provision shall extend to the taking of all necessary sanitary precautions to avoid contamination of such materials that must be maintained and incorporated into the work in a sanitary condition.

2.23 Protection of Property. The Contractor shall give reasonable notice to the OWNER or OWNERS of public or private property and utilities when such property is liable to injury or damage through the performance of the work and he shall make all necessary arrangements with such OWNER or OWNERS relative to the removal and replacement or protection of such property or utilities.

The Contractor shall satisfactorily shore, support, and protect any and all structures, and all pipes, sewers, drains, conduits, and the facilities belonging to the OWNER, and he shall be responsible for any damage resulting thereto. The Contractor shall not be entitled to any damages or extra pay as a result of any postponement, interference, or delay caused by any such structures and facilities being on the line of the work whether they are shown on the Plans or not.

2.24 Shelters for Workmen and Materials. The building or structures for housing men or the erection of tents or other forms of protection for workmen or materials will be permitted only as the Engineer shall authorize or direct. The sanitary conditions of the grounds in or about such structures shall at all times be maintained in a manner satisfactory to the Engineer.

2.25 Sanitary Facilities. Necessary sanitary toilet facilities for the use of all employees on the work shall be of a type complying with State and local sanitary regulations and shall be constructed and maintained by the Contractor in such manner and at such points as shall be approved by the Engineer. Their use shall be strictly enforced.

3. CONTRACTOR'S OBLIGATIONS AND RESPONSIBILITIES

3.01 Labor, Equipment, Materials and Construction Plant. The Contractor shall provide all labor, tools, equipment, machinery, supplies, and materials necessary for the execution and completion of this Contract where it is not specifically provided that the OWNER shall furnish them. The OWNER shall not be held responsible for the care, preservation, conservation, or protection of any material, tools, or machinery on any

part of the work until it is finally completed and accepted. The contractor shall maintain on the job at all times sufficient labor, material, and equipment to adequately prosecute the work.

3.02 Performance and Payment Bonds. It is further agreed by the Parties to this Contract that the contractor will execute separate performance and payment bonds, each in the sum of 100% of the total Contract price in standard forms for this purpose, guaranteeing faithful performance of the work and the fulfillment of any guarantees required and further guaranteeing payment to all persons supplying labor and materials of furnishing him any equipment in the execution of the Contract. It is agreed that the Contract shall not be in effect until such performance and payment bonds are furnished and approved by the OWNER. The cost of the premium for the performance and payment bonds shall be included in the price bid by the Contractor for the work under thiss Contract, and no extra payment for such bonds will be made by the OWNER.

The surety company or companies underwriting the performance and payment bonds shall be acceptable according to the latest list of companies holding certificates of authority from the secretary of the Treasury of the United States, shall be duly authorized to act under the laws of the State of Texas as SURETY, and shall be approved by the OWNER.

3.03 Contractor's Ability to Perform. Upon receipt by the OWNER the Contractor shall furnish sufficient evidence of his ability to perform the work which is outlined in this document. This shall include an equipment inventory and records showing the satisfactory completion of projects of equal magnitude in the past. It shall be the prerogative of the OWNER to terminate the contract as outlined in Section 7 "Termination of contract," if job progress indicates that the contractor lacks either appropriate experience or ability.

3.04 Superintendence and Inspection. The contractor shall give personal attention to the faithful execution and completion of the contract and shall keep a competent superintendent and any necessary assistants, all of whom are satisfactory to the Engineer, on the work continuously during its progress. The superintendent shall represent the contractor in his absence, and all directions given to him by the OWNER'S representative shall be as binding as if given to the Contractor.

In the event that the Contractor and the superintendent are both absent from the site of the work for prolonged periods of time, the Engineer may order any or all work under this Contract to be stopped until the Contractor provides continuous and proper supervision of the work. Such stoppage shall not constitute a basis for any claim against the OWNER for damages caused by delay for such work stoppage.

3.05 Character of Employees. The Contractor agrees to employ only orderly, competent, and skillful persons to do the work, and whenever the Engineer shall inform him that the work being accomplished is of substandard character by reason of carelessness, incompetence, or inexperience on the part of the workers the installation of such work shall be immediately suspended and shall not be resumed until the Engineer is satisfied that the conditions causing such faulty work have been corrected.

3.06 Contractor's Duty to Protect Persons and Property. In the performance of this Contract, the Contractor shall protect the public and the OWNER fully by taking reasonable precaution to safeguard persons from death or bodily injury and to safeguard property of any nature whatsoever from damage. Where any dangerous condition or nuisance exists in and around construction sites, equipment and supply storage areas, and other areas in anyway connected with the performance of this Contract, the Contractor shall not create excavations, obstructions, or any dangerous condition or nuisance of any nature whatsoever in connection with the performance of this Contract unless necessary to its performance, and in that event the contractor shall provide and maintain at all times reasonable means of warning of any danger or nuisance created. The duties of the Contractor in this paragraph shall be non-delegable, and the Contractor's compliance with the specific recommendations and requirements of the OWNER as to the means of warning shall not excuse the Contractor from the faithful performance of these duties should such recommendations and requirements not be adequate or reasonable under the circumstances.

3.07 Safety Codes. The Contractor shall comply with all applicable provisions of any Federal, State, and Municipal safety laws and building and construction codes. All machinery, equipment, and other physical

hazards shall be guarded in accordance with Federal, State, or Municipal laws or regulations.

3.08 Barricades. When barricades are used to satisfy safety requirements, such barricades shall be properly identified with the Contractor's name prominently stenciled on both sides of the barricades with letters at least 2 inches high.

3.09 Minimum Wages. All employees directly employed on the work shall be paid not less than the established prevailing wage scale for work of a similar character in this locality. The Contractor shall pay not less than the general prevailing wages as established by the U.S. Department of Labor and shall keep accurate wage records accessible in accordance with Article 5159 of the Revised Civil Statutes of Texas.

3.10 Unsuitable Work or Materials. It is understood and agreed that if the work or any part thereof or any material furnished by the Contractor for use in the work or selected for the same shall be deemed by the Engineer as unsuitable or not in conformity with the specifications, the Contractor shall, after receipt of written notice thereof from the Contracting Officer, forthwith remove such material and replace, rebuild, or otherwise remedy such work so that it shall be in full accordance with this Contract. Should the Contractor fail to initiate compliance with the above provision within 72 hours or should he fail to properly execute and complete correction of such faulty work, the Engineer may direct that the work be done by others and that the cost of the work be deducted from monies due the Contractor.

3.11 No Waiver of Contractor's Obligations. The Engineer, supervisor, or inspector shall have no power to waive the obligations of this contract for the furnishing by the Contractor of good material and of his performing good work as herein described and in full accordance with the plans and specifications. No failure or omission of the Engineer, supervisor, or inspector to condemn any defective work or material shall release the Contractor from the obligation to at once tear out, remove, and properly replace the same at any time prior to final acceptance upon the discovery of said defective work or material; provided, however that that Engineer, supervisor, or inspector shall upon request of the Contractor inspect and accept or reject any material furnished, and once the material has been accepted by the Engineer, supervisor, or inspector such acceptance shall be binding on the OWNER unless it can be clearly shown that such material furnished was not as represented and does not meet the specifications for the work. Any questioned work may be ordered taken up or removed for re- examination by the Engineer prior to final acceptance, and if found not in accordance with the specifications for the work. Any questioned work may be ordered taken up or removed for re-examination by the Engineer prior to final acceptance, and if found not in accordance with the specifications for said work, all expense of removing, re- examination, and replacement shall be borne by the Contractor; otherwise the expense thus incurred shall be allowed as "Extra Work" and shall be paid for by the OWNER.

3.12 Site Clean-Up. The Contractor shall not allow the site of the work to become littered with trash and waste material but shall maintain the site in a neat and orderly condition throughout the construction period. The Engineer shall have the right to determine what is waste material or rubbish and the manner and place of disposal. On or before the completion of the work the Contractor shall, without charge therefore, carefully clean out all pits, pipes, chambers, or conduits, shall tear down and remove all temporary structures built by him, shall remove all rubbish of every kind from the tracts or grounds which he has occupied, and shall leave them in a condition satisfactory to the Engineer.

3.13 Guarantee. During a period of 12 months from and after the date of the final acceptance by the OWNER of the work embraced by this Contract, the Contractor shall make all needed repairs arising out of defective workmanship, materials, or both, which in the judgment of the OWNER shall became necessary d during such period. If within 10 days after the mailing of a notice in writing to the Contractor or his agent the said Contractor shall neglect to make or to undertake with due diligence the aforesaid repairs, the OWNER is hereby authorized to make such repairs at the Contractor's expense; provided, however, that in case of an emergency where, in the judgment of the OWNER, delay would cause serious loss or damage, repairs may be made without notice being sent to the Contractor, and the contractor shall pay the cost thereof.

4. OWNER'S OBLIGATIONS AND RESPONSIBILITIES

4.01 Lines and Grades. All necessary lines and grade shall be furnished by the Engineer. Whenever necessary, work shall be suspended to permit performance of this work, but such suspension will be as brief as practicable, and the Contractor shall be allowed no extra compensation therefore. The Contractor shall give the Engineer ample notice of the time and place where lines and grades will be needed. All stakes, marks, etc. shall be carefully preserved by the Contractor, and in case of careless destruction or removal by him or his employees such stakes, marks, etc. shall be replaced by the Engineer at the Contractor's expense.

4.02 Right of Entry. The OWNER reserves the right for its personnel or its agents to enter the property or location on which the work herein contracted is being constructed on installed for the purpose of supervising and inspection the work for the purpose of construction or installing such collateral work as the OWNER may desire.

4.03 OWNER's Inspectors. It is agreed by the Contractor that the OWNER shall appoint such Engineer, supervisors, or inspectors as the said OWNER may deem necessary to inspect the material furnished and the work done under this Contract, to see that the said material is furnished, and to see that said work is done in accordance with the plans and specifications therefore. The Contractor shall furnish all reasonable aid and assistance required by the Engineer, supervisors, or inspectors for the proper inspection and examination of the work and all parts thereof. The Contractor shall regard and comply with the directions and instructions of the Engineer, supervisors, or inspectors so appointed when such directions and instructions are consistent with the obligations of this Contract.

4.04 Collateral Work. The OWNER reserves the right to provide all labor and material essential to the completion of work that is not included in this Contract either by a separate contract or otherwise. Any collateral work shall be executed in such a manner that it will not damage the Contractor nor delay the progress of the work being accomplished under this Contract. The respective rights of and operations of the various interests involved shall be established and coordinated by the Engineer.

4.05 Environmental Assessment. The OWNER will provide completed and approved Environmental Information Documents to the Contractor for each job site concurrent with the issuance of the Notice To Proceed. The Contractor may proceed with the preparation of submittal and site design upon receipt of the Notice of Award.

4.06 Right-of-Way. Easements across private property and lands needed for construction under this Contract will be provided by the OWNER.

4.07 Adequacy of Design. It is agreed that the OWNER shall be responsible for the adequacy of the design, sufficiency of the Contract Documents, the safety of the structure and practicability of the operations of the completed project; provided the Contractor has complied with the requirements of the said Contract Documents, all approved modifications thereof, and additions and alterations thereto approved in writing by the OWNER. The burden of proof of such compliance shall be upon the contractor to show that he has complied with said requirements of the Contract Documents, approved modifications thereof and all approved additions and alterations thereto.

5. SCHEDULING AND PROGRESS OF WORK

5.01 Order and Execution of the Work. It is the meaning and intent of this Contract, unless otherwise herein specifically provided, that the Contractor shall be allowed to execute his work at such times and seasons in such order of precedence and in such manner as shall be most conducive to economy of construction; provided however, that the order and time of execution shall be such that the work shall be completed as a

whole or in part in accordance with this Contract within the time of completion hereafter designated; provided also that the Engineer may direct the time and manner of constructing any part or parts of the work when in his opinion such should be given priority to lessen the probability of danger to the public or to anticipate seasonal hazards from the elements or to coordinate with other work being done for or by the OWNER.

5.02 Rate of Progress. The Contractor shall give the Engineer full information in advance as to his plans for carrying on any part of the work. If at any time prior to the start or during the progress of the work any part of the Contractor's plant or equipment or any of his methods of executing the work appear to the Engineer to be unsafe, inefficient, or inadequate to insure the required quality or rate of progress of the work, the Engineer may order the contractor to increase or improve his facilities or methods, and the Contractor shall promptly comply with such orders; failure to comply will result in placing Contractor in abandonment per Section 8 "Abandonment of Contract by Contractor," but neither compliance with such orders nor failure of the Engineer to issue such orders shall release the Contractor from his obligation to secure the degree of safety, the quality of work, and the rate of progress required by this Contract. The Contractor alone shall be responsible for the safety, adequacy, and efficiency of his plant, equipment, and methods.

5.03 Sunday, Holiday and Night Work. Except in connection with the care, maintenance, or protection of equipment or of work already done, no work shall be done between the hours of 6:00 p.m. and 7:00 a.m. or on Sundays or legal holidays without consent of the Engineer.

5.04 Hindrances and Delays. No claims shall be made by the Contractor for damages, hindrances, or delays from any cause during the progress of any portion of the work embraced by this Contract except where the work is stopped by order of the OWNER. If the OWNER stops the work for just cause because the contractor is not complying with the plans and specifications or the intent thereof, the Contractor shall have no claim for damages, hindrances, or delays. However, if the OWNER stops the work for any other reason, the Contractor shall be
entitled to reimbursement paid by the OWNER for such expenses actually incurred which in the judgment of the Engineer occurred as a result of the work
stoppage.

Should delays repeatedly occur due to the Contractor's failure to provide adequate plant, equipment, or personnel, or where the Engineer determines that unreasonable inconvenience to the public is due to such failure, the Contractor's operations shall be suspended until he shall have provided adequate plant, equipment, and personnel to properly resume and continually execute the work.

5.05 Extensions of Time. Should the Contractor be delayed in the final completion of the work by an act or neglect of the OWNER or Engineer, or of any employee of either, or by any other contractor employed by the OWNER, or by strikes, fire or other cause or caused outside of and beyond the control of the Contractor and which the Engineer determines could have been neither anticipated nor avoided, then an extension of time sufficient to compensate for the delay as determined by the Engineer shall be granted by the OWNER; provided, however, that the Contractor shall give the OWNER prompt notice in writing of the cause of delay in each case. Extensions of time will not be granted for delays caused by unfavorable weather, unsuitable ground conditions or inadequate construction force.

5.06 Liquidated Damages for Failure to Complete on Time. The Contractor agrees that time is of the essence on this Contract and that the definite value of damages which would result from delay would be incapable of ascertainment and uncertain, so that for each day of delay beyond the number of days herein agreed upon for the completion of the work herein specified and contracted for, after due allowance for such extension of time as is provided for under the provisions of the preceding paragraph, the OWNER may withhold permanently form the Contractor's total compensation, not a penalty but as liquidated damages, the sum per day given in the following schedule:

Amount of Contract			Amount of Liquidated Damages per Day
Less than		$ 5,000.00	$ 30.00
$ 5,001.00	to	15,000.00	35.00
15,001.00	to	25,000.00	40.00
25,001.00	to	50,000.00	50.00
50,001.00	to	100,000.00	70.00
100,001.00	to	500,000.00	200.00
500,001.00	to	1,000,000.00	300.00
1,000,001.00	to	2,000,000.00	400.00
2,000,001.00	to	5,000,000.00	500.00

6. INDEMNITY

6.01 Contractor's Indemnity Provision. To protect the OWNER from the Contractor's failure to perform any of the foregoing duties or any of the terms of this Contract, the Contractor shall indemnify and save harmless the OWNER and the OWNER's agents and employees from all losses, damages, judgments, decrees, and expenses or costs of any nature whatsoever arising out of or in any way connected with any claims or actions at law or in equity brought against the OWNER and the OWNER'S agents and employees for the death or injury to persons or for damage to property caused, or allegedly caused, by any willful acts, negligence, nuisance, or breach of any term or condition of this Contract by the Contractor, his agents, servants, subcontractors, or employees. The contractor shall furthermore indemnify and save harmless the OWNER and the OWNER'S agents and employees from all demands of subcontractors, workers, material persons, or suppliers of machinery and part thereof, equipment, power tools, and supplies incurred in connection with work to be performed under this Contract. Property of any description, including property of the OWNER, which shall be damaged in the performance of this Contract by the Contractor, his agents, employees, subcontractors or their employees and subcontractors shall be restored to its condition prior to damage by the Contractor at the Contractor's expense.

6.02 Workmen's Compensation Insurance. The Contractor agrees to comply with the Workmen's Compensation Act of the State of Texas, and to pay or cause to be paid all compensation, medical or other benefits, which may become due or payable thereunder, and to protect and indemnify the OWNER and the OWNER'S agents and employees from and against any and all liabilities by reason of accidental injury, disease, or death sustained by subcontractor's employees. The Contractor shall furnish the OWNER with a certificate from the industrial Accident Board evidencing the contractor's and subcontractor's compliance with said statute.

6.03 Comprehensive General Liability Insurance. The Contractor shall provide and maintain during the life of this Contract and until all work under said Contract has been completed and accepted by the OWNER, a Comprehensive General Liability insurance policy, said policy and the issuing carrier approved by the OWNER, which specifically insures the contractual liability of the contractor assumed under Paragraph 6.01 above entitled "Contractor's Indemnity Provision." The Liability limits for the Comprehensive General Liability insurance coverage under this policy shall not be less than the following:

Bodily Injury	$500,000 each person $1,000,000 each accident
Property Damage	$250,000 each accident $250,000 aggregate

A $1,000,000 umbrella coverage shall also be required.

6.04 OWNER'S Protective Insurance. The contractor shall provide and maintain during the life of this Contract and until all work under said Contract has been completed and accepted by the OWNER, and OWNER'S, Engineer's and Contractor's Protective Policy which co-insures the OWNER, Engineer, and the OWNER'S agents and employees with the same comprehensive General Liability coverage as described in Paragraph 6.03 above entitled "Comprehensive General Liability Insurance."

6.05 Comprehensive Automobile Liability Insurance. The Contractor shall provide and maintain during the life of this Contract and until all work under said Contract has been completed and accepted by the OWNER, a Comprehensive Automobile Liability insurance policy, said policy and issuing carrier approved by the OWNER, covering the operation on or off the site of the work of all motor vehicles licensed for highway use, whether they are owned, non-owned, or hired by the Contractor, in which shall specifically insure contractual liability of the Contractor assumed under the above Paragraph 6.1 entitled "Contractor's Indemnity Provision." The liability limits for the comprehensive Automobile Liability insurance coverage shall not be less than the following:

Bodily Injury	$250,000 each person $500,000 each accident
Property Damage	$500,000 each accident

6.06. Insurance Certificate. In connection with the insurance coverage set out in Sections 6.02, 6.03, 6.04, and 6.05 above, the Contractor shall furnish the OWNER with a certificate verifying said insurance. The Owner shall be listed as the Certificate holder, and the Owner and Engineer shall be named as additional insured. Said certificate shall state the OWNER shall be given 10 days advance written notice before any provision of the policies are changed or in the event said policies shall be canceled. This Certificate of Insurance shall be provided the OWNER prior to starting any construction work in connection with this Contract.

7. TERMINATION OF CONTRACT

7.01 Right of OWNER to Terminate. If the Contractor should be guilty of substantial violation of the Contract or any provision thereof, the OWNER, upon certification by the Engineer as to the nature and extent of such violation, may without prejudice to any other resources or remedy give the contractor written notice of termination of the employment of the contractor 10 days subsequent to such notice. Immediately following such date the OWNER may take possession of the site of the work and all material, equipment, tools, and appliances thereon and may finish the work in accordance with the provisions of Section 8 "Abandonment of Contract by Contractor," of these General Conditions.

7.02 Right of Contractor to Terminate. If work should be stopped by order of any public authority or court through no act or fault of the Contractor for a period of three (3) months or if the OWNER should substantially fail to perform the provisions of the Contract with regard to OWNER'S obligations to the contractor, then the contractor may, upon 10 days written notice to the OWNER, terminate this Contract and recover from the OWNER payment for all completed work.

7.03 Removal of Equipment. In the event that the Contract should be terminated for any reason whatsoever, the OWNER may request the contractor in writing to remove any or all of his equipment, tools, and supplies, and the contractor shall comply with the request within 10 days after receipt of the notice. Should he fail to do so within 10 days after receipt of such notice, the OWNER shall have the right to remove such equipment and supplies at the expense of the Contractor and to place such equipment, tools and supplies in storage at

the risk and expense of the Contractor.

8. ABANDONMENT OF CONTRACT BY CONTRACTOR

8.01 Notification of Contractor. If the contractor should abandon and fail or refuse to resume work within 10 days after written notification from the OWNER or the Engineer of if the Contractor fails to comply with the orders of the engineer when such orders are consistent with this contract or with the specifications hereto attached, then the Contractor shall be deemed as having abandoned the Contract. In such event the SURETY on the bond shall be notified in writing and directed to complete the work, and a copy of said notice shall be delivered to the Contractor.

8.02 Retention of Contractor's Equipment and Materials by OWNER. After receiving said notice of abandonment the contractor shall not remove from the work any machinery, equipment, tools, materials, or supplies then on the job, but the same together with any materials and equipment under contract for the work may be held for use on the work by the OWNER or the SURETY on the performance bond or another contractor in completion of the work; and the Contractor shall not receive any rental or credit therefore except when used in connection with extra work where credit shall be allowed as provided for under Section 2.12 entitled "Extra Work," it being understood that the use of such equipment and materials will ultimately reduce the cost to complete the work and will be reflected in the final settlement.

8.03 Methods of Completing the Work. If the SURETY should fail to commence in compliance with the notice for completion provided within 10 days after service of such notice, then the OWNER may provide for completion of the work in either of the following elective manners:

a. The OWNER may employ such force of workers and use such machinery, equipment, tools, materials, and supplies as said OWNER may deem necessary to complete the work and charge the expense of such labor, machinery, equipment, tools, material, and supplies to said Contractor, and the expense so charged shall be deducted and paid by the OWNER out of such monies as may be due or that may thereafter at any time become due to the Contractor under and by virtue of this Contract. In case such expense is less than the sum which would have been payable under this Contract if the same had been completed by the Contractor, then said Contractor shall receive the difference. In case such expense is greater than the sum which would have been payable under this contract if the same had been completed by said Contractor, then the Contractor or his SURETY shall pay the amount of such excess to the OWNER.

b. The OWNER under sealed bids, after 14 days' notice published two or more times in a newspaper having a general circulation in the county of location of the work, may let the contract for the completion of the work under substantially the same terms and conditions which are provided in this Contract. In case of any increase in cost to the OWNER under the new contract as compared to what would have been the cost under this Contract, such increase shall be charged to the Contractor, and the SURETY shall be and remain bound therefore. However, should the cost to complete any such new contract prove to be less than what would have been the cost to complete under this Contract, the Contractor or his SURETY shall be credited therewith.

8.04 Final Acceptance. When the work has been completed the Contractor and his SURETY shall be so notified and a Contract Completion Certificate as hereinafter provided shall be issued. A complete itemized statement of the Contract amounts certified by the Engineer as being correct shall then be prepared and delivered to the Contractor and his SURETY, whereupon the contractor, his SURETY, or the OWNER, as the case may be, shall pay the balance due as reflected by said statement within 15 days after the date of such Contract Completion certificate.

8.05 Disposition of Contractor's Equipment. In the event the statement of accounts shows that the cost to

complete the work is less than that which would have been the cost to the OWNER had the work been completed by the Contractor under the terms of this Contract or when the Contractor or his SURETY pay the balance shown to be due by them to the OWNER, then all machinery, equipment, tools, materials, or supplies left on the site of the work shall be turned over to the Contractor or his SURETY. Should the cost to complete the work exceed the contract price, and the contractor or his SURETY fail to pay the amount due the OWNER within the time designated, and there remains any machinery, equipment, tools, materials, or supplies on the site of the work, notice thereof together with an itemized list of such equipment and materials shall be mailed to the Contractor and his SURETY as the respective addresses designated in this Contract; provided, however, that actual written notice given in any manner will satisfy this condition. After mailing or other giving of such notice such property shall be held by the OWNER at the risk of the Contractor or his SURETY subject only to the duty of the OWNER to exercise ordinary care to protect such property. After 15 days from the date of said notice the OWNER may sell such machinery, equipment, tools, equipment, or supplies and apply the sum derived from such sale to the credit of the Contractor and his SURETY. Such sale may be made at either public or private sale, with or without notice, as the OWNER may elect. The OWNER shall release any machinery, equipment, tools, materials, or supplies which remain on the work and belong to persons other than the Contractor or his SURETY to their proper OWNERS.

9. MEASUREMENT AND PAYMENT

9.01 Character of Measurements. No extra or customary measurements of any kind will be allowed, but the actual length, area, solid contents, number, and weight only shall be considered unless otherwise specifically provided.

9.02 Estimates vs. Actual Quantities. Any and all estimated quantities stipulated in the proposal form under unit price items are approximate and are to be used only (a) as a basis for estimating the probable cost of the work and (b) for the purpose of comparing the proposals submitted for the work. It is understood and agreed that the actual amounts of work done and materials furnished under unit price items may differ from such estimated quantities and that the basis of payment for such work and materials shall be for the actual amount of such work done and the actual quantity of materials furnished.

The Contractor agrees that he will make no claim for damages, anticipated profits, or otherwise on account of any difference between the amounts of work actually performed and materials actually furnished and the amounts estimated therefore in the proposal or other Contract Documents; provided, however, that if the actual quantity of any item should become as much as 25 percent more than or 25 percent less than the estimated or contemplated quality for such items, then either party to this Contract shall be entitled upon demand to a revised consideration on the portion of the work above or below 25 percent of the estimated quantity prior to initiating work or furnishing materials for the overrun or under-run quantities. Such revised consideration shall be determined by agreement between the parties or otherwise by the terms of this Contract as provided under Section 2.12 entitled "Extra Work."

9.03 Payment. In consideration of the furnishing of all the necessary labor, equipment, and material and the completion of all work by the Contractor, and on the completion of all work and the delivery of all material embraced in this Contract in full conformity with the specifications and stipulations contained herein, the OWNER agrees to pay the Contractor the amounts set forth in the proposal attached hereto which has been made a part of this Contract. The Contractor hereby agrees to receive such amounts in full payment for furnishing all material and all labor required for the aforesaid work, for all expense incurred by him, and for well and truly performing the same and the whole thereof in the manner and according to this Contract, the attached specifications, and requirements of the Engineer.

9.04 Monthly Estimates and Payments. On or about the fifth day of each month the Engineer will make an approximate estimate of the value of work done in conformity with the plans and specifications during the previous calendar month. The Contractor shall furnish to the Engineer such detailed information as he may request to aid him as a guide in the preparation of monthly estimates. After each such estimate shall have

been approved by the OWNER, the OWNER shall pay to the Contractor 90 percent of the amount of such estimated sum on or before the 25th day of said month. It is understood, however, that in case the whole work is near to completion and some unexpected or unusual delay occurs due to no fault or neglect on the part of the Contractor, the OWNER upon written recommendation of the Engineer, pay a reasonable and equitable portion of the retained percentage to the Contractor.

9.05 Certificates of Completion. Within 10 days after the Contractor has given the Engineer notice that the work has been completed, the Engineer shall inspect the work and satisfy himself by examination and test that the work has been finally and fully completed in accordance with the plans, specifications and contract. If so, the Engineer shall issue a Contract Completion Certificate to the OWNER and the Contractor. Such certificate when issued shall constitute final acceptance of the work covered under this Contract.

9.06 Final Estimate and Payment. After the Contract Completion Certificate has been issued, the Engineer shall proceed to make final measurements and to prepare a final estimate of the work done and materials furnished under this Contract and the value thereof. The Engineer shall certify the Final Estimate and submit it to the OWNER within five (5) days from the date of the Contract Completion Certificate.

The OWNER shall pay the Contractor within 15 days from the date of the Contract Completion Certificate the entire sum shown due on the certified Final Estimate prepared by the Engineer after deducting all amounts to be kept and retained under any provision of this Contract. However, it is to be specifically understood that the final payment will not be paid by the OWNER to the Contractor under any circumstances until the Notarized Affidavit required by Section 9.07 entitled "Notarized Affidavit," has been submitted to the Engineer.

All prior estimates and payments shall be subject to correction in the final estimate and payment; but in the absence of error or manifest mistake, it is agreed that all estimates, when approved by the OWNER, shall be conclusive evidence of the work done and materials furnished.

9.07 Notarized Affidavit. Before final payment for the work by the OWNER, the Contractor shall submit to the Engineer a notarized affidavit in duplicate stating under oath that all subcontractors, vendors, and other persons or firms who have furnished or performed labor or furnished materials for the work have been fully paid or satisfactorily secured. Such affidavit shall bear or be accompanied by a statement, signed by the SURETY Company who provided the performance bond for the work, to the effect that said SURETY Company consents to final payment to the contractor being made by the OWNER.

9.08 Release of Liability. The acceptance by the Contractor of the last payment shall operate as and shall be a release to the OWNER and every officer and agent thereof from all claims and liability hereunder for anything done or furnished for or relating to the work or for any act or neglect of the OWNER or of any person relating to or affecting the work.

9.09 Contractor's Obligation. Neither the Contract Completion Certificate nor the final payment nor any provision in the Contract Documents shall relieve the contractor of the obligation for fulfillment of any warranty which may be required in the Contract Documents.

9.10 Payments Withheld. The OWNER may on account of subsequently discovered evidence, withhold or nullify the whole or part of any payment to such extent as may be necessary to protect himself from loss on account of:

a. Defective work not remedied.
b. Claims filed or reasonable evidence indicating probable filing of claims.
c. Failure of the Contractor to make payments properly to subcontractors or for material or labor.
d. Damage to another contractor.

When the above grounds are removed or the Contractor provides a SURETY Bond satisfactory to the OWNER, which will protect the OWNER in the amount withheld, payment shall be made for amounts withheld because of them.

END OF SECTION

SPECIAL CONDITIONS OF THE AGREEMENT

City of Copperas Cove – Technology Building Site Work

SECTION 01: INFORMATION

1.01 COPIES OF PLANS AND SPECIFICATIONS FURNISHED

The Agreement will be prepared in not less than seven (7) counterpart (original signed) sets. OWNER will furnish Contractor two (2) sets of conforming Contract Documents, Technical Specifications and Plans free of charge, and additional sets will be obtained from the Engineer at commercial reproduction rates plus 20% for handling.

1.02 GOVERNING CODES

All construction as provided for under these Plans and Specifications shall be governed by any existing Resolutions, Codes and Ordinances, and any subsequent amendments or revisions thereto as set forth by the OWNER.

1.03 ADDITIONAL SPECIFICATIONS

All work shall be performed according to the plans and specifications provided herein. If an item of work is not covered within the specifications, the appropriate City of Copperas Cove Standard Specifications shall prevail.

1.04 PAY ESTIMATES

If pay estimates from the Contractor are not received by the Engineer on or before the time specified in Section 9.04 of the General Conditions, then the pay estimate will not be processed and will be returned to the Contractor.

SECTION 02: SPECIAL CONSIDERATIONS

2.01 CROSSING UTILITIES

Prior to commencing construction, it shall be the Contractor's responsibility to make arrangements with the OWNERs of such utility companies to uncover their particular utility lines or otherwise confirm their location. Certain utility companies perform such services at their own expense, however, where such is not the case, the Contractor will cause such work to be done at this own expense.

2.02 "AS-BUILT" DRAWINGS

The Contractor shall mark all changes and revisions on all of his copies of the working drawings during the course of the Project as they occur. Upon completion of the Project and prior to final acceptance and payment, the Contractor shall show field locations of all above ground appurtenances, including but not limited to, valves, fire hydrants and manholes. Each appurtenance shall be located by at least two horizontal distances measured from existing, easily identifiable, immovable appurtenances such as fire hydrants or valves. Property pins can be used for as-built tie-ins provided no existing utilities as previously described are available. Costs for developing as-built drawings shall be subsidiary to other bid items. Prior to submission of final as-built drawings to the Engineer, the Contractor shall meet with representatives of the OWNER and Engineer on the site to verify the accuracy and completeness of the as-built drawings.

2.03 LANDS FOR WORK

OWNER provides, as indicated on the drawings, land upon which work is to be done, rights-of-way for access to some and such lands which are designated for use of Contractor. Contractor provides, at his expense and without liability of OWNER, any additional land and access thereto that may be required for his construction operations, temporary construction facilities, or for storage of materials.

2.04 UTILITY SERVICES FOR CONSTRUCTION

The Contractor will be responsible for providing his own utility services during construction. No additional payment will be made for this item.

2.05 GUARANTEES

Guarantee work, including equipment installed, to be free from defects due to faulty workmanship or materials for a period of one (1) year from the date of final acceptance by the OWNER. Upon notice from OWNER, repair defects in all construction which develop during specified period at no cost to the OWNER. Neither final acceptance, Certificate of Completion, final payment, nor any provision in Contract Documents relieves the Contractor of above guarantee. Notice of observed defects will be given with reasonable promptness. Failure to repair or replace defect upon notice entitles OWNER to repair or replace same and recover reasonable cost thereof from Contractor.

2.06 DEVIATIONS OCCASIONED BY UTILITY STRUCTURES

Whenever existing utilities, not indicated on the Plans, present obstructions to grade and alignment of pipe, immediately notify Engineer, who without delay, will determine whatever existing improvements are to be relocated, or grade and alignment of pipe changed. Where necessary to move existing services, poles, guywires, pipelines, etc., as determined by the Engineer, the Contractor will make arrangements with the OWNER of the utility to be moved and have it moved. The cost of any utility relocation will be at the Contractor's sole expense. OWNER will not be liable for relocation costs or damages on account of delays due to changes made by OWNER'S of privately owned utilities which hinder progress of the work.

2.07 MINIMUM WAGE SCALE / PREVAILING WAGE RATES

Minimum wage scale as specified and regulated by the State of Texas and the Federal Government.

The Contractor or a subcontractor of the Contractor shall pay not less than the rates as determined by the Davis-Bacon Wage Determinations for Travis County Heavy construction, General Decision TX20070041, or current.

2.08 LIMIT OF FINANCIAL RESOURCES

The OWNER has a limited amount of financial resources committed to this Project; therefore, it shall be understood by all Bidders that the OWNER may be required to change and/or delete any times which OWNER may feel is necessary to accomplish all or part of the scope of work within its limit of financial resources.

Contractor shall be entitled to no claim for damages for anticipated profits on any portion of work that may be omitted. At any time during the duration of this Contract, the OWNER reserves the right to omit any work from this Contract. Unit prices for all items previously approved in this Contract shall be used to delete or add work per change order.

2.09 CONSTRUCTION REVIEW

The OWNER shall provide a project representative to review the quality of materials and workmanship.

2.10 LIMITS OF WORK AND PAYMENT

It shall be the obligation of the Contractor to complete all work included in this Contract, so authorized by the OWNER, as shown on the drawings or described in the Contract Documents and Technical Specifications. All items of construction not specifically paid for in the bid schedule shall be included in the unit price bids. Any questions arising as to the limits of work shall be left up to the interpretation of the Engineer.

2.11 PAYMENT FOR MATERIALS-ON-HAND

OWNER shall pay for 90% of amount of materials-on-hand in accordance with monthly estimate procedure stipulated in the General Conditions of the Agreement.

2.12 CONSTRUCTION STAKING

The Contractor shall provide construction staking for this Project. The Contractor shall furnish and pay for any re-staking.

Protection of Stakes, Marks, Etc.

All engineering and surveyor's stakes, marks, property corners, etc. shall be carefully preserved by the Contractor, and in case of destruction or removal during the course of this Project, such stakes, marks, property corners, etc. shall be re-staked by the Contractor at the Contractor's sole expense without additional compensation by the OWNER.

The Contractor shall furnish to the OWNER, at the Contractor's expense, the Engineer's certification that all property pins are in place prior to his moving off the job site. Such certification will be expected of each Contractor involved with the time periods specified:

1. Street Contractor - after subgrade, before Utility contractor moves in.
2. Utility Contractor - after utilities are installed, before installation of gas.
3. Gas Contractor -after gas installation, before Street Contractor moves back in.
4. Street Contractor - after streets installed, before final acceptance.

SECTION 03: INSURANCE

Insurance policies must be obtained by the Contractor or separate endorsement obtained by his existing insurance policies on projects that involve special hazards, such as blasting, excavation on public properties, etc.
The principal types of insurance which will be necessary are:

Comprehensive general liability insurance.
The Contractor shall provide and maintain during the life of this Contract, and until all work under said Contract has been completed and accepted by the OWNER, a Comprehensive General Liability insurance policy, said policy and the issuing carrier approved by the OWNER, which specifically insures the contractual liability of the Contractor assumed under Paragraph 6.01 in the General Conditions entitled "contractor's Indemnity Provision." The liability

coverage under this policy shall cover Independent Contractors. Liability limits for the Comprehensive General Liability insurance coverage under this policy shall not be less than the following:

Bodily Injury	$300,000 each person $300,000 each accident
Property Damage	$100,000 each accident $100,000 aggregate

A $500,000 umbrella coverage shall also be required.

Public Liability and Property Damage to protect the Contractor, any of his subcontractors, the OWNER, and the Engineer against claims arising from personal injury, including accidental death, as well as claims for property damage.

The amount for liability is $250,000/$500,000. The amount for property damage is $100,000 per accident.

Automobile and Truck Public Liability and Property Damage to protect the same individuals as indicated under Public Liability and Property Damage above, and in the same amount of liability.

Worker's Compensation and Employer's Liability.

Builder's Risk Insurance is necessary to cover loss of or damage to the building materials while the Project is under construction.

The contractor shall supply to the OWNER a Certificate of Insurance, on a form supplied by the insurance companies or a form similar to the attached sample from the Contractor prior to the start of work.

Owner's Protective as required by the General Conditions of the Agreement.

END OF SECTION

ABBREVIATIONS

City of Copperas Cove – Technology Building Site Work

PART 1. GENERAL

1.01 SCOPE OF WORK

A. Whenever in these Contract Documents the following abbreviations are used, the intent and meaning shall be Interpreted as follows:

AA	Aluminum Association
AAMA	Architectural Aluminum Manufacturers' Association
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturers' Association
AGA	American Gas Association
AGMA	American Gear Manufacturers' Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
APA	American Plywood Associations
API	American Petroleum Institute
AREA	American Railway Engineering Association
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers' Association
AWPB	American Wood Preservers' Bureau
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builder's Hardware Manufacturers' Association
CBMA	Certified Ballast Manufacturers' Association
CDA	Copper Development Association
CISPI	Cast Iron Soil Pipe Institute
CMAA	Crane Manufacturers' Association of America
CRSI	Concrete Reinforcing Steel Institute
Fed. Spec.	Federal Specialist
HI	Hydraulic Institute
HMI	Hoist Manufacturers' Institute
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IPCEA	Insulated Power Cable Engineer's Association
MMA	Monorail Manufacturers' Association
NACE	National Association of Coatings Engineers
NBMA	National Builders' Hardware Association
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NESC	National Electric Safety Code
NFPA	National Fire Protection Association
NLMA	National Lumber Manufacturers' Association
NWMA	National Woodwork Manufacturers' Association
OECI	Overhead Electrical Crane Institute
OSHA	Occupational Safety and Health Act (both Federal & State)
PS	Product Standards Sections – U.S. Department of Commerce
RMA	Rubber Manufacturers' Association
SAE	Society of Automotive Engineers
SSPC	Steel Structures Painting Council
TCA	Tile Council of America
TEMA	Tubular Exchanger Manufacturers' Association
UBC	Uniform Building Code
UL	Underwriter's Laboratories, Inc.
WWPA	Western Wood Product Association

END OF SECTION

STANDARD

CONSTRUCTION SPECIFICATIONS

OF THE

CITY OF COPPERAS COVE, TEXAS

FEBRUARY 1980 - REVISED 1990

AN ORDINANCE

AN ORDINANCE AMENDING THE CODE OF ORDINANCES OF THE CITY OF COPPERAS COVE, TEXAS, BY AMENDING SECTION 8-2 ADOPTING THE STANDARD CONSTRUCTION SPECIFICATIONS OF THE CITY OF COPPERAS COVE DATED FEBRUARY 1980 AND ANY SUBSEQUENT REVISIONS THERETO:

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF COPPERAS COVE, TEXAS, That the Code of Ordinances, City of Copperas Cove, Texas, Section 8-2 be amended to read as follows:

SECTION 1: The attached Standard Construction Specifications of the City of Copperas Cove dated February 1980 and any subsequent revisions thereto are included as a part of this ordinance. All facilities constructed within the existing public right-of-way or newly dedicated right-of-way shall conform to the applicable provisions of these Standard Construction Specifications of the City of Copperas Cove, including any subsequent revisions, or to the Standard Construction Specifications in effect when the work is accomplished.

SECTION 2: Considering the fact that the existing City of Copperas Cove plumbing ordinance of April 15, 1956, now covers construction operations as performed by Plumbers in the City limits, this ordinance shall not be construed to include plumbing operations when such operations are being conducted from a point two (2) feet behind the curb line, or future curb line, to and including the plumbing for the building to be served. However, when a plumbing contractor exceeds these limits, his operations shall be deemed those of a contractor and in this case, shall be governed by these specifications and this ordinance.

SECTION 3: This ordinance shall not be construed to include a person, individual partnership, corporation which constructs or contracts to construct a building which will receive service from City owned utility lines and appurtenances, said persons being included under existing ordinances.

SECTION 4: In the event any section, sub-section, sentence, clause or phrase of this ordinance shall be declared or adjudged invalid or unconstitutional, such adjudication shall in no means affect any other sections, sub-sections, sentences, clauses or phrase of this ordinance, but all the rest hereof shall be in full force and effect just as though the section, sub-section, sentence, clause or phrase so declared are adjudged invalid or unconstitutional was not originally a part hereof.

SECTION 5: All ordinances or part of ordinances inconsistent or in conflict with the provisions of this ordinance shall be void and the same are hereby repealed.

PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF COPPERAS COVE, TEXAS this 19th day of FEBRUARY, 1980, at which meeting a quorum was present.

/s/ R.D. Mitchell
MAYOR
City of Copperas Cove, Texas

ATTEST:
/s/ Rose E. Mansfield
Rose E. Mansfield, City Secretary

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GENERAL PROVISIONS

1. DEFINITIONS: The following definitions of terms as used in the Technical Specifications and elsewhere shall apply:

   City shall refer to the governing body of the City of Copperas Cove or to the office or employees to which or to whom appropriate authority has been delegated.

   City Manager shall refer to the City Manager or to his designated representative.

   City Engineer, or Engineer shall refer to the staff City Engineer or to a representative designated by the City Manager.

   Approved - where the word "approved" or the phrase "as approved" appears in the Standard Specifications, it shall be construed to refer to approval by the City Engineer or the City Manager.

   City Inspector or Inspector shall refer to the City Engineer or any duly authorized representative of the Engineer who is performing field inspection of the work.

   Developer, Sub-Divider, or Contractor - these terms shall be construed as referring to the individual(s) or firm(s) alike who are responsible for the work within the public right-of-way and is not intended to differentiate between the individuals or firms for the purpose of settling responsibility.

   Public Right-of-Way for the purpose of these specifications shall include all publicly owned or controlled property within the property lines established by approved plats, deeds, or easements.

2. APPLICABILITY: These standards are intended to apply primarily to the design and construction of new developments, subdivisions, or additions to the City of Copperas Cove. However, they may be used also for contract work directly with the City for work within previously developed areas, as applicable and as stipulated in the Contract.

3. PLANS AND PROCEDURES: Prior to initiation of any construction work in connection with any planned development, subdivision or addition within the City or proposed for annexation, the developer shall submit plats, plans, drainage studies, and other data for approval as required by the current Subdivision Ordinance, these specifications and any current revisions thereto, and any other applicable Ordinances or Standards in effect at the time of application. Prior to final approval and acceptance of the plat, plans shall be sufficiently complete to permit engineering review and approval of the proposed work, and shall include as a minimum plans and profiles of streets, drainage facilities, and gravity sewer lines. Plans shall also include locations, sizes, and other pertinent data for water lines, force mains, lift stations, and off-site work required to connect to existing facilities. The amount of detail required shall be commensurate with the size and complexity of the project. However, all plans will be required to conform to all applicable provisions of these Standard Specifications.

4. CONSTRUCTION PROCEDURES:

   A. Contractor's Public Responsibility:

(1) The Contractor shall at all times conduct the work in such manner as to insure the least possible obstruction to public traffic and protect the safety of the public. Public safety and convenience and provisions therefore made necessary by the work shall be the direct responsibility of the Contractor and shall be performed at his entire expense. Materials placed on the site, or materials excavated and the construction materials or equipment used shall be located so as to cause as little obstruction to the public as possible. The Contractor shall at all times conduct his operations and the use of construction machinery, so as not to damage or destroy improvements, trees and shrubs located adjacent to the site of the work. Whenever any such damage may be done, the Contractor shall immediately satisfy all claims of the property owners.

(2) The Contractor shall at all times conduct the work in such manner as to insure no damage to existing utilities or other facilities. However, in the event that damage is done to existing utilities, the Contractor shall repair and replace them immediately and at his entire expense. In the event public facilities are damaged which cannot be replaced or repaired by the Contractor, the Contractor shall inform the City or the Utility Company involved and will reimburse them for the replacing or repairing of the item damaged. This reimbursement shall be a prerequisite to any acceptance of the construction which was responsible for the damage.

(3) The Contractor shall save harmless the City from his operations, shall provide bonds, insurance, etc., as required by law.

(4) Contractor shall be an Equal Opportunity Employer and comply with all applicable regulations.

B. QUALITY CONTROL:

(1) Materials - The Contractor shall furnish such evidence as may be requested by the City Engineer that materials furnished for incorporation in the work comply with the requirements of these Standard Specifications. Manufacturer's Certifications, certified copies of independent laboratory tests, shop drawings, catalog literature, or similar data will normally be considered sufficient. Any materials not meeting specification requirements shall be removed from the site.

(2) Construction:

(a) If work is being performed as a part of a new subdivision the City shall determine the need for laboratory and field testing to assure that materials and construction complies with the requirements of the plans and specifications. Generally, laboratory and field testing requirements will not exceed those set out below for other than new subdivisions. All costs shall be paid by the subdivider. Should test results indicate failure to comply, the subdivider shall also pay for additional tests required to assure compliance.

(b) If work being performed is not a part of a new subdivision, the Contractor shall be responsible for the cost of tests required to assure compliance with the specifications on the following basis:

1) A modified Proctor Density test for each type of material to be used in all types of construction where density requirements are specified.

2) One field density test for each type of material in each section, however short that section may be; in the case of a street more than four-hundred (400) linear feet in length, there shall be

required one (1) for each four-hundred (400) linear feet of street constructed. All locations for tests shall be determined by the City inspector. Areas where failures occurred will be retested.

3) Where materials such as flexible base, sub-base, portland cement concrete and hot-mix asphaltic concrete are used, sufficient tests as determined by the City inspector will be made to assure compliance to specification requirements. Other materials may be accepted on the basis of manufacturers literature and grade markings at the option of the City Engineer.

4) All tests required by these specifications will be conducted by a commercial testing laboratory operating under the supervision of a registered professional engineer.

(3) Supervision and Inspection: The Developer or Contractor is responsible for compliance with the approved plans and the applicable provisions of these Standard Construction Specifications and shall furnish sufficient supervision to insure that the work is accomplished in a satisfactory manner. The City Engineer will inspect the work sufficiently to satisfy himself that the work does comply with all requirements. It shall be the Contractor's responsibility to keep the Engineer advised of scheduled work and to notify the Engineer when work is ready for inspection or acceptance, and no work or increments thereof will be accepted without inspection unless the requirement for inspection is waived by the Engineer.

(4) Reference Specifications and Standards : When specifications and standards such as ASTM, AASHO, AWWA, ASA, and other association standards are referenced in the specifications, it shall be interpreted to refer to the latest or current issue of the standard or specification.

(5) Standard Details: The Standard and Typical details and drawings bound in the back of these specifications shall be considered an extension of the plans and these specifications and any reference to the plans, specifications, and/or details shall be construed as including these details and drawings.

(6) Warranty: Notwithstanding any certificate or other indication of acceptance which may have been given by the City Engineer, if any materials, equipment or any workmanship which does not comply with the requirements of this contract shall be discovered within one (1) year after final completion of construction of the project, and acceptance by the Owner, the Contractor shall replace such defective materials or remedy any such defective workmanship within ten (10) days after notice in writing of the existence thereof shall have been given by the City or Engineer. In the event of failure by the Contractor to replace any such defective materials or equipment or to remedy defective workmanship as herein provided, the City may replace such defective materials or equipment or remedy such workmanship as the case may be and in such event the Contractor shall pay to the City the cost and expense thereof.

(7) Bridges, Culverts, and Special Drainage Structures: Requirements for design and construction of bridges, culverts, and special drainage structures are not included herein, and shall be subject to the approval of the City Engineer in all instances.

(8) Protection of Existing Utilities: Existing utilities are indicated on the City maps from available information. The Contractor is advised that any reference to or indication of existing utilities on these maps is solely for the City's general information and is not to be construed as indicating the exact location or number of said utilities. The locations shown on the maps relative to existing

utilities are based upon the best record and/or field information available. It shall be the Contractor's responsibility to verify the location of adjacent and conflicting utilities and to take all necessary precautions in order to protect all utilities encountered.

(9) Order of Work: Unless otherwise approved by the City Engineer, all rough grading for streets shall be accomplished prior to the installation of any underground utility systems. All utilities shall be completed prior to the subgrade preparation, construction of curb and gutter, and construction of the base course for the streets.

TECHNICAL SPECIFICATIONS

ITEM 1

TRENCHING AND BACKFILLING

1. General: All excavation, trenching and backfilling for utility lines and appurtenant structures shall conform to the requirements of this specification and to the applicable typical details attached to these specifications. The inspector shall have the right to limit the amount of trench opened in advance or left open after pipe laying.

2. Excavation: Trench excavation shall be to the lines and grades shown on the plans or standard details or as required by the specifications for the line work to be installed therein. The City inspector may direct or authorize deviations where appropriate at his discretion. Excavation for structures shall be sufficient to accommodate forms, where required. Overdepth excavation shall be avoided. All excavation, regardless of the materials encountered, shall be unclassified so far as payment is concerned.

3. Methods of Excavation: Excavation may be performed with any type of trenching or excavating equipment which is capable of cutting properly aligned trenches in whatever materials are encountered. All excavation shall be by open cut unless specifically required to be bored. Blasting will be permitted only when or where specifically approved by the City Manager in writing, and only in the manner specifically approved. Blasting shall conform to all Federal and State laws and Municipal Ordinances. When necessary to prevent caving or unduly hazardous working conditions, trench walls shall be sheathed and braced or shall be layed back from a point six (6) inches above the pipe. Where sheathing and bracing are used, sheathing shall remain in place until the pipe has been installed, tested for leaks and defects, repaired if necessary, and the earth backfill completed to a depth of two (2) feet unless ordered by the City Engineer to be left in place. (see also section on Trench Safety) If trenching for utilities indicates seepage of ground water into the area under the road bed subsurface drainage as approved by the City Engineer shall be installed.

4. Excavated Materials: All excavated material shall be piled in such a manner that it will not endanger the work in progress and will avoid blocking sidewalks and driveways or obstructing traffic. Driveways must be immediately cleared to permit free access. Gutters and drainage channels shall be kept clear, or other means of securing proper drainage shall be provided.

5. Dewatering: Where ground water is encountered, the water table shall be lowered so that all necessary work may be carried on in the dry. The water shall be kept down until the unit or section under construction is completed. No water shall be allowed to flow through or over unset concrete or through the completed line.

6. Use of Washed Gravel: Where ground water is encountered, four (4) inches of washed gravel will be placed the full width of the trench in lieu of the granular embedment upon which the pipe will rest. The City Engineer will direct the Contractor when and where to place washed gravel.

7. Existing Structures: At the expense of the Contractor, all existing structures, improvements and utilities shall be adequately protected from damage that may occur due to construction operations. Where construction comes in close proximity to existing structures or utilities, or if it becomes necessary to

move services, poles, guy wires, pipelines or other obstructions, the Contractor shall notify and cooperate with the utility or structure owner.

8. Backfill: Backfill shall be of three types: Granular embedment, Select Backfill, and Trench Backfill.

A. Granular Embedment shall be used under, around, and over all utility lines in accordance with the standard details for utility trenches, except that service lines in soil not containing rock may be installed wthout embedment. Granular embedment shall be defined as free flowing sand or mixed sand and pea gravel that is free of stone, organic material or clay and which material shall not form mud or muck when wet. This material may be an inferior grade or "pit-run" sand not normally considered satisfactory for construction purposes, and it may be used directly from pits without processing. No fine granular material will be installed by the Contractor without the Engineer's approval.

Granular embedment shall be replaced to a grade slightly higher than required for the grade. Wedging or blocking up of pipe will not be permitted. Each pipe section shall have a uniform bearing on the embedment for the length of the pipe, except for immediately at the joint. Embedment under either water or sewer lines shall amount to at least four (4) inches in earth cut and six (6) inches in rock cut. Ganular embedment over the pipe shall be at least six (6) inches.

Where sand of a quality meeting the requirements for granular embedment material is encountered in the trench excavation, it may be stockpiled and used in lieu of material from other sources. Compaction of granular embedment by flooding will not be permitted.

"Crusherfines" do not constitute approved embedment material.

B. Select Backfill: Select backfill shall be used for a depth of twelve (12) inches immediately below the base material of streets or other areas to be paved. Select backfill shall be of generally granular type material such as base material, road gravel, sand or sandy gravel, and shall have a Plasticity Index of not more than ten (10). Select backfill shall contain no rock larger than three (3) inches in its greatest dimension. Not more than fifty (50) percent of the material shall be rock, and not more than ten (10) percent shall be as large as three (3) inches. Not more than twenty-five (25) percent shall be clay or clay lumps. Select backfill shall be compacted to not less than ninety-five (95) percent of Modified Proctor Density, ASTM Designation D1667, in layers of not over four (4) inches in thickness. Compaction method shall be approved by City Engineer.

C. Other Trench Backfill: In areas outside of streets, drives, and in treets below select backfill material, etc., trench backfill above embedment material may be accomplished by the use of excavated material if the material is suitable for compaction and contains only an occasional rock up to eight (8) inches in greatest dimension.

Trench backfill in areas outside of streets, drives, etc., will not be tested for density, but the material shall be compacted and the entire area left in a neat and orderly condition with excess material mounding over the trench. After a suitable length of time to permit settling, the trench surface shall be brought to a smooth grade.

Trench backfill in streets below select backfill shall be compacted to ninety (90) percent modified Proctor Density.

9. Pavement Repair: Existing pavement shall be precut, sawed or scored so as to result in an event, straight cut. After completion of the trench backfill, and upon approval of the Engineer, on all paved streets other than gravel streets, the Contractor shall cut and excavate the surface and base of the streets back on each side of the trench to form a shoulder for the new base and surfacing. The base, if stone, shall then be replaced in three (3) inch layers tamped in place. On gravel streets, six (6) inches of road gravel shall be rolled in place to serve as a wearing surface. All cutbacks shall be to a neat, straight line, and the paving cut shall be made with a concrete saw and shall be parallel to the center line of the pipe. Where excess surfacing has been removed beyond the nominal limits of the ditch, such areas shall be kept to a minimum, and where excess of such areas shall be cut parallel to the pipe. All stone or gravel base or surface course shall be compacted to ninety-five (95) percent Modified Proctor Density, ASTM Designation D1557.

In all paved streets the trench shall be finished in a workmanlike manner with the same type of roadway which was removed so that the underlying courses, as well as the wearing surface, shall conform to the remainder of the roadway and shall be equal in every respect to the improvements existing prior to excavation.

TECHNICAL SPECIFICATIONS

ITEM 2

CONCRETE

1. Description: The requirements of this item shall govern for all concrete for structures, curb and gutter, and incidentals or miscellaneous construction.

   Concrete shall be composed of Normal Portland Cement or High Early Strength Cement, coarse aggregate, fine aggregate and water proportioned and mixed as hereinafter provided in these specifications.

2. Materials:

   A. Cement: Only one brand of cement shall be used in any one (1) structure, except by written permission of the City Engineer. When such permission is granted and more than one (1) brand is used in one (1) structure, the resulting concrete shall be uniform in color.

      Portland Cement shall meet the requirements of the current Standard Specifications for Portland Cement of the ASTM Designation C-150, Type I, for Normal Portland Cement, Type III for High Early Strength Portland Cement and Type II will have a maximum of five (5) percent tricalcium aluminate for exposure to sewage.

      All cement shall be sampled and tested in accordance with the current Standard Methods of Sampling and Testing Portland Cement of the ASTM Designation C-183, C-184, C-188, C-190 and C-191.

   B. Mixing Water: Water for use with cement shall be clean and free from injurious amounts of oil, acid, alkali, salt, organic matter or other deleterious substances. Water from doubtful sources shall not be used until tested and approved.

      Water which is suitable for drinking or for ordinary household use may be accepted for use without being tested.

   C. Coarse Aggregate: Coarse aggregate shall consist of gravel or crushed stone meeting the requirements of the current ASTM Specifications C-33.

      When tested by the Standard Method for Testing for Abrasion of Coarse Aggregate by use of the Los Angeles Testing Machine, ASTM Designation C-131, coarse aggregate shall have a percentage of wear of not more than forty (40).

      Coarse aggregate for Class F concrete shall have a minimum of fifty (50) percent calcium carbonate equivalent.

      When tested by approved methods, the coarse aggregate shall conform to the following grading requirements:

Maximum Size Aggregate

1-1/2"

Retained on 1 1/2" screen	0 to 5%
Retained on 3/4" screen	25 to 60%
Retained on 1/4" screen	95 to 100%

1"

Retained on 1" screen	0 to 5%
Retained on 1/2" screen	25 to 60%
Retained on 1/4" screen	95 to 100%

D. Fine Aggregate: Fine aggregate shall consist of natural sand, manufactured sand, or a combination thereof, conforming to the current ASTM Specification C-33.

When tested in accordance with the Standard Method of Test of Organic Impurities in Sands for Concrete, ASTM Designation C-40, the fine aggregate shall not show a color darker than the standard color.

When tested by approved methods, the fine aggregate shall conform to the following grading requirements:

Retained on 3/8" screen	0%
Retained on 1/4" screen	0 to 5%
Retained on 20 mesh sieve	15 to 50%
Retained on 100 mesh sieve	85 to 100%

E. Concrete Admixtures:

(1) Water Reducing Agent shall conform to ASTM C-494 Type A, and shall have a dosage as recommended by the manufacturer. Admix shall be Pozzolith by Master Builders Co.; WRDA by W.R. Grace; PSI by Gifford Hill & Company or approved equal.

(2) Set Retarding Agent: When, in the opinion of the Engineer, the ambient or concrete temperature requires the use of a set retarding admixture, such admix shall conform to ASTM C-494, Type D. Admixtures shall be PSI-R by Gifford Hill; Daratard by W.R. Grace, or approved equal.

(3) Air Entaining Admixture shall be used where specified or directed to improve workability and increase resistance to freeze and thawing, and scaling. The admix shall comply with ASTM C 260 and shall be used in accordance with manufacturer's recommendations. Products shall be Air-Tite by Gifford Hill; Daravair by W.R. Grace; MB-VR by Master Builders, or approved equal.

The total air content of the concrete shall be three (3) percent to six (6) percent.

F. Curing and Sealing Compound: All concrete shall be cured and sealed with a continuous acrylic membrane forming compound meeting the requirements of ASTM C-309. Curing compound shall be applied as soon as practical after placement of concrete and shall be used in accordance with the manufacturer's recommendations. Products shall be Sealco 309 by Gifford-Hill; Horn Clear Seal by W.R. Grace and Company, or an approved equal.

G. Bonding Agent: Bonding agent shall be a liquid polymer latex compound such as Daraweld-C manufactured by W.R. Grace and Company or an approved equal.

H. Reinforcing Steel:

(1) Bar Steel: All bar reinforcement shall be open hearth new billet steel of structural, intermediate, or hard grade. New billet steel shall conform to the requirements of the latest Standard Specification for Billet-Steel Concrete Reinforcement Bars, ASTM Designation A-15.

Unless otherwise shown on the plans, all reinforcing bars shall be deformed bars. Twisted bars are not considered as deformed bars and will not be used. The form of deformed bars shall be such as to provide a net sectional area at all points equivalent to that of the plain round bars of equal nominal size.

(2) Wire Fabric: Wire for fabric reinforcement shall be cold-drawn from rods hot rolled from open hearth billets. Wire shall conform to the requirements of the latest Standard Specification for Drawn Wire for Concrete Reinforcement, ASTM Designation A-82.

I. Premolded Expansion Joint Filler shall conform to the requirements of ASTM Designation D-994 or other as approved by City Engineer.

3. Equipment: The Contractor shall obtain the Inspector's approval of all concrete mixing, handling and transporting equipment before any pour of concrete is commenced. Such approval will not relieve the Contractor of his responsibility for providing adequate equipment to carry on satisfactorily the project operations.

4. Batching and Mixing: All batching and mixing of concrete materials shall conform to ACI 304-73 "Recommended Practice for Measuring, Mixing and Placing Concrete". All materials shall be measured separately and accurately and batches shall be uniform. The coarse and fine aggregate shall be measured or weighed, loose and separately.

When transit mix concrete is used, the delivery of concrete shall be continuous at regular and uniform intervals, without stoppages or interruptions. Transit mix concrete shall not be placed in the job after a period of forty-five (45) minutes after the cement has been placed in the mixer.

5. Consistency: In general, the consistency of concrete mixtures shall be such that:

A. The mortar will cling to the coarse aggregate.

B. The aggregate will not segregate in the concrete when it is transported to the place of deposit.

C. The concrete and mortar will show no free water when removed from the mixer.

D. The surface of the finished concrete will be free from a surface film of "laitance".

Any concrete mix failing to meet the above outlined consistency requirements, although meeting the slump requirements, will be considered unsatisfactory, and the mix shall be changed to correct such unsatisfactory conditions.

6. Classification and Proportions: Concrete shall be proportioned as determined by the Inspector. The total volume of materials in the concrete mixture shall be so regulated that the cement content per cubic yard of concrete shall not be less than the minimum specified for that class of concrete.

A. The concrete shall be uniform and workable and the minimum cement content, maximum water content, and the maximum slump for the various classes of mixes shall conform to the following:

Class	Min. Cement Bags/C.Y.	Max. Size Coarse Ag. (Inches)	Max.Water Gals./Bag (Net)	Max. Slump (Inches)
A	5.5	1.5	6.75	5
B	5.0	1.5	7.00	4
C	6.0	1.0	6.25	5
D	6.5	1.5	6.25	5
E	3.0	1.5	6.25	4
F	6.0	1.5	5.50	4

The maximum amount of coarse aggregate (dry loose volume) per cubic foot of finished concrete shall not exceed zero-point-eighty-two (0.82) cubic feet.

The maximum amount of water, as set forth in the table above, is based upon the assumption that the aggregates are in a saturated, surface dry condition.

B. The concrete mix will be designed with the intention of producing concrete which will have compressive or flexural strength equal to or greater than the following when using current ASTM Designation C-39 and C-293.

Class of Concrete	Compressive Strength (Pounds Per Square Inch)		Flexural Strength (Pounds Per Square Inch)	
	7-Day	28-Day	4-Day	7-Day
A	2,000	3,000	400	500
B	1,700	2,500	350	425
C	2,000	3,000	400	500
D	2,000	3,000	400	500
E	1,000	1,500	150	250
F	2,700	4,000	-	-

C. The following class of concrete will be used as shown, unless otherwise specified:

Class	Use
A	Formed Structures, such as: Walls, Decks, Structural Foundations, Floor Slabs, Paving, Culverts, Storm Sewer Manholes and Inlets, except Water Retaining Walls and Structures exposed to sewage.
B	Unformed Structures, such as: Riprap, Sidewalks, Curb and Gutter, Gutter, Valleys, Exposed Encasement or as noted on Plans.
C	Drilled Shafts and Thin Wall Sections, Formed Septum Walls.
D	Railings, Stairs and Unformed Foundation Seals.
E	Confined Cradling, Blocking, Backfill, unexposed Encasement below grade, or Backfill.
F	Structures exposed to Sewage and Water Retaining Walls.

In order to obtain a more workable mix and denser concrete, there shall be added as a part of the concrete for Class "A" and Class "F" concrete a cement dispersing or water reducing agent conforming to ASTM Specification C-494, Type A. The agent shall be added in accordance with the manufacturer's recommendations.

The quantity of water to be used shall be determined by the Engineer and shall be such as to give a mixture containing the minimum amount of water consistent with the required workability. The quantity of water shall be varied only by the Engineer.

7. Quality of Concrete: During the progress of the work the Inspector may cast test cylinders or beams for testing to maintain a check on the compressive or flexural strength of the concrete actually placed.

Test beams or cylinders shall be required for each fifty (50) cubic yards or portion thereof, placed each day. On small structures, such as manholes, inlets, culverts, wing-walls, etc., the Inspector may vary the number for small placements to tests for each twenty-five (25) cubic yards, placed over a several-day period.

8. General Construction Requirement for Concrete Structures:

A. Prior to starting work the Contractor shall inform the Inspector as to the methods of construction and the amount and character of equipment he proposes to use, the adequacy of which shall be subject to the approval of the Inspector.

B. Forms and falsework to be used in the construction of the various units of a structure shall be in accordance with all governing safety requirements and shall be the responsibility of the Contractor.

C. Approval by the Inspector of construction methods, equipment, or form and falsework plans will not relieve the Contractor of responsibility for the safety or correctness of methods used, adequacy of equipment, or from carrying out the work in full accordance with the contract.

9. Concrete Delivery: The rate of delivery of transit mixed concrete shall be so arranged that a cold joint is not allowed to form between loads. Concrete shall be hauled in vehicles so constructed and operated to provide constant agitation during transportation. Concrete improperly mixed shall not be placed in the structure.

   The transit mixer shall be of an approved revolving drum or revolving blade type so constructed as to produce a thoroughly mixed concrete with a uniform distribution of the materials throughout the mass and shall be equipped with a discharge mechanism which will insure the discharging of the mixed concrete without segregation.

   The mixer drum shall be water-tight when closed and shall be equipped with a locking device which will automatically prevent the discharging of the mixer prior to receiving the required number of revolutions.

   The entire quantity of mixing water shall be accurately measured and controlled. Each batch shall be mixed to the consistency as described in paragraph 5 above. Any additional mixing shall be done at a slower speed specified by the manufacturer for agitation and shall be continuous until the batch is discharged.

10. Construction Joints: Construction joints shall be placed as shown on the plans unless otherwise specifically authorized by the Engineer, in which case the joints shall be so placed and formed as to least impair the strength and appearance of the structure. All construction joints shall be made on horizontal and vertical planes and formed with mortises or keys made in the concrete unless shown otherwise on the plans.

11. Forms: Nominal one (1) inch lumber surfaced to a uniform width and thickness will be permitted for general use on the various portions of structures, if backed by a sufficient number of studs and wales.

    Forms shall be mortar tight, and of sufficient strength to prevent bulging between supports. Forms shall be maintained to the lines designated until the concrete is sufficiently hardened to permit form removal and until the minimum time for forms to remain in place has elapsed in accordance with ACI Standard 318-71 "Building Code Requirements for Reinforced Concrete (ASI318-71)".

    Where corners occur, suitable chamfer strips shall be placed at the angle of the forms to round off or level them. All forms shall be constructed so as to permit removal without injuring the concrete. At the time of placing concrete, the forms shall be clean and entirely free of all chips, dirt, sawdust, and other extraneous matter.

    For thin wall sections and other locations where access to the bottom of the forms by other methods would be cumbersome and inadequate, clean-out opening shall be provided.

    Only spreaders approved by the Inspector shall be used.

    Metal form ties of an approved type shall be used to hold forms in place. Such ties shall be of a type especially designed for use in connection with concrete work, and they shall have provision to permit ease of removal of the metal as hereinafter specified. The use of metal form ties of a type that are encased in paper or other materials to allow the removal of the complete tie, leaving a hole through the concrete structure, will not be permitted. Metal ties shall be held in place by devices attached to walls. Each device

shall be capable of developing the strength of the tie.

All cavities produced by the removal of metal ties shall be carefully cleaned and completely filled with retempered sand cement mortar mixed in proportion of one to three, and the concrete shall be left smooth and even.

12. Placing Concrete:

A. General: The Contractor shall give the Inspector at least twenty-four (24) hours advance notice that he intends to pour concrete in any unit of the structure. The mixing of concrete and placing of same in the forms shall not be commenced until the Engineer has given his approval. No concrete shall be placed in any unit prior to completion of the form work and the placement of the reinforcing and other steel.

Where the Contractor's operations involve the placing of concrete from above directly into an excavated area or through the completion of forms, all concrete so placed shall be deposited through a vertical sheet metal or other approved pipe or tremie not less than six (6) inches nor more than ten (10) inches in diameter. The pipe shall be made in sections so that the outlet may be adjusted to proper heights during placing operations.

Concrete shall be placed in continuous horizontal layers approximately twelve (12) inches in thickness. The rate of delivery shall be so arranged that a cold joint is not allowed to form between loads. The Contractor shall avoid unauthorized construction joints by placing required portions of abutments, piers, walls, floors, slabs columns or superstructures in one continuous operation. As a safety precaution, openings in the forms shall be provided for the removal of laitance and other foreign material.

All concrete shall be well compacted and the mortar flushed to the surface of the forms of continuous working with concrete spading implements and mechanical vibrators of an approved type. Vibrators of the type which operate by attachment to forms or reinforcement will not be permitted. The vibrators shall be applied to the concrete immediately after deposit and shall be moved throughout the mass, thoroughly working the concrete around the reinforcement, embedded fixtures, and into the corners and angles of the forms until it has been reduced to a plastic mass. The mechanical vibrator shall not be operated so that it will penetrate or disturb layers placed previously which have become partially set or hardened. The vibration shall be of sufficient duration to accomplish thorough compaction and complete embedment of reinforcement and fixtures, but shall not be done to an extent that will cause segregation. Vibration shall be supplemented by hand spading to insure the flushing of mortar to the surface of all forms.

B. Foundation and Footings: Concrete shall not be placed in footings until the depth and character of the foundation has been inspected and permission has been given to proceed.

Concrete in deep foundations shall be placed in a manner that will avoid separation of the aggregates or displacement of the reinforcement. Suitable chutes or vertical pipes shall be provided.

When footings can be placed in dry foundation pits without the use of cofferdams or caissons, forms may be omitted, if desired by the Contractor and approved by the Engineer, and the entire excavation filled with concrete to the elevation of the top of the footing.

C. Weather Conditions for Placement: No concrete shall be placed when the atmospheric temperature is

at or below forty (40) degrees F (taken in the shade away from artificial heat) unless permission is given or in cases where the temperature drops below forty (40) degrees F after the concreting operations have been started.

The Contractor shall furnish sufficient canvas and frame work or other type of housing to enclose and protect the structure in such a way that the air around the forms and fresh concrete can be kept at a temperature not less than fifty (50) degrees F for a period of five (5) days after the concrete is placed.

Sufficient heating apparatus such as stoves, salamanders, or steam equipment and fuel to furnish all required heat shall be supplied.

D. Installation of Premolded Expansion Joint Filler shall be made where indicated, and the filler shall extend through the entire section of the structure.

13. Finishing:

A. Slabs, Valve Vault, Tops, Etc.: As soon as concrete placing operations have been completed for a slab section of sufficient width to permit finishing operations, the concrete shall be approximately leveled and then struck, off, tamped, and screeded using a longitudinal screed. The screed shall be of a design adaptable to the use intended, shall have provisions for vertical adjustment, and shall be sufficiently rigid to hold true to shape during use.

The initial strike off shall leave the concrete surface at an elevation slightly above grade so that, when consolidation and finishing operations are completed, the surface of the slab will be at the grade elevation shown on the plans with proper allowance for finished camber when required.

Tamping and screeding operations shall be continued until the concrete is properly consolidated and the surface voids are eliminated. The surface shall then be brought to a smooth true alignment by means of longitudinal screeding, floating, belting, and/or other methods approved by the Engineer. When templates are used, they shall be of such design as to permit early removal in order to avoid construction joints and to permit satisfactory finishing at and adjacent to the site of the template.

While the concrete is still plastic, the surface shall be straightedged by the use of a standard ten (10) foot metal straightedge. Deviations in excess of permissible variations shall be corrected. The final surface finish of the slab shall be done after the initial straightedging, and corrective adjusting, if required, is completed, as specified hereinafter.

B. Formed Surfaces: Immediately after forms are removed, the formed surfaces shall be finished as follows:

(1) Any honeycomb areas shall be chipped out to firm concrete and thoroughly cleaned of chips and particles of broken concrete. A bonding agent shall then be applied to the entire surface of the cavity, and the cavity packed with a relatively dry mortar of the same sand-cement ratio as the concrete mix used in the structure. The mortar shall be thoroughly compacted to insure complete filling of the cavity and the surface struck off to match the surrounding concrete.

(2) Exterior surfaces that will be more than one (1) foot below grade will require no further finish.

(3) Exterior surfaces to be exposed to view and to a point one (1) foot below finish grade, and interior

exposed surfaces, shall be finished as follows.

All fins, form marks or offsets, and other protrusions shall be removed and surface voids shall be filled or pointed with grout. After the pointing has dried sufficiently to permit rubbing, all surfaces shall be wetted and given a surface rubbing with a No. 16 Carborundum stone or an abrasive of equal quality. The rubbing shall be continued sufficiently to bring the surface to a paste, to remove all form marks and projections, and to produce a smooth dense surface without pits or irregularities. The material that has been ground to a paste shall be carefully spread or brushed uniformly over the surface and allowed to take a reset. The use of cement to form a surface will not be permitted.

C. Floor and Slab Finishes: Finish treatment of floors and slabs to be provided after the initial treatment specified under "A" above shall be as follows:

(1) Sidewalks: The sidewalk shall be floated with a steel trowel to provide a smooth, burnished surface. After floating and before the finish has set, the surfaces shall be lightly brushed with a fine brush to remove the surface cement film, leaving a fine grained, smooth but sand texture.

(2) Concrete Valleys, Driveways, Vault Tops and Floors, Etc.: After the initial treatment specified in "A" above, and after the surface has become firm, the surface shall be given a single floating with a wood float to provide a uniform surface.

(3) Other slab surfaces shall be finished with one of the above finishes, or not finished, as otherwise specified or as approved by the City Inspector.

14. Curing Concrete: Immediately after finishing, all upper non-formed surfaces shall be covered with a continuous, uniform, water impermeable coating. Immediately after removal of the side and end forms of non-exposed surfaces, and after required finishing of exposed surfaces, the formed surfaces of all concrete shall receive a like coating. The solution shall be applied under pressure with a spray nozzle in such a manner as to cover the entire exposed surface thoroughly and completely with a uniform film.

The rate of application shall be such as to insure complete coverage, but the area covered shall not exceed two hundred (200) square feet per gallon of curing compound.

The coating shall be sufficiently transparent and free from permanent color to result in no pronounced change in color from that of the natural concrete at the conclusion of the curing period. It shall, however, contain a fugitive dye of color strength to render the film distinctly visible on the concrete for a period of at least four (4) hours after application.

Under normal conditions, the curing compound, after application, shall dry to touch within one (1) hour and shall dry thoroughly and completely within four (4) hours. When thoroughly dry, it shall provide a continuous flexible membrane free from cracks or pinholes and will not disintegrate, check, peel, or crack during the required curing period. If for any reason the seal is broken during the curing period, it shall be immediately repaired with additional sealing solution.

TECHNICAL SPECIFICATIONS

ITEM 3

WATER SYSTEM

1. General: The Contractor shall be responsible for furnishing all materials and accomplishing all work necessary for the construction of new water lines in accordance with approved plans and in conformance with the following requirements. He shall also be responsible for the construction of service lines from the main to the meter box location behind the curb. The Contractor shall make all required connections to existing lines. All plans and specifications shall conform to the current Rules and Regulations for Public Water Systems of the Texas Department of Health and to these Specifications as they may be amended. Water lines shall not be located closer than nine (9) feet from sewer lines. Where water lines cross sewer lines, the water line shall cross over the sewer line, if possible. All work will be subject to inspection by an authorized representative of the City and no work will be accepted until all construction, testing, flushing, and disinfection has been completed in accordance with the applicable plans and these specifications and to the satisfaction of the City Engineer. Any work found not to be acceptable shall be removed and replaced at the Contractor's expense. The Contractor shall notify the City Engineer or City Manager prior to starting work and prior to covering any water lines in place.

2. Materials: Materials for water line construction shall conform to requirements specified below. All materials shall be class 150, or designed for 150 p.s.i. working pressure. All new water lines shall be a minimum of six (6) inches in diameter, except that smaller diameter lines may be installed in designated locations within the existing developed areas of the City for system rehabilitation or for interim supply augmentation.

   A. Pipe: Pipe for lines four (4) inches to twelve (12) inches in diameter shall be Cast Iron or Polyvinyl Chloride (PVC). Lines over twelve (12) inches in diameter shall be Concrete Steel Cylinder type. Lines smaller than four (4) inches in diameter shall be PVC.

      (1) Cast Iron Pipe shall be manufactured in accordance with Federal Specification WW-P-421b lb or in accordance with AWWA C106 (ANSI- A21.6) or AWWA C108 (ANSI-A21.8) Specifications. All pipe shall be designated Class 150. All pipe shall have an inside mortar lining reduced to one-half (1/2) that stipulated in the American Standards Association Specifications for Cement Mortar Lining (ASA-A21.4- 1953). Outside coating shall conform to the current AWWA Specification C106 (ASA-A21.6). Cast iron pipe shall be approved by the Underwriter's Laboratory and shall be accepted by the State Fire Insurance Commission for use in water distribution systems without penalty. All pipe shall be new and made in the United States. All cast iron pipe shall be designed for five (5) feet of cover. Unless otherwise specified on the plans or in the Special Conditions, above ground joints shall be flanged, sub-surface joints shall be compression, and all specials shall be mechanical joint.

         (a) Bell and Spigot: Bell and spigot shall comply with the current Federal Specification WW-P-42lb as Type 11 bell and spigot.

         (b) Mechanical Joint: Mechanical type joints for cast iron pipe and fittings shall comply in all respects with current American Standards Association Specification ASA-A21.11.

         (c) Flanged Joint: Flanged joints for cast iron pipe and fittings shall comply with current American

Standards Association Specification ASA-B16.

(2) Polyvinyl Chloride (PVC) Pipe for four (4) inch through twelve (12) inch size shall be rigid integral bell and spigot type conforming to the requirements of AWWA Standard C-900, "Polyvinyl Chloride (PVC) Pressure Pipe", for class 150 pipe, cast iron pipe O.D., with wall thickness of DR series 18. Pipe shall be suitable for use in a potable water system, and shall be approved by Underwriter's Laboratories for use in fire lines and water mains, and shall have the NSF Seal of Approval. The manufacturer shall furnish an Affidavit of Compliance to the effect that all materials meet the specification requirements. Joints must provide for contraction and expansion of the pipe. Bells shall be designed to be of equal or greater strength than the pipe. Rings and lubricants shall be of the type designed for water service.

Pipe shall meet all physical property requirements of Section 2.2.3 of AWWA Standard C-900. Standard laying lengths shall be twenty (20) feet, plus or minus one (1) inch, with a maximum of 15 (15) percent furnished in shorter lengths of not less than ten (10) feet each.

(3) Concrete Pressure Pipe shall be pretensioned concrete steel cylinder pipe conforming to the requirements of AWWA Standard C303, and shall be furnished in nominal thirty-two (32) foot or thirty- six (36) foot lengths.

The manufacturer shall submit a complete experience record in the design and construction of the type of concrete pressure pipe involved. The manufacturer shall also provide an Affidavit of Compliance as described under Section 1.11 of AWWA Standard C303. Upon the award of the contract, the Contractor shall furnish the City with Shop Drawings, showing the pipe and fittings to be furnished and shall include a tabulated layout schedule with reference to the stationing on the contract drawings with plan and profile drawings. Such drawings shall be subject to the approval of the City Engineer, and fabrication of pipe and fittings shall not be commenced until such drawings have been approved. Such approval will not relieve the Contractor of any responsibility of providing pipe and/or fittings in accordance with the plans and specifications.

The pipe shall be designed for 150 psi working pressure and 225 psi working plus transient pressure.

Chlorine and/or test connections consisting of an installed corporation-stop shall be required when installing a gate valve in concrete pressure mains (one (1) on each side of the gate valve). These connections shall have a bushing of nylon or other approved nonconductor installed by the pipe manufacturer.

Pipe design for external loads shall be based on the following external loading conditions:

(a) Earth Load: Five (5) foot depth of soil using 130 lbs/C.F.

(b) Concentrated Loads:

Within pavement limits - 16,000 lbs.

Outside pavement limits - to accommodate Contractor's equipment, but not less than 8,000 lbs.

(c) Load Factor: 1.90 (Class B bedding)

(d) Impact Factor, Live Loads: 1.0

(e) Factor of Safety: 1.50

(4) Plastic Pipe 3" and under shall meet the requirements for unplasticized Polyvinyl Chloride (PVC) pipe with integral thickened-wall and bells shall meet all requirements of ASTM D1784, ASTM D2241, and Commercial Standard CS256-63. Unless otherwise specified, the pipe shall be pressure rated at 160 psi with a standard dimension ratio (SDR) of 26. All pipe must meet requirements as set forth in Commercial Standard CS256-63, bearing the National Sanitation Foundation seal for potable water pipe. Provisions must be made for contraction and expansion at each joint, with a rubber ring and integral bell as part of each joint. Pipe and fitting must be assembled with a non-toxic lubricant. Pipe shall be made from an NSF-approved Type I, Grade I, PVC compound conforming to ASTM resin specification D1784. Clean, reworked material generated from the manufacturer's own pipe production may be used. All physical and chemical tests shall be method.

B. Fittings and Specials:

(1) Fittings and specials for cast iron and PVC pipe shall be cast iron or ductile iron conforming to the requirements of AWWA Standards C110 and C111 for Class 150 service. Joints shall be integral bell and spigot, mechanical joint, or flanged joints as required by the pipe joint and all fittings shall be cement lined. Flanges shall be Class 125. All fittings shall be short body type.

(2) Fittings and Specials for Concrete pressure pipe shall be provided as necessary for the concrete pressure pipe line and for connection to other types of pipe or fittings. Design of fittings shall conform to the requirements for the design of the pipe with which they and other specials are specified elsewhere in these specifications, but all special adapters necessary for connections to the concrete pressure pipe shall be provided by the concrete pressure pipe manufacturer and shall be shop fabricated.

(3) Accessories: All bolts, nuts, glands, gaskets, and other accessories necessary for the complete installation shall be furnished with the pipe and fittings.

C. Gate Valves two (2) inch thru twelve (12) inch valves shall conform to the requirements of AWWA Standard C500 for double disc type with parallel seats and all valves shall have a non-rising stem with a resilient wedge either Mueller, Clow, Waterous or M & H. Valves shall have mechanical joint ends except that valves used with flanged pipe shall have flanged ends, and end joints shall be specifically designed for the type of pipe or joint to which they will be connected. Valves shall turn counterclockwise to open. All valves shall be for vertical installation in horizontal lines. Operators shall be nut type for underground service and handwheels for above ground service.

Gate valves eighteen (18) inches and larger shall be equipped with spur gears. Gate valves sixteen (16) inches and larger, unless otherwise specified, shall be Mueller, M & H or Waterous.

Geared valves shall be equipped with cut-tooth steel spur gears without gear case where valves are to be installed in a vault or inside a pump station and not to be buried in the ground. Where valves are to be buried in the ground without a vault, cut-tooth spur steel gears having an enclosed gear case of the

"extended" type, oil or grease lubricated, shall be furnished. Removable cast iron plates shall be furnished on valves with gear cases of the extended type, installed on the valve to enclose and keep the packing gland and valve stem free from dirt. All above ground two (2) inch valves shall have bronze bodies with all working parts of bronze. They shall be of the double disc, parallel seat, internal wedging type and shall have screw ends. They shall open by turning to the LEFT. They shall be guaranteed for one hundred fifty (150) pounds per square inch working pressure.

D. Cast Iron Valve Boxes and Covers: Cast iron valve boxes and covers shall be standard three (3) piece box and cover, consisting of base housing, extension hollow shaft and cover. The covers shall have the word "WATER" cast in raised letters in its upper surface on water mains and shall have no designation for other types of mains. Boxes furnished shall be adjustable unless shown otherwise on the plans and the extension hollow shaft shall be of sufficient diameter to admit readily standard valve wrench. Boxes shall be as manufactured by Mueller, Clow or equivalent and will be required for every subsurface gate valve unless otherwise specified.

E. Fire Hydrants shall be either Mueller Centurion (A-423) or a Clow F2500 having a dry barrel and a six (6) inch inlet with a five and one-quarter (5 1/4) inch main valve opening, with one (1) pumper connection and two (2) hose nozzles, and shall conform to the requirements of AWWA Specification C502 except that the barrels shall have a frangible section at the ground level for break off upon impact. Hydrants shall open by turning counterclockwise. Barrels shall be for thirty-six (36) inch bury. Extensions shall be provided where necessary to attain the proper height setting of hydrants. The inlet shall be a mechanical joint.

F. Service Lines: Materials for service lines from mains to the meter box shall be as specified below. Single services shall be a minimum of three-quarter (3/4) inch and double services a minimum of one (1) inch.

(1) Copper tubing shall conform to ASTM Specification B88, Type K.

(2) Polybutylene tubing shall be SDR-9 Class 250, the SDR-11.5, as stated in the current specifications is of iron pipe size, where the SDR-9 is the same size as copper tubing.

(3) Fittings for either copper tubing or polybutylene tubing shall be brass conforming to ASTM B62. Couplings for copper tubing shall be compression type. Couplings for polybutylene tubing shall be compression type. All fittings shall have threads conforming to the following:

Coupling ends to be connected to iron pipe shall have thread dimensions conforming to Table 3 of ASA B2.1, American Standard Pipe Threads.

Coupling nut threads shall conform to the dimensions shown in Table 3 of AWWA Specifications C800.

(4) Corporation Cocks shall be Mueller H-15008 which is a CC thread x compression outlet.

(5) Curb or Meter Stops: For single service connections, curb stops shall be Mueller H-14258 compression inlet with lockwing head.

For double service connections, "U" branch connections shall be Mueller H-15363 with a

compression inlet. Two (2) curb stops, Mueller H-14265 shall be furnished and installed with lockwing head.

3. Excavation, Trenching, and Backfill, including pipe bedding, shall conform to the applicable provisions of Item 1, Trenching and Backfill, and to the applicable trenching and backfilling details. Walls of trenches shall be vertical to a minimum distance of twelve (12) inches above the top of the pipe. Minimum depth of cover shall be three (3) feet over the top of the pipe, except that minimum cover on top of service lines shall be at least eighteen (18) inches below the top of subgrade.

4. Pipe Handling: Handling of pipe during unloading, stockpiling, and distribution along the trench shall be done in such a manner that the pipe or coating is not damaged by handling equipment which may cause cuts or indentations in the pipe or coating. Slings shall be used to handle all pipe and fittings; no hooks will be permitted.

   Plastic pipe shall be stored on flat surfaces to avoid deformation of the pipe. Particular care shall be exercised during cold weather to avoid severe impact which may damage the pipe. Care should be exercised at all times to prevent entrance of dirt and foreign matter into the pipe.

   All pipe, fittings, valves, hydrants and accessories should be carefully lowered into the trench using suitable equipment in such manner as to prevent damage to pipe and accessory items. Pipe and accessories should never be dropped or dumped into the trench.

   Pipe and accessories should be inspected for defects and cleanliness prior to lowering into the trench. Any defective, damaged or unsound material should be repaired or replaced and all foreign matter or dirt should be removed from the interior of the pipe and accessories before lowering into the trench.

   Any unsound or damaged pipe, fittings, or specials shall be rejected and removed from the site unless, in the opinion of the Inspector, it is suitable for repair. Pipe or fittings approved for repair shall be repaired in accordance with the recommendations of the Inspector and the manufacturer of the pipe.

5. Installation: The pipe shall be kept clean during the laying operation and free of all dirt and trash and, at the close of each operating day, the open end of the pipe shall be effectively sealed against the entrance of all objects and, especially, water. Pipe shall be layed to the lines and grades shown on the plans or otherwise approved. Horizontal and vertical curves may be effected by offsetting of the pipe joints where the radius of the curve exceeds the minimum radius recommended by the manufacturer of the pipe. Where the curve radius is less than the acceptable minimum for offsetting the pipe joints, bends shall be installed.

   All pipe and fittings shall be laid on specified bedding so as to be uniformly supported along its entire length. No "blocking up" of pipe or joints will be permitted. Bell holes to allow making the exterior joint shall be provided. Laying and jointing of pipe shall conform to the requirements of the following Manuals and Standards:

Cast Iron Pipe:	AWWA Standard C600
PVC Pipe:	ASTM Standard 2321
Concrete Pressure Pipe:	AWWA Manual M9

If the above listed publications are not available, the pipe shall be installed in accordance with the pipe manufacturer's published recommendations.

6. Setting Fittings: The Contractor shall furnish and install all fittings at the points shown on the drawings, and as directed. Before installing any fittings, care shall be taken to see that all foreign material is removed from the interior. Fittings shall be placed in the lines as shown on the plans or directed by the Engineer and shall be firmly supported and anchored in accordance with the recommendations of the manufacturer of the pipe.

7. Installation of Gate Valves: Valves shall be carefully handled and lowered into position by mechanical equipment in such a manner as to prevent damage to any part of the valve. The valve shall be placed in the proper position and held securely until all connections have been made.

   Where valves are to be placed in a concrete structure the floor shall be completed before installing the valve. The valve shall be securely blocked so that its weight is carried by the floor rather than being supported by the connected piping.

   Valves sixteen (16) inches and larger, which are not housed in structures shall be supported on concrete bases as detailed on the plans. Valves fourteen (14) inches and smaller, not housed in structures shall be supported on the same material as that supporting the connecting pipe. An adjustable cast iron valve box and cover shall be provided for all buried valves fourteen (14) inches and smaller, and all sixteen (16) inch valves installed in streets (including bypass valves), with stem extension when depth exceeds three (3) feet. The valve shall be set with the stem in a truly vertical position with the box correctly centered over the operating nut.

   When the valve box is in position and the top of the box adjusted to the proper elevation, select backfill material shall be firmly tamped around the outside.

8. Setting Fire Hydrants: The hydrant shall set truly vertical and be securely braced and blocked with concrete. It shall be set on a block of concrete at least one (1) foot square and six (6) inches thick placed on well compacted or undisturbed soil surrounded by a minimum of seven (7) cu. ft. of clean gravel or stone to permit free draining of the hydrant.

   The six (6) inch fire hydrant lead shall be of such length as is necessary to reach from the main to the hydrant location, and at such depth as to permit the pipe being installed in a horizontal position, and the barrel of the fire hydrant being in a vertical position. The bury depth may vary, and care must be taken to select and install the proper length of fire hydrant extension as required.

   A six (6) inch gate valve shall be installed in the six (6) inch hydrant lead between the fire hydrant and the main where shown on the plans.

   After installation is complete, the Contractor shall apply two (2) coats of bright red machinery enamel, Pittsburg or approved equal.

9. Installation of Three Inch (3) and Smaller PVC Lines: Fittings for two (2) inch and three (3) inch PVC pipe shall be PVC of the same pressure class. Gate valves shall be cast iron for two (2) inch and three (3) inch diameter pipe and gate valves under two (2) inch shall be bronze body, as hereinbefore specified. All joints shall be compression type. Pipe ends shall be lubricated in accordance with the manufacturer's recommendation and pushed in to the proper depth as indicated by the reference mark on the pipe. Pipe may

be jointed in the trench or above ground prior to placing in the trench. Bedding shall be used where rock is encountered in the trench or when directed by the Engineer. Pipe layed in earth trenches without rock need not have bedding if the backfill material is free of rock. Pipe shall be "snaked" in the trench when temperatures exceed seventy (70) degrees F to allow for contraction due to cooling, and the pipe should preferably be filled with water before backfilling.

10. Sewer Line Crossings: Whenever sanitary sewer mains, laterals or service lines are encountered by trenching operations, the sewer pipe shall be placed with one eighteen (18) inch joint of cast iron pipe centered in the trench. The cast iron pipe shall have solid bearing on undisturbed earth, at least eighteen (18) inches back from the face of the trench. The jointing and connection of the cast iron pipe to clay or concrete pipe shall be done in accordance with City standards. Upon completion of the joints they shall be completely surrounded with thoroughly compacted moist backfill.

11. Concrete Blocking and Cradle: Concrete blocking (Class "E" Concrete) shall be placed at bends, tees, crosses and plugs in the pipe lines. The concrete blocking shall be placed so as to rest against firm, undisturbed trench walls, normal to the thrust. The supporting area for each block shall be at least as great as that indicated on the plans an/or standard details and shall be sufficient to withstand the thrust, including water hammer which may develop. Each block shall rest on a firm, undisturbed foundation or trench bottom. When tie downs are required, concrete shall be Class "A" or "B" and constructed as detailed and/or noted on the plans. Concrete cradle shall be Class "E" concrete and shall be installed where shown on the plans in accordance with the standard details.

12. Pressure Testing: All new water mains shall be tested by the Contractor with a hydraulic test pressure of maximum of one hundred fifty (150) pounds per square inch. The pressure test shall be maintained for a continuous period of not less than four (4) hours on each section of the pipeline under test. All pressure testing will be monitored by the City Engineer prior to acceptance.

    The Contractor shall furnish adequate and satisfactory equipment and supplies necessary to make such hydrostatic tests.

    Materials and labor for the installation of corporation cocks in cast iron mains for this purpose will be furnished by the Contractor. The Contractor shall be responsible for all excavation, etc., in preparation for installation of taps.

    The section of line to be tested shall be gradually filled with water, carefully expelling the air, and the specified pressure applied. The City will furnish water required for the testing at its nearest City line. All air shall be expelled from the pipe before applying the required test pressure.

    All exposed joints shall be examined during the pressure test. All pipe, fittings and valves shall be examined while the test is in progress, and any items found to be defective shall be removed and replaced by the Contractor and retested after repairs are completed.

    In order to determine the quantity of water lost through leakage in a section of pipe under the required test pressure the Contractor will be required to measure all water used in the pressure test through an approved meter. The maximum leakage permitted on the basis of one hundred fifty (150) pounds per square inch pressure shall not exceed the amounts indicated below for each type of pipe per inch of pipe diameter per mile of pipe in twenty-four (24) hours:

Cast Iron Pipe: 25 Gallons

PVC Pipe: 25 Gallons

Concrete Pressure Pipe: 25 Gallons

The Contractor shall correct defects and bring the leakage within the specified limits before the contract is accepted by the City.

Permanent pavement shall not be placed over any pipe until all leakage tests on the section of pipe line involved have been completed.

The cost of testing and finding and repairing the leaks, and retesting, if necessary, shall be at the expense of the Contractor.

13. Chlorination of Water Mains: When the entire pipe line, or selected sections thereof, have been completed, tested and are ready for turning over to the Owner for use, the line or section shall be disinfected according to the following procedure:

    A. The line shall be flushed out and filled with water from a City main.

    B. Chlorine or HTH shall be injected at one end of the line, and water released from the opposite end until chlorine is present at the discharge end in such quantity to indicate a residual of fifty (50) p.p.m.. All valves shall then be closed, and the solution shall remain in the line for at least twenty-four (24) hours.

    C. After twenty-four (24) hours the solution shall be discharged from the line and replaced by water direct from a City main.

    D. A water sample shall be taken from a suitable tap (not through a fire hydrant) under the supervision of the City and submitted to an Independent Laboratory or to the Texas Department of Health Laboratory for analysis. If the tests show a satisfactory quality of water, the line may be placed in service. If the sample shows an unsatisfactory quality of water, the process of disinfection shall be repeated until a satisfactory sample is obtained.

    E. Unless other wise specified or approved, the Contractor will make all necessary taps into pipe to accomplish chlorination of a new line.

14. Installation of Service Lines: Service lines shall be of copper or polybutylene plastic pipe as hereinbefore specified. Connections to water mains shall be made by tapping for cast iron pipe, and by the use of Mueller galvanized or cadmium coated Smith-Blair #313 (formerly Rockwell) or Ford F202 service saddle.

    Corporation stops shall be installed in all taps or service saddles with the lines connected to the corporation stop. Service lines shall be installed a minimum of eighteen (18) inches below subgrade without sharp bends or changes of direction. Particular care shall be taken to avoid kinking or excessive bending of either copper or plastic pipe during installation and the pipe shall be laid from side to side in the trench to provide for expansion and contraction. Lines shall extend to approximately two (2) feet in back of and one (1) foot below the top of the back face of the curb. Curb stops, meter couplings, and "U" branch connections shall be provided on the end of the line for future connection to the meter. Service lines in earth trenches without

rock will not require bedding. Where trenches are partially or entirely in rock, or where the backfill material contains rock, bedding a minimum of four (4) inches under and over the pipe shall be required. The curb shall be marked by an imprinted letter "W", three (3) inches in height, at the point where the service pipe passes under the curb.

Pressure testing and sterilization of service lines is not required, but prior to backfilling, the lines shall be filled under normal working pressure and observed for leaks. Backfill will not be placed over pipe until approved by the City Inspector.

When tapping into the City water main the tapping sleeve shall be a stainless steel wrap-around, either the Smith-Blair #663 (formerly Rockwell) or the Romac SST.

The Contractor shall also furnish the City with the extracated piece of pipe from the tap known as the coupon.

15. Clean-Up: Upon completion of the installation of the water lines, distribution systems and appurtenances, all debris and surplus materials resulting from the work shall be removed.

TECHNICAL SPECIFICATIONS

ITEM 4

SEWER SYSTEM

1. General: This item includes the construction of both gravity sewers and force mains. Insofar as possible sewer systems shall consist of gravity lines and the use of lift stations and force mains shall be avoided. Design of sewer systems shall conform to the requirements of the Texas Department of Health. Design Criteria for Sewer Systems Construction shall conform to the requirements of these specifications. The Developer shall provide with his plat plans and profiles for review of all sewer line work proposed and shall construct the sewer system in accordance with the approved plans.

2. Alignment and Grades: Sewers shall be laid in straight alignment where possible and a uniform grade between manholes where possible. Where horizontal curves are required, curves may be made not to exceed the maximum allowable for type of joint and size of pipe as recommended by the manufacturer of the pipe. The pipe will bend without using extra fittings (45's, 90's). If fittings have to be used a manhole must be placed for access. All lines shall be located a minimum of nine (9) feet horizontally from water lines, and where sewers cross water lines, they shall be constructed of pressure pipe for a distance of nine (9) feet on either side of the water line. Crossings shall be under water lines where possible. Minimum grades, as per Texas Department of Health requirements shall be:

Pipe I.D. in Inches	Fall in Feet Per 100 Ft.
6"	0.50
8"	0.33
10"	0.25
12"	0.20
15"	0.15
18"	0.11

3. Materials:

   A. Gravity Pipe: Gravity sewer pipe shall be one of the following materials. All gravity sewer pipe shall be so manufactured that the completed sewer shall have a maximum infiltration or exfiltration of two hundred (200) gallons per inch of internal diameter, per mile of pipe, per twenty-four (24) hours, where the maximum hydrostatic head at the center line of the pipe does not exceed twenty-five (25) feet.

      (1) SDR 26-P.V.C. Gravity Sewer Pipe: PVC sewer pipe and fittings shall conform to the requirements of current ASTM Specification D- 3034-SDR 26, and shall be equipped with joints meeting the requirements of current ASTM Specification D-3212.

      (2) Ultra-Rib P.V.C. Gravity Sewer Pipe: Ultra-Rib sewer pipe shall conform to ASTM F 79 and Uni-Bell Specification UNI-B-9 when pipe is approved for use by City Engineer.

   B. Pressure Pipe for force mains and water line crossings shall be:

(1) Cast Iron Pipe and fittings shall conform to the requirements for Class 150 pipe for water lines as specified under Item 3, Water System Specifications.

(2) PVC Pressure Pipe and fittings shall be Class 160, SDR 26, pipe conforming to ASTM Designations D1784 and D2241.

C. Concrete shall conform to the requirements of Item 2, Concrete, of these specifications.

D. Manholes shall be forty-eight (48) inch inside diameter reinforced concrete, precast or monolithic cast-in-place, or when so approved, may be preformed fiberglass.

(1) Precast Concrete manholes shall consist of precast riser, concentric cones, and grade rings supported on a cast-in-place concrete base. For water containment construction, precast reinforced concrete manhole sections shall be of the bell and spigot or tongue and groove design meeting the requirements of ASTM C-478, having a wall thickness equal to that of ASTM C-76 wall "B", using a trapped type preformed O-Ring rubber gasket conforming to the requirements of ASTM C-443. Risers shall be in standard lengths of one (1) through six (6) feet in increments of one (1) foot. Manhole steps shall be installed by the pipe manufacturer where attention shall be given to a safe structural tie. Vertical center line of steps shall be marked on the outside of each manhole section.

(2) Monolithic Manholes: Monolithic concrete manholes shall be poured on the job site in forms as approved by the Engineer. These manholes shall be poured from Class "F" (4000#) concrete to provide a formed wall thickness of at least six (6) inches.

(3) Fiberglass Manholes shall consist of a preformed riser with an integral cone supported on a reinforced cast-in-place concrete base. They shall be manufactured in accordance with ASTM Specification X-23.2.10 or the latest draft thereof, and shall be designed for H-20 wheel load.

E. Manhole Frames and Covers: Grey iron manhole frames and covers shall be McKinley Iron Works, Type No. A24AM, Neenah Type B, No. 1415, or approved equal. Covers shall be provided with pick slots for those manholes equipped with twenty-four (24) inch diameter cover. The word "Sewer" shall be cast in each cover.

F. Non-Metal Manhole Steps: Non-metal steps shall be of solid glass fiber or other non-corrosive manhole steps. Only non-metallic manhole steps will be used in sanitary sewer manholes.

G. Cleanouts: Cleanouts shall be standard castings with covers, Bass and Hays Pattern No. 339, McKinley Iron Works, Type SC2, or an approved equal.

4. Excavation, Trenching and Backfilling shall conform to the requirements of Item 1 of these specifications.

5. Pipe Laying: All pipe shall be lowered into the trench by suitable mechanical equipment; no pipe shall be rolled or dumped into the trench. All dirt and trash shall be removed from the pipe while suspended. Previous to being lowered into the trench, each pipe shall be carefully inspected, and those not meeting specifications shall be rejected, and either destroyed or removed from the job. All pipe shall be laid to the line and grade shown on the plans.

A. The pipe and specials shall be so laid in the trench that after the project is completed, the interior surface

shall conform accurately to the grade and alignment indicated on the plans. All pipe shall be carefully adjusted to fit snugly in cradling or embedment so that the entire length bears on cradling or embedment materials. Pipe shall be laid with the bell (or groove) end upgrade, unless otherwise approved by the Engineer.

B. Before laying, the interior of the bell shall be carefully wiped smooth and clean and the annular space shall be kept free from dirt, stones, or water. All water must be kept out of the bell-hole during laying.

C. Pipe shall be installed and joints made up in complete conformance with the instructions and recommendations regarding proper installation and assembly furnished by the manufacturer.

D. Pipe shall be installed in accordance with the most current revision of ASTM Specification D-2321, "Standard Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe", available from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103. In addition, written recommendations of the pipe manufacturer shall be followed, where these recommendations do not conflict with ASTM D-2321.

E. When work is suspended on the line for any reason, the end of the line shall be properly plugged to prevent water, trash, dirt, or rodents from entering.

6. Service Connections: Unless otherwise shown or approved by the City Engineer, a sewer service connection shall be installed to serve each lot in the area served by the sewer main.

Standard sewer service connections shall be installed in trenches down to twelve (12) feet deep, and deep-cut service connections shall be installed in trenches greater than twelve (12) feet deep. Installation of sewer service connections will consist of such wyes, bends, etc., as may be required by the Standard Details. The four (4) inch tap on main for service line shall be a ninety (90) degree "T" or wye laid with the line, or it shall be made on pipe in place by installing a tapping saddle on the pipe over a four (4) inch hole cut in the pipe. Pipe saddles shall be completely encased in concrete. Wyes, forty-five (45) degree tapping saddle with direction of flow. No taps in manhole unless approved.

Service lines shall extend from the sanitary sewer lateral in the street to a point at least two (2) feet behind the curb, unless otherwise shown.

The end of the services shall be plugged with a precast plug or other suitable means, meeting the approval of the Engineer. The curb shall be marked by an imprinted letter "S", three (3) inches in height, at the point where the service pipe passes under the curb.

All completed service lines must have a clean-out.

7. Manhole Construction: Sewer line manholes shall be constructed in accordance with the plans, specifications, and standard details and approval of the Engineer. They shall be provided with cast iron manhole ring and covers. Noncorrosive manhole steps shall be installed as shown on the plans or as directed by the Engineer.

Sewer pipe shall be laid through the manhole where possible, prior to concreting floor slab, so that full depth of pipe is embedded in concrete to form the flow channel. Where pipe cannot be used through manholes due to direction of flow, the flow channel to top of pipe shall be formed with concrete and troweled with a steel

trowel to a smooth even finish. The slab shall be sloped one (1) inch per foot to flow channel and troweled to a smooth even finish. After concrete has set, the top half of the pipe between the walls of the manhole shall be broken out and the edges pointed up.

A. Cast-In-Place Manholes: The walls and base of cast-in-place manholes shall be poured monolithically. The earthen pit shall be widened and deepened at the bottom to allow a sufficient spread of base concrete matching the dimensions shown on the detail in the plans. The walls shall be constructed using form sections which can be disconnected and removed both inside and outside after the concrete has cured.

   Precast cover grade rings shall be used to bring the manhole to finish grade. The grade rings and cast iron frame and cover shall be mortared around the outside flush with the outside wall of the cast-in-place section.

B. Precast Manholes: The Class "B" concrete base shall be poured around the sewer pipe to the shape and dimensions shown on the plans. The first section of reinforced precast concrete pipe shall be set on the base and grouted in place. The required sections of precast pipe shall be placed to bring the manhole up to grade. Precast pipe joints shall be "O" ring. The last section of precast pipe shall be a concentric manhole ring. Precast concrete grade rings shall be used to bring the manhole to finished grade. The grade rings and cast iron frame and cover shall be mortared around the outside flush with the outside wall of the precast manhole cone.

C. Fiberglass Manholes shall be installed in accordance with the manufacturer's recommended procedures as found in Owens-Corning Fiberglass Publication No. 5-PS-6455-C, "Fiberglass Flowtite Manholes".

D. Drop Manholes: Drop manholes shall be constructed with cast iron pipe drops in locations as shown and as shown in the standard details.

8. Connection to Existing Lines: Where possible, connection to an existing line shall be made without interruption of flow of sewage in the existing line.

9. Bypassing of Sewage: Sewage shall not be bypassed from existing lines unless absolutely necessary. Before any sewage may be bypassed from an existing sanitary sewer to accomplish any of the work required on the project, written permission to make such bypass must be obtained from the City's Engineer. A request for permission to effect such bypass shall be made in writing at least two (2) days prior to the time needed. The request shall contain full details as to the manner in which bypassing is to be accomplished, and the minimum and maximum time bypass is to remain in service. In general, bypassing will not be approved unless it is absolutely essential to accomplish the work, and all costs incurred by the City in taking proper health and sanitation precautions as a result of an approved bypass shall be paid by the Contractor.

10. Testing: All PVC sewer pipe shall be tested for deflection. The deflection test for PVC sewer pipe shall consist of passing a prefabricated plug designed for deflection testing through the pipe a minimum of seven (7) days and no later than one (1) year after installation. The prefabricated plug shall have an outside diameter of ninety-five (95) per cent of the inside diameter of the pipe being tested. If during the test, the plug hangs and cannot be pulled completely through a section of the sewer line between two (2) access points, i.e., two (2) manholes, or a manhole and a cleanout, all or a part of that section of pipe shall, at the discretion of the Engineer, be removed and replaced. A deflection test shall be performed on the replaced section of pipe in the prescribed time range as stated above. A completed section of sewer line will not be

accepted until it has passed the deflection test.

When, in the opinion of the City Engineer, an excessive amount of infiltration, or leakage, is indicated in a newly installed line prior to acceptance, an exfiltration test may be required to be performed by the Contractor. This test may be performed by either of the following methods:

A. This method may be used in lieu of B. The influents to the manholes at the upper and lower ends of the new line shall be plugged with an inflatable rubber pipe stopper. The line shall be filled by introducing water into the manhole and filling it to ground level.

   After the water has remained in the line twenty-four (24) hours, the water level is again brought up to ground elevation. After one (1) hour the water level is measured from the starting point and the quantity of leakage computed.

B. This method may be used in lieu of A. The effluents to the manhole at the upper end of the new line and the influent to the manhole at the lower end of the line shall be plugged with a plumber's plug. The plug at the upper end of the new line shall be watertight and shall be so constructed as to permit the introduction of water into the sewer through a hose. The end of the hose shall be connected to a barrel which will permit variation of the hydrostatic pressure by elevating the barrel. The line shall be filled by introducing water through the hose until the line and barrel are full. After the water has remained in the line twenty-four (24) hours, the water level is again brought up to ground elevation. After one (1) hour the water level is measured from the starting point and the quantity of leakage computed. Any line, or segment of line which has exfiltration in excess of two hundred (200) gallons per inch of internal diameter, per mile of pipe, per twenty-four (24) hours, where the maximum hydrostatic head at the center line of the pipe does not exceed twenty-five (25) feet will not be considered to be acceptable.

TECHNICAL SPECIFICATIONS

ITEM 5

STREETS, WALKS, AND DRIVEWAYS

1. General: This item includes the construction of all street, curb and gutter, sidewalk, and driveway construction within public right-of-way. It does not include walk and driveway construction beyond the right-of-way property line. The provisions of these specifications are intended to apply primarily to new developments and to new streets within existing platted or annexed areas, and the developer shall provide complete plans, including profiles, of the proposed work for approval prior to initiating any work in the area. Street design shall conform to the requirements of the current Subdivision Ordinance and to these technical specifications. All streets shall have curb and gutter and bituminous surfacing, and all street construction shall conform to the requirements of this item of the Standard Specifications.

2. Street Classification and Pavement Structure Requirements:

A. All streets shall be classified as either Residential (local, minor, and major), Collector (minor or major), or Others. The classifications shall be as specified in the criteria found in the Subdivision Ordinance and/or as approved by the City. "Others" shall refer to streets shown by the City, City Engineer, or a Registered Professional Engineer, based on acceptable engineering practices, that loading or traffic count requirements exceed those provided for the street classifications.

(1) Residential

ROW	- See Subdivision Ordinance
Asphaltic Surface	- 1 1/2" hot-mix asphaltic concrete
Flexible Base	- See Pavement Thickness Design Chart
Pavement Width	- See Subdivision Ordinance

(2) Collector

ROW	- See Subdivision Ordinance
Asphaltic Surface	- 2" hot-mix asphaltic concrete
Flexible Base	- See Pavement Thickness Design Chart
Pavement Width	- See Subdivision Ordinance

(3) Other

ROW	- As approved by City
Asphaltic Surface	- 2" hot-mix asphaltic concrete
Flexible Base	- See Pavement Thickness Design Chart

Pavement Width	- As approved by City
Axle Frequency Loading	- Number of 18,000 pound equivalent axle load repetitions which street will experience if its design life exceeds 150,000.

3. Alignment and Grades:

A. Alignment: Street and curb alignment shall consist of uniform straight line tangents connected by true circular horizontal curves. Compound curves may be used where necessary to achieve the desired alignment. Extensions of existing streets shall match the existing street centerline without abrupt offsets, and any widening shall be accomplished equally on both sides with horizontal curves in the curb line. Requirements of the current Subdivision Ordinance shall also be complied with in establishing the street alignment. At intersections, curbs shall have a minimum radius of fifteen (15) feet to the back of the curb. Larger radii at these points are permissible if desired. Curb returns at driveway approaches shall have five (5) foot radius to the back of the curb.

B. Grades: Streets and curbs shall be on uniform straight line grades with any changes of grade made on a true calculated parabolic vertical curve. Abrupt changes of grade without vertical curves will not be permitted. Vertical curves may be successive without an intervening tangent grade where necessary, but shall not be compounded. Uniform grades shall not be less than zero point thirty (0.30) percent and shall not exceed ten (10) percent without approval. Grades for sidewalks shall be exactly that of the curb which is adjacent. Elevations for sidewalks shall be one (1) inch above the elevation of the adjacent curb, with the sidewalk also having a fall of one quarter (1/4) inch per foot toward the street. Valley gutters shall have a minimum of zero point thirty (0.30) percent grade truly uniform.

C. Standard Details: All streets, curb and gutter, sidewalks, and driveways shall conform to the standard plans and details appended to these Standard Specifications.

D. Construction Tolerances: Maximum allowable deviations from alignments and grades shown on the plans shall be:

(1) Alignment: Variations from the true alignment shall not exceed zero point zero five (0.05) feet combined amount in any one hundred (100) foot distance.

(2) Grade:

(a) Subgrade - + 0.05 feet

(b) Finished Base Course - + 0.03 feet without abrupt changes.

(c) Finished Pavement Surface - + 0.02 feet

(d) Curbs - For grades of:

Over 1.0% - 0.02 ft.
0.5 to 1.0% - 0.01 ft.
Under 0.5% - 0.00

Regardless of the allowable tolerances indicated for curbs, all curb and gutter shall be constructed to proper grade to drain freely and any gutter constructed with water pockets shall be torn out and properly replaced at the Contractor's expense.

Any variation in alignments, grades, plans or sections as herein required shall only be by written consent of the City Engineer.

4. Quality Control: Attention is invited to the Quality Control provisions of the General Provisions of these Standard Specifications. All work under this item will be subject to these quality control requirements.

5. Materials: Materials for the various features of work under this item of these specifications shall meet the following requirements:

A. Concrete shall conform to the requirements of Item 2, Concrete.

B. Lime for subgrade stabilization shall conform to the requirements of Item 264 of the Texas Highway Department Standard Specifications, for Type A or Type B.

C. Flexible Base Material shall be obtained from approved sources and shall be crushed limestone consisting of durable particles mixed with approved binding materials. The material shall be subject to approval of the City Engineer at the source. The processed material when properly slaked and tested by standard laboratory methods shall meet the following requirements:

Retained on 1 3/4 inch sieve . .0%
Retained on No. 4 sieve . . . . 45 to 75%
Retained on No. 40 sieve . . . .60 to 85%

The material when tested by "The Wet Ball Method for Determining the Disintegration of Flexible Base Materials" according to the latest procedures of the Texas Highway Department shall not develop more than fifty (50) percent soil binder prior to rolling.

Materials passing the No. 4 sieve shall be known as "Binder". The portion of material passing the No. 40 sieve shall be known as "Soil Binder" and shall meet the following requirements:

The liquid limit shall not exceed 40 when tested in accordance with AASHO designation T89-49.

The plastic limit shall be determined by testing in accordance with AASHO designation T90-49.

The plasticity index shall not exceed 12 or be less than 4 when calculated in accordance with AASHO designation T91-49.

The preparation of samples for testing according to AASHO designations T89-49, T90-49, and T91-49 shall be according to AASHO designation T146-49 "Wet Preparation of Disturbed Soil Samples for Test".

Materials retained on the No. 4 sieve shall have a per cent wear of not more than 45 when tested according to AASHO designation T96-49 "Abrasion of Coarse Aggregate by use of the Los Angeles Abrasion Machine".

D. Bituminous Materials: All bituminous materials shall conform to the Texas Highway Department Standard Specification Item 300, types and grades as indicated below:

Tack Coat	- RC-2, or a slow or medium setting emulsion.
Prime Coat	- MC-30 or MC-70
Asphalt for Hot-Mix Asphaltic Concrete	- AC-10
Asphalt for 2-Course Surface Treatment	- AC-3 or AC-5

E. Paving Mixes and Aggregates shall conform to the Standard Specification items of the Texas Highway Department as listed below:

Hot Mix Asphaltic Concrete	- Item 340, Type "D"
Aggregate for Surface Treatment	- Item 302, Type B, Grade 3 for first course and Grade 4 for second course.

F. Where more than one (1) type or grade of material is given, the City Engineer shall determine the type of grade to be used for the project.

6. Excavation, Fill, and Grading: All excavation, construction of fills or embankments and grading within the public right-of-way shall conform to the following requirements. All completed work shall conform to the plans and applicable Standard Details and shall be accomplished as specified hereinafter.

A. Excavation shall be in accordance with the lines, grades, and typical sections as shown on the plans or established by the Engineer. Unless otherwise shown on the plans or established by the Engineer, street excavation will be made to the subgrade.

B. Embankments (Fills): Prior to placing fill material, the area on which the fill is to be placed shall be cleared of all trees, brush, stumps, and other obstructions.

Embankments shall be constructed of suitable materials approved by the Engineer and shall be placed in successive horizontal layers of not more than eight (8) inches in depth, loose measurement, for the full width of the embankment and in such lengths as designated. Stumps, trees, rubbish, vegetation or other unsuitable materials shall not be placed in embankments. All construction traffic shall be uniformly distributed over the entire surface of each layer of the embankment.

A "Maintainer", or a "Blade Grader" weighing at least three (3) tons, with a blade at least ten (10) feet in length shall be kept in operation on the embankment for the purpose of uniformly mixing, spreading, pulverizing, and consolidating the embankment material.

After a layer of embankment material has been placed and bladed, it shall be sprinkled, if directed, in the quantity as determined by the Engineer, and rolled-to-compaction with a

tamping roller, of approved type.

Embankment placed over and adjacent to pipes, culverts, and other structures shall be of suitable materials, and shall be placed in successive horizontal layers of not more than eight (8) inches in depth, loose measurement, and each layer uniformly mixed, pulverized and thoroughly compacted to the satisfaction of the Engineer, by the use of rakes, hand tamps, and/or other approved methods.

Special care shall be taken to prevent any wedging action against the structure. This method of consolidation and compaction shall be used for such distances along embankment adjacent to structures as may be necessary and in other areas where blading and rolling would be impractical.

Where a large portion of the materials excavated consist of rock, the rock may be used in the construction of the embankment as hereinafter specified.

The maximum dimension of any rock used shall not exceed fifty (50) percent of the height of the embankment and in no case shall any rock over twenty-four (24) inches in its maximum dimension be placed in the embankment. When the greater portion of the embankment is to compose of materials other than rock, the embankment shall be constructed as required in the preceeding paragraphs, and the rock shall be carefully distributed throughout the embankments and filled around with earth or other approved fine material so that the interstices between the large particles are filled and a dense, compacted, uniform embankment is secured.

The upper eight (8) inches of all embankments shall be composed of soil without objectionable quantities of rock.

All embankments shall be compacted for the full depth to a density of ninety (90) percent of maximum density as determined by the modified Proctor method, ASTM Designation D1557.

7. Provisions for Drainage: If it is necessary in the prosecution of the work to interrupt the natural drainage of the surface, or the flow of artificial drains the Contractor shall provide temporary drainage facilities that will prevent damage to public or private interests, and shall restore the original drains as soon as the work will permit. The Contractor shall be held liable for all damages which may result from neglect to provide for either natural or artificial drainage which his work may have interrupted.

   If excavation of road materials indicates seepage of ground water into the area under the road bed subsurface drainage as approved by the City Engineer shall be installed.

   If permanent underground drainage facilities or off-street drainage facilities are required, they shall conform to Item 6, Drainage Facilities, of these Standard Specifications.

8. Subgrade Sampling Procedure:

   A. Samples shall be obtained of the predominant subgrade materials from the street right-of-way.

B. Sampling locations shall be selected at intervals not to exceed three hundred (300) feet.

C. Each sample shall consist of approximately two (2) pounds of material and should be properly identified as to sampling location and sampling depth interval.

D. The sample shall be representative of the twelve (12) inches below subgrade elevation. It should be cautioned that the top twelve (12) inches of the natural soil profile is not necessarily representative of the subgrade.

E. Notations shall be made of any fill areas, soft ground conditions, groundwater, or other unusual situations which may influence the pavement design. Sampling should not be from previously backfilled trenches.

9. Laboratory Testing Procedure:

A. All samples of subgrade materials shall be visually examined in the laboratory for the initial soil classification and color description.

B. Samples which visually appear to be similar shall be grouped together. This process is very important since subsequent testing is performed on these grouped samples.

C. Representative samples from each of these groups shall be tested for the following properties:

Liquid Limit (LL)
Plastic Limit (PL)
Plasticity Index (PI)
Percentage Passing No. 200 Mesh Sieve
Optimum Moisture Content
Modified Proctor Density

D. All samples shall be stored until the project is complete. These samples may be useful during construction as an aid in identifying the various subgrade groups.

10. Subgrade Group Classification Procedure:

A. Plot the results of the Atterberg Limits tests (LL and PI) on the "Subgrade Classification Chart", Table II, to obtain the subgrade group.

B. The resulting subgrade group may be up-graded one (1) group if less than forty (40) percent of the material passes the No. 200 mesh sieve. This applies only to groups III through VII.

11. Pavement Thickness Design Procedure:

A. Each street must be assigned one of the traffic classifications as indicated below:

Residential Street	(local, minor, and major)
Collector Street	(minor and major)
Others	(approved by City)

The City Engineering Department must be consulted to aid in these traffic classifications.

B. The appropriate "Pavement Thickness Design Chart" (see Tables III through V) selected on the basis of the traffic classification can then be used with the subgrade classification group to determine the total required pavement thickness.

C. The pavement section will consist of hot-mix asphaltic concrete surface (thickness as indicated on "Pavement Thickness Design Chart") overlying a crushed limestone base material.

D. For pavements designed for subgrade groups IV through VII, a select sub-base layer may be substituted for a portion of the base layer. The select sub-base material must be classified using the subgrade classification procedure and a subgrade group assigned to the sub-base material. The pavement thickness required above the sub-base material is determined using the design charts and the group classification.

E. A six (6) inch thickness of lime-stabilized subgrade may be substituted for eight (8) inches of crushed limestone base material for pavements designed in subgrade groups IV through VII. The quantity of hydrated lime may be selected from the table below:

Subgrade Group No.	Pounds of Lime to be Applied per Square Yard: Six (6) inch Compacted Thickness
IV	20 pounds per square yard
V	22 pounds per square yard
VI	25 pounds per square yard
VII	28 pounds per square yard

TABLE I

CITY OF COPPERAS COVE

FLEXIBLE PAVEMENT DESIGN PROCEDURE

SUBGRADE CLASSIFICATION GROUPS

Soil Classification Tests

Group No.	Liquid Limit	Plasticity Index	Typical Material Description
I	< 35	5-15	limestone, weathered limestone, or severely weathered limestone
II	30-40	10-25	sandy clays, silty clays, or severely weathered limestone
III	40-50	15-30	sandy clays, silty clays, or severely weathered limestone
IV	50-60	20-35	clay or silty clay
V	60-70	25-40	clay
VI	70-80	35-50	clay
VII	> 80	40-60	clay

Graphical representation of these subgrade groups are shown on following Table II. Values which plot on the borderline between two (2) groups should be assigned the group number of the poorer soil group. Soils which have less than forty (40) percent passing the No. 200 mesh sieve and which would plot in Groups III through VII may be up-graded to the next better group.

TABLE II

CITY OF COPPERAS COVE

PAVEMENT DESIGN PROCEDURE

SUBGRADE CLASSIFICATION CHART

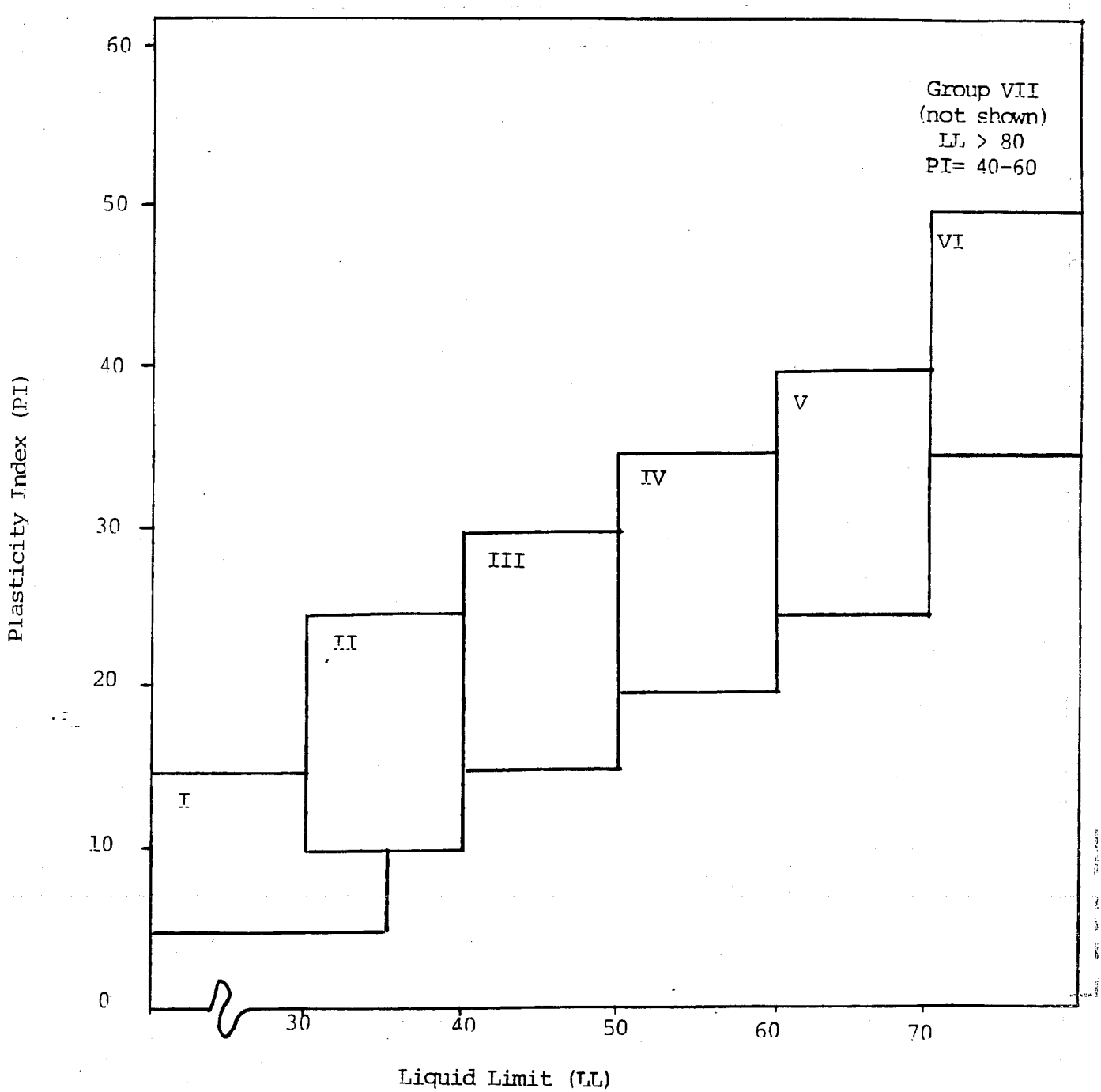


TABLE III

CITY OF COPPERAS COVE

PAVEMENT THICKNESS DESIGN CHART

LOCAL, MINOR, and MAJOR RESIDENTIAL STREET

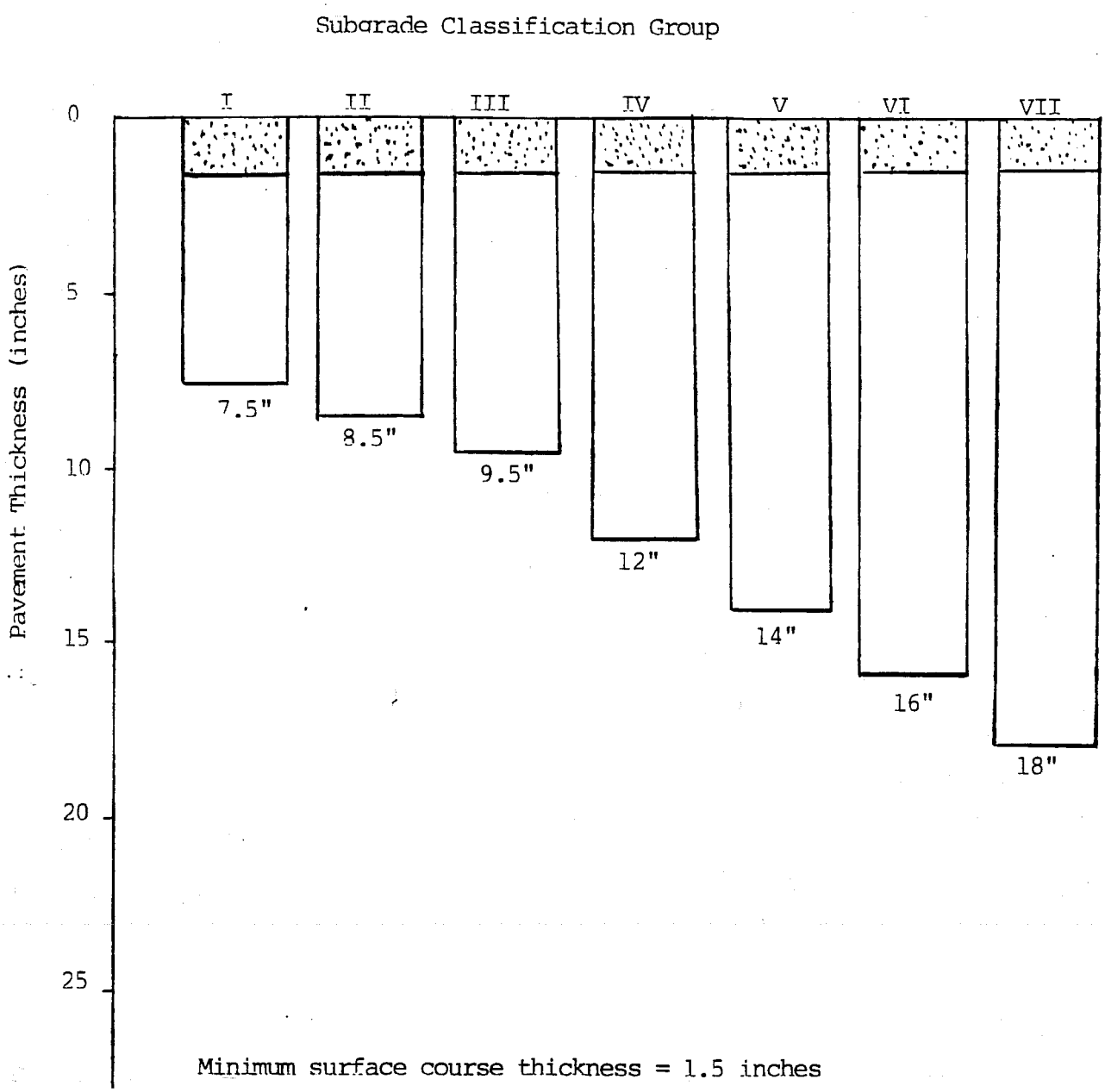


TABLE IV

CITY OF COPPERAS COVE

PAVEMENT THICKNESS DESIGN CHART

MINOR and MAJOR COLLECTOR STREET

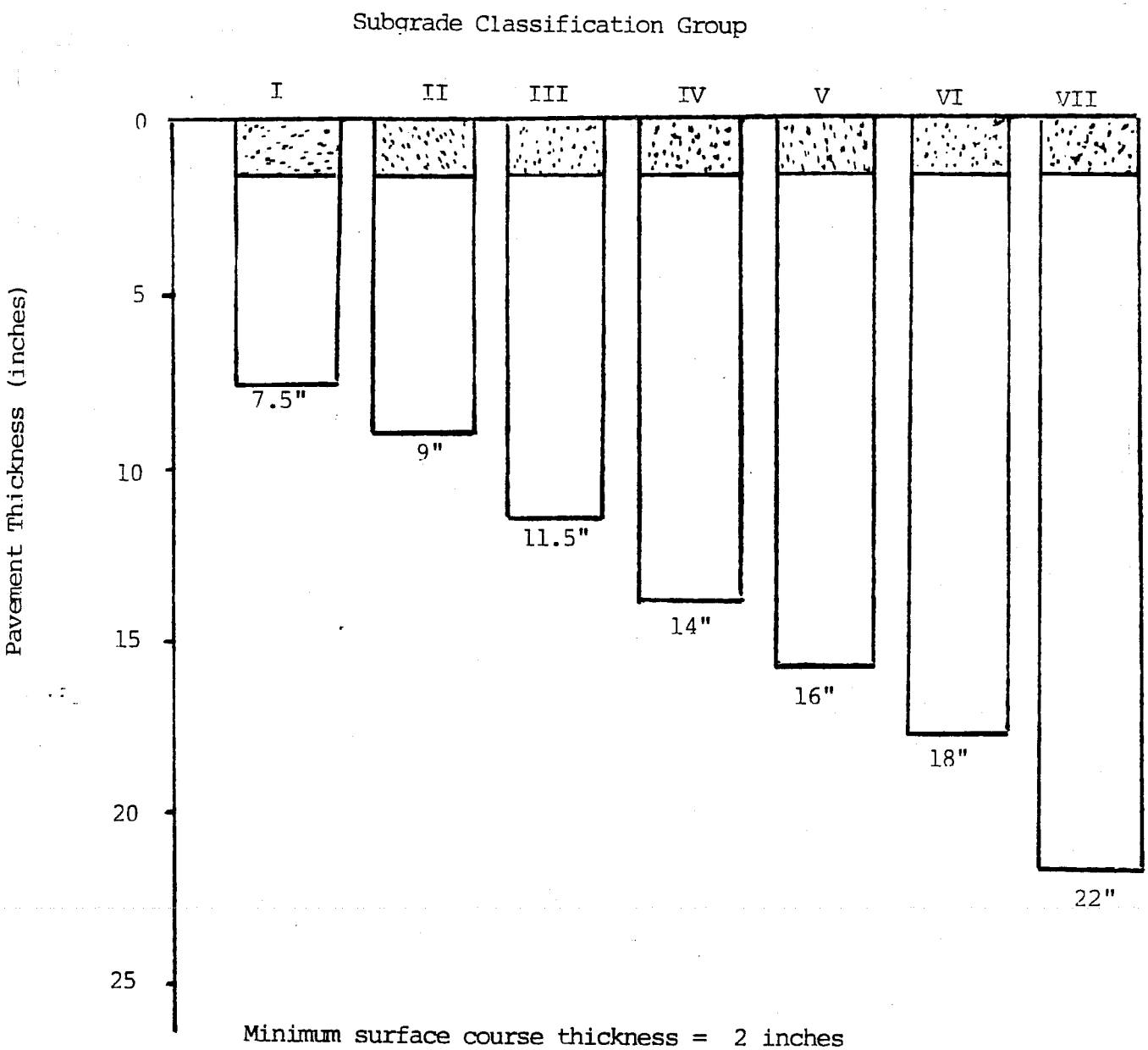
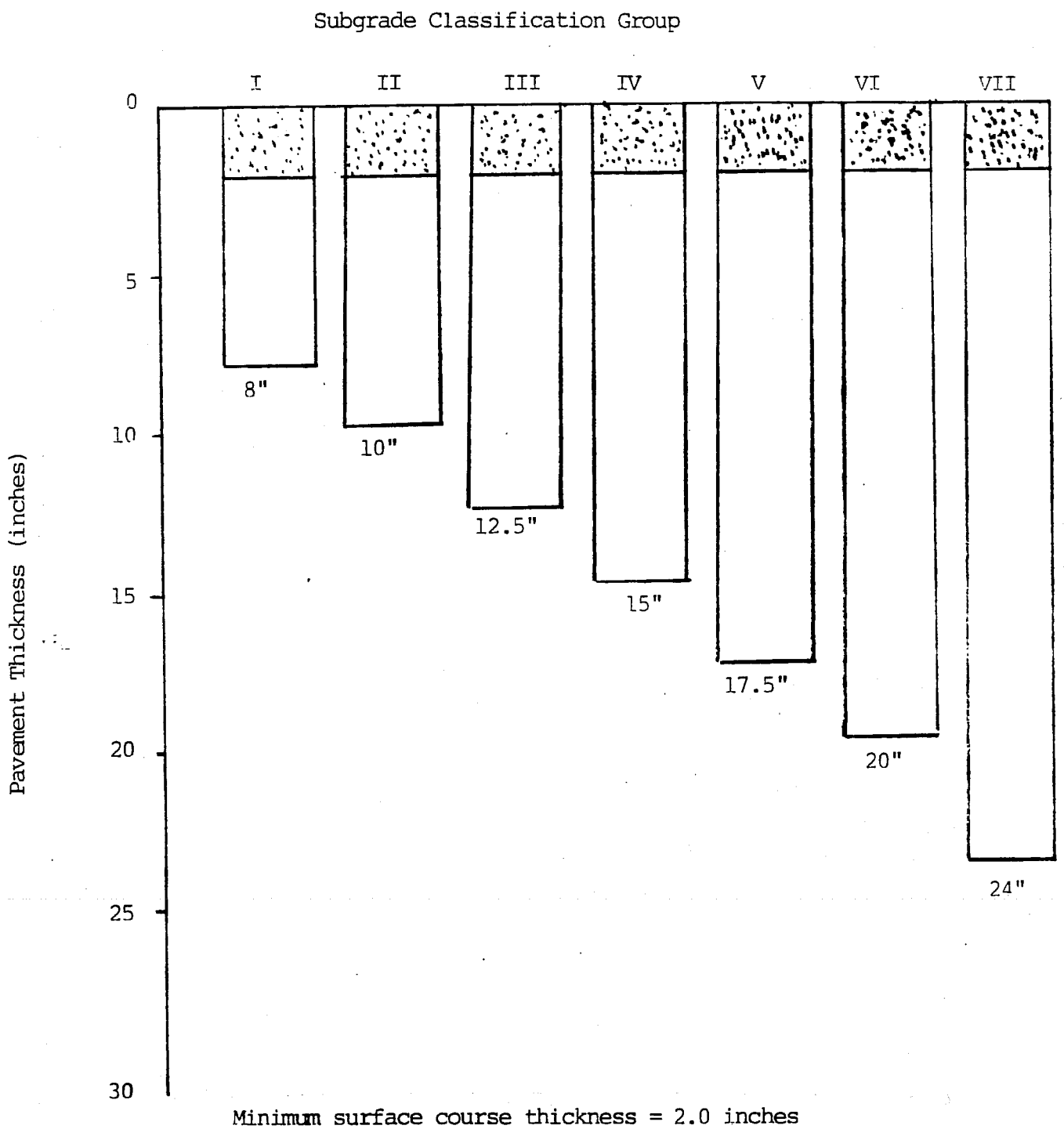


TABLE V

CITY OF COPPERAS COVE

PAVEMENT THICKNESS DESIGN CHART

OTHER STREETS



12. Subgrade Preparation:

A. If subgrade consists of fill material or natural, non-lime-stabilized material the top six (6) inches shall be compacted as required to ninety-five (95) percent modified Proctor Density.

B. Lime Stabilized Subgrade should be constructed in accordance with Texas Highway Department Item 260, Lime Treatment for Materials In-Place using the quantity of hydrated lime required by the design procedure. Hydrated lime should meet the requirements of Texas Highway Department Item 264. The well-mixed and cured soil-lime mixture should be compacted to a minimum of ninety-five (95) percent of ASTM D1557 maximum density at optimum moisture content.

Approved lime-stabilization procedures follow.

The existing subgrade shall be pulverized to a depth of six (6) inches and shall be treated with lime and water either in the form of a slurry or the materials may be applied to the subgrade separately.

The lime and moisture are to be uniformly mixed with the subgrade by the use of an approved pulvi-mixer. The section will then be brought to proper crown and grade. In the event that all clods and lumps are not sufficiently broken up by the pulvi-mixer, the soil-lime mixture shall be allowed to cure from two (2) to four (4) days as directed by the City Engineer. During the curing period, the material shall be kept moist as directed. After the curing is completed, the final mixing shall begin. The mixture (exclusive of all plus half (1/2) inch non-slaking aggregates) when properly mixed shall meet the following requirements when dry screened on a dry weight basis.

Passing 2" Screen	100%
Passing 1/2" Screen, Minimum	60%

Water shall be added during the mixing of soil and lime to attain the optimum moisture content to ninety-five (95) percent maximum density as determined by the modified Proctor method, ASTM Designation D1557.

After compaction is completed, the surface shall be shaped, water added as needed and finish rolled as directed with a pneumatic or other suitable roller sufficiently light to prevent cracking.

The completed section shall be moist cured until such time as the first course of base material is placed and compacted.

13. Flexible Base Course: Prior to placing the flexible base material on the subgrade, the surface of the subgrade shall be bladed and rolled, as necessary and to the extent directed in order to place the subgrade in an acceptable condition to receive the base material. The surface of the subgrade shall be smooth and conform to line and grade as established and in conformity with the typical section as shown on the plans. Sufficient subgrade shall be prepared in advance to insure satisfactory prosecution of the work.

Where the base course exceeds six (6) inches in thickness, it shall be constructed in two (2) or more courses of equal thickness as indicated on the typical section.

Immediately before placing the base course material, the subgrade shall be checked as to conformity with grade and section. The surface of the subgrade shall not show deviations in excess on one quarter (1/4) inch of five (5) feet, nor one-half (1/2) inch in sixteen (16) feet longitudinally.

The base course material shall be delivered in approved vehicles of a uniform capacity, and the required amount of specified material shall be delivered to secure the proper thickness of completed base course. Material deposited on the subgrade shall be spread and shaped the same day. All material shall be moved at least once from the original position in which it is deposited. The material shall be sprinkled, if directed, and shall then be bladed and shaped to conform to the typical section as shown on the plans. All areas and "nests" of segregated coarse or fine material shall be corrected or removed and replaced with well graded material as directed by the Engineer. If additional binder is considered desirable or necessary after the material is spread and shaped, it shall be furnished and applied in the amount directed by the Engineer. Such binder shall be carefully incorporated with the other approved methods. The course shall be sprinkled as required and compacted to the extent necessary to provide not less than the percent density as hereinafter specified. After each section of flexible base is completed, tests as necessary will be made. If the material fails to meet the density requirements, it shall be reworked as necessary to meet these requirements. Throughout this entire operation, the shape of the course shall be maintained by blading, and the surface upon completion shall be smooth and in conformity with typical sections shown on the plans and to the established lines and grades. On the surface where pavement is to be placed, any deviation in excess of one-fourth (1/4) inch in cross-section and in length of sixteen (16) feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and recompacting by sprinkling and rolling. All irregularities, depressions or weak spots which develop shall be corrected immediately by scarifying the areas affected, adding suitable material as required, reshaping and recompacting by sprinkling and rolling.

The base material shall be compacted at optimum moisture content to ninety-five (95) percent modified Proctor Density as determined by ASTM Designation D1557.

14. Bituminous Surfaces: All streets shall have a surface treatment of Hot Mix Asphaltic Concrete (HMAC) of the minimum thickness shown on the Standard Details, or, when approved in writing by the City Engineer, a two (2) course penetration type asphalt surface treatment may be applied. If the two (2) course penetration pavement is used, the thickness of the flexible base course must be increased by at least the difference in thickness between the HMAC surface course and the two (2) course penetration pavement in order to provide a combined total thickness of base course and surface treatment equal to or greater than the combined total thickness of the base course and HMAC pavement shown on the Standard Details or otherwise required.

A. Construction of HMAC Pavement: Prime coat, tack coat, and HMAC surface course or courses shall be placed in accordance with the following:

(1) Prime Coat: All base courses to receive asphaltic concrete pavement shall be cleaned and primed with a uniform application of asphaltic material as specified above. The priming material shall be applied with a self-propelled pressure distributor sprayer, except in places impossible to use a sprayer, at a rate of zero point fifteen (0.15) to zero point three (0.3) gallons per square yard of surface as determined by the Engineer. Subsequent application of pavement course shall not be laid until the primed surfaces have cured long enough to evaporate the volatiles. Alternate methods of application at the same coverage rates shall be used where the pressure distributor sprayer cannot be used.

(2) Tack Coat: When required to obtain a satisfactory bond between courses or between the prime coat and surface course, a tack coat shall be applied prior to placing the next course. Tack coat material shall be as specified under "Materials" above. The course to which the tack coat is applied shall be swept clean before the tack is applied. The asphalt tack coat material shall be applied uniformly with a sprayer at a maximum coverage of zero point ten (0.10) gallons per square yard of surface as directed by the Engineer. The surface of curbs, gutters, vertical faces of existing pavements, and all structures in actual contact with asphalt mixes shall be painted with a thin, complete coating of asphaltic tack coat material to provide a closely bonded, water- tight joint.

(3) Hot Mix Asphaltic Concrete construction methods shall conform to the requirements of Item 340 of the Texas Highway Department 1972 Standard Specifications for Construction of Highways, Streets and Bridges. Materials shall be as specified above under "Materials".

The compacted thickness or depth of the asphaltic concrete surface course shall be as shown on the plans or Standard Details. Where the plans require a depth or thickness of the surface course greater than two (2) inches, it shall be accomplished by constructed multiple courses of approximately equal depth.

All asphaltic concrete material shall be placed and rolled during daylight hours. The mixture shall be at a temperature between two-hundred twenty five (225) degrees F and three-hundred twenty five (325) degrees F when placed.

During the application of asphaltic material, care shall be taken to prevent splattering on adjacent pavement, curbs, gutters, and other structures.

(a) Joints: The placing of the mixture shall be as continuous as possible, and the roller shall pass over the unprotected edge of the freshly laid mixture only when the laying is discontinued for such length of time as will permit chilling or cooling of the mixture. In every case when resuming the work, the material previously laid shall be cut back to produce a slightly beveled edge for the full depth of the course. The material cut away shall be removed from the site of the work. Fresh mixture shall be laid against the fresh cut. Construction joints shall be either parallel to or at right angles to the longitudinal axis of the work.

(b) Compaction: The edges of the pavement along curbs, headers, manholes, valve boxes, and similar structures, and all places not accessible to the roller, or such areas where proper compaction cannot be obtained with the roller, shall be compacted with lightly oiled hand operated vibrating rollers, mechanical tamps, or hand tamped.

Each separate course after final compaction shall have a density of not less than ninety-five (95) percent of the density developed in the laboratory test method, ASTM D1188, "Test for Bulk Specific Gravity of Compacted Bituminous Mixtures, Using Paraffin-Coated Specimens".

(c) Testing: The surface of the pavement, after final compaction, shall be

smooth and true to the established line, grade, and cross section, and shall have no deviation in excess of one eighth (1/8) inch per foot from the nearest point of contact when tested with a sixteen (16) foot straight-edge placed parallel to the centering of the roadway. The maximum ordinate measured from the face of the straight-edge shall not exceed one-quarter (1/4) inch at any point. All areas not complying with this requirement shall be corrected. When required by the City Engineer, the completed pavement shall be sampled and tested for thickness and density.

The testing agency will cut cores from the pavement at locations selected by the Engineer in order to determine if the specified thickness, stability, and density have been obtained. If any core indicates a deficient thickness, the Contractor may cut additional cores at his own expense in order to define the area of deficiency. The Contractor shall remove and repair the areas of deficient thickness, stability, or density, designated by the Engineer at no extra cost.

B. Construction of Two Course Surface Treatment: Prime coat shall be required on all base course surfaces, as specified above for HMAC pavement, prior to construction of the two (2) course surface treatment. Materials shall be as specified above under "Materials". Construction methods shall conform to Item 322 of the Texas Highway Department Standard Specifications.

15. Curb and Gutter, Sidewalks, and Driveways: Construction of curb and gutter, concrete valleys, sidewalks, and driveway approaches shall conform to the following requirements. Concrete shall be Class B as specified under Item 2, "Concrete", of these Standard Specifications. No concrete shall be placed until the forms have been checked and approved by the City Inspector. Dimensions and conformation shall comply with the Standard Details appended to these specifications. Grades, alignment, and tolerances shall be as hereinbefore specified.

Forms shall be of wood or metal, of a section satisfactory to the Engineer, straight, free of warp and of a depth equal to the depth of the concrete face. They shall be securely staked to line and grade, and maintained in a true position during the depositing of concrete. Thin plywood, steel, or other similar material may be used to form short radius curb returns at driveways. The reinforcing steel, if required, shall be placed in position as shown on the typical sections. Care shall be exercised to keep all steel in its proper location.

A. Curb and Gutter: The length of curb and gutter placed in any one day shall be limited to the amount which can be furnished in daylight hours. The concrete shall be of sufficiently dry consistency when placed to permit shaping of the curb without a face form. The concrete shall be spaded along the forms to eliminate honeycomb and the gutter section shall be consolidated by tamping. The top section of curb and gutter shall be formed by a template or "mule" fabricated to match the contour of the curb and gutter. The lip of the gutter shall be "turned down" where necessary to match the adjacent grade of valley gutters.

When the concrete has set sufficiently, the top surface shall be finished uniformly with a wood float, and then tooled transversely at five (5) foot intervals and longitudinally at the gutter lip and the back of the curb with a quarter (1/4) inch radius edging tool. Expansion joints with half (1/2) inch thick premolded expansion joint filler shall be installed at ends of curb returns, at cold joints between pours, and at other locations required by the Standard

Details or as directed by the City Engineer.

As an option to the method described above, the concrete may be struck off one-quarter (1/4) inch to half (1/2) inch low, and a mortar topping of the same sand-cement ratio placed to fill the curb and gutter section. Finishing shall then be accomplished as specified above with a full-section mule, wood float, and edging. Topping must be placed while the base concrete is still plastic and prior to initial set. The face of the curb shall be marked where water and sewer service lines cross under the curb with the letters "W" or "S", as appropriate, and as specified under Item 3, Water System, and Item 4, Sewer System, of these specifications. The letters shall be three (3) inches high and shall be imprinted while the concrete is sufficiently plastic to receive a legible impression.

Completed curb and gutter shall be coated immediately with a curing compound as specified under Item 2, "Concrete". Immediately following the removal of forms, the formed surfaces shall have all honeycomb neatly patched and the surface treated with curing compound.

Backfill shall not be placed against the curb face for at least five (5) days, and the backfill shall not be compacted in a manner that will cause lateral displacement of the curb. Care shall also be exercised to prevent scarring or defacing of the exposed surfaces with equipment used for backfilling and grading.

B. Concrete Valleys shall be constructed in accordance with the Standard Details and to the grades indicated on the plans. Transitions to and from the standard curb and gutter sections at each end shall be such that water will not be trapped in the gutter section. The structure shall be monolithic with the curb and gutter at either end. Valleys shall have a wood float finish with transverse tooled joints as shown in the details. Steel reinforcement shall be provided as shown.

C. Sidewalks and Drive Approaches shall conform to the Standard Details appended to these specifications. The subgrade shall be compacted uniformly to the approximate density of the surrounding undisturbed material, and a one (1) inch sand cushion provided on the subgrade. Wire mesh reinforcement shall be provided in both sidewalks and drive approaches. Wire mesh shall be 6 x 6 - 10 / 10 for sidewalks and 6 x 6 - 6 / 6 for driveways. Expansion joints shall be installed at the intersection of drives and walks, where cold joints occur, and where walks or drives abut other concrete structures. Walks and drives shall have a light brush finish as specified under Item 2 / Concrete of these specifications. The edges shall be tooled with a one-quarter (1/4) inch radius edging tool, and walks shall also be tooled transversely at five (5) foot intervals. This pattern shall be continued through the drive approach apron. Curing compound shall be applied to the surface immediately after finishing is completed.

TECHNICAL SPECIFICATIONS

ITEM 6

STORM DRAINAGE

1. General: This item includes the construction of underground storm drainage facilities, particularly for new developments. The use of open channels shall be limited to major drainage facilities in open areas. Storm drainage facilities shall include inlets, manholes, pipe drains, culverts, headwalls, and pipe underdrains. All except underdrains shall be designed to convey the runoff from a one-hundred (100) year storm from the area served by the storm drain, including any contributing areas, without any significant ponding in streets or overflows onto adjacent property. All storm drains shall discharge into larger collector drains or outfall into natural major drainageways or streams within the same drainage area in such a manner as to not endanger downstream property or facilities from increased or concentrated flows caused by the storm drainage facility. Design of all storm drainage facilities must be approved by the City Engineer. Materials and construction methods shall conform to requirements specified hereinafter.

2. Excavation, Trenching, and Backfilling shall conform to the applicable requirements of Item 1 of these specifications except for bedding as specified below.

3. Concrete shall conform to the requirements of Item 2, "Concrete", of these specifications. Concrete for structures such as inlets, manholes,. and headwalls shall be Class A.

4. Storm Drain Lines and Culverts materials and construction shall conform to Items 464 and 465 of the Texas Highway Department Standard Specifications except as provided above. Pipe jointing materials shall be rubber gaskets or cold applied preformed plastic gaskets unless otherwise approved by the City Engineer. Bedding shall be Class B. Pipe shall be precast reinforced concrete unless otherwise approved.

5. Manholes and Inlets shall conform to Items 470 and 471 of the Texas Highway Department Standard Specifications.

6. Pipe Underdrains shall conform to Items 510 of the Texas Highway Department Standard Specifications, of the type pipe approved for use.

TECHNICAL SPECIFICATIONS

ITEM 7

TRENCH SAFETY SYSTEMS

1. DESCRIPTION: This item shall govern for the Trench Safety Systems required for all trench excavation and including all additional excavation and backfill necessitated by the safety system. A trench shall be defined as a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than fifteen (15) feet. Trench Safety Systems include, but are not limited to, sloping, sheeting, trench boxes or trench shields, sheet piling, cribbing, bracing, shoring, dewatering or diversion of water to provide adequate drainage.

2. CONSTRUCTION METHODS: Trench safety systems shall be accomplished in accordance with the detailed specifications set out in the provisions of Excavations, Trenching, and Shoring, Federal Occupational Safety and Health Administration (OSHA) Standards, 29CFR, Part 1926, Subpart P, as amended, including Proposed Rules published in the Federal Register (Vol. 52, No. 72) on Wednesday, April 15, 1987. The sections that are incorporated into these specifications by reference include Sections 1926-650 through 1926-653. Legislation that has been enacted by the Texas Legislature (H.B. No. 662 and H.B. 665 and any subsequent) with regard to Trench Safety Systems, is hereby incorporated, by reference, into these specifications.

   If the Contractor elects to use a trench protective system that, in the Proposed Rules, requires "design by a qualified person or a qualified Engineer", (for example see 1926-652 (b) (3) and 1926.652 (c) (4), "a qualified person or a qualified engineer" shall be a Professional Engineer Registered in the State of Texas.

3. SAFETY PROGRAM: The Contractor shall submit a safety program specifically for the construction of trench excavation.

   The trench safety program shall be in accordance with OSHA standards governing the presence and activities of individuals working in and around trench excavation.

4. INSPECTION: The Contractor shall make daily inspections of the Trench Safety Systems to ensure that the systems meet OSHA requirements. Daily inspection is to be made by a competent person provided by the Contractor with actual experience in trench safety systems.

   If evidence of possible cave-ins, or slides, is apparent, all work in the trench shall cease until the necessary precautions have been taken by the Contractor to safeguard personnel entering the trench. It is the sole duty, responsibility and prerogative of the Contractor, not the Owner or the Engineer, to determine the specific applicability of the designed trench safety systems to each field condition encountered on the project. The Contractor shall maintain a permanent record of daily inspections.

5. INDEMNIFICATION: The Contractor shall indemnify and hold harmless the City, its employees and agents, from any and all damages, costs (including, without limitation, legal fees, court costs, and the cost of investigation), judgements or claims by anyone for injury or death of persons resulting from the

collapse or failure of trenches constructed under this contract.

The Contractor acknowledges and agrees that this indemnity provision provides indemnity for the City in case the City is negligent either by act or omission in providing for trench safety, including, but not limited to, inspections, failure to issue stop work orders, and the hiring of the Contractor.

PART 1 G E N E R A L

1.01 PROJECT SUMMARY

A. Project is designed for the ultimate construction of a building approximately 6400 SF in size, to be erected by others. This project will be a Phased construction. Phase I will be to over excavate the building pad site to a width of 5 feet outside of the building envelope to a depth of 4 feet, and replace with select fill as determined in the Geotechnical Report issued as part of the project documents. At the completion of Phase I, Contractor will withdraw from the site, and allow the building contractor to place the concrete slab and erect the building. The estimated time for the work of building construction is 30 days, and is included in the contract time for substantial completion of 120 days. Phase II, Contractor will return when authorized by the Engineer to the site and complete site grading, concrete paving, detention outlet, striping, and concrete sidewalk.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. Work of the Contract is for construction of Site work to include building pad, site grading, concrete parking, and concrete sidewalk for an Information Systems Building.

CITY-FURNISHED PRODUCTS

A. Items Furnished by the City for Installation and final connection by Contractor: City crews will install water and sewer services to the building across the site during the 30 day period the building is being erected.

B. Contractor's Responsibilities:

1. Arrange and pay for Product delivery to the site.

2. Receive and unload Products at the site; jointly with the City, inspect for completeness or damage.

3. Handle, store, Install, and finish Products.

4. Repair or replace damaged items.

~~1.05~~ 1.06 WORK SEQUENCE

A. Construct the Work in Phases during the construction period, coordinate construction schedule and operations with the Engineer:

1. Phase 1: Building dimensions are included on a site plan as part of the Contract Documents. Contractor shall excavate an area 5 feet outside of the finished dimensions of the building, to a depth or 5 feet below the finished floor elevation of the proposed building. Select fill meeting the requirements of the 2004 TxDOT Item 247, Type A, Grade 3 or better shall be placed in 6-inch lifts in the manner as described in the Geotechnical Report, with 3 density tests for each lift. Moisture content shall be monitored within 3 percentage points to achieve 95 percent of ASTM D698 Maximum Dry Density.

2. Phase 2: Remobilize to site and complete grading operations, excavations, concrete work, detention outfall, and striping.

B. NOT USED.

C. Coordination of the Work: All work and schedules to be coordinated with the Engineer.

~~1.06~~ 1.07 CONTRACTOR USE OF PREMISES

A. Comply with procedures for access to the site and Contractor's use of rights-of-way as specified in Section 01145 - Use of Premises.

B. Construction Operations: Limited to the City's property.

C. Utility Outages and Shutdown: Provide a minimum of 48 hours notice to the City and private utility companies (when applicable), excluding weekends and holidays, in advance of required utility shutdown. Coordinate all work as required.

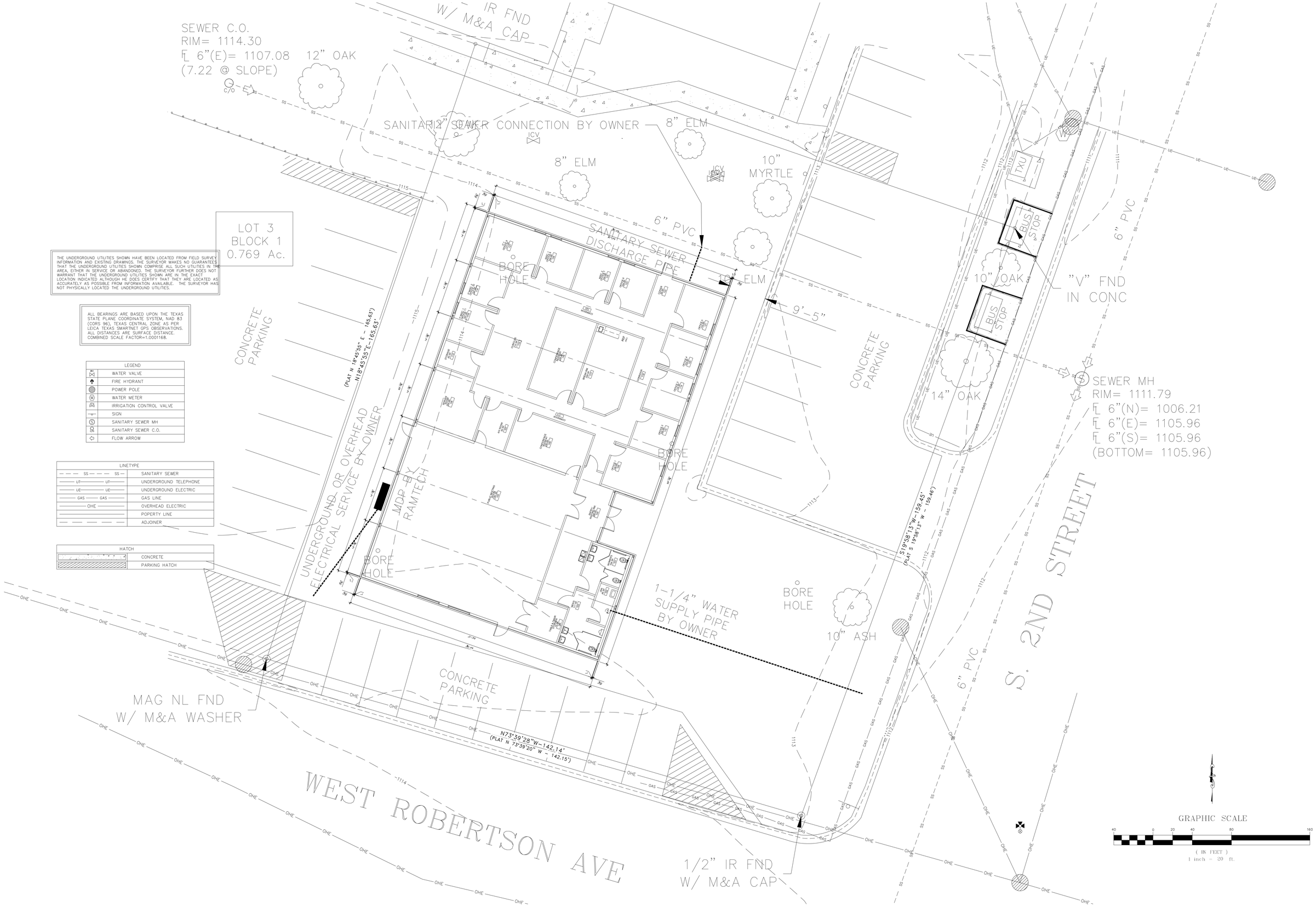
~~1.08~~1.09 WARRANTY

A. Comply with warranty requirements in accordance with Document 00700 - General Conditions.

PART 2 P R O D U C T S - Not Used

PART 3 E X E C U T I O N - Not Used

END OF SECTION


SEWER C.O.
RIM= 1114.30
FL 6"(E)= 1107.08
(7.22 @ SLOPE)
12" OAK
IR FND
W/ M&A CAP
SANITARY SEWER CONNECTION BY OWNER
8" ELM
8" ELM
10" MYRTLE
6" PVC
SANITARY SEWER DISCHARGE PIPE
10" ELM
9'-5"
LOT 3
BLOCK 1
0.769 Ac.
THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.
ALL BEARINGS ARE BASED UPON THE TEXAS STATE PLANE COORDINATE SYSTEM, NAD 83 (CORS 96), TEXAS CENTRAL ZONE AS PER LEICA TEXAS SMARTNET GPS OBSERVATIONS. ALL DISTANCES ARE SURFACE DISTANCE. COMBINED SCALE FACTOR=1.0001168.
LEGEND
WATER VALVE
FIRE HYDRANT
POWER POLE
WATER METER
IRRIGATION CONTROL VALVE
SIGN
SANITARY SEWER MH
SANITARY SEWER C.O.
FLOW ARROW
LINETYPE
SANITARY SEWER
UNDERGROUND TELEPHONE
UNDERGROUND ELECTRIC
GAS LINE
OVERHEAD ELECTRIC
POPERTY LINE
ADJOINER
HATCH
CONCRETE
PARKING HATCH
CONCRETE PARKING
(PLAT N 18°45'55" E - 165.63')
N18°45'55"E-165.63'
UNDERGROUND OR OVERHEAD ELECTRICAL SERVICE BY OWNER
MDP BY RAMTECH
BORE HOLE
BORE HOLE
BORE HOLE
1-1/4" WATER SUPPLY PIPE BY OWNER
10" ASH
CONCRETE PARKING
CONCRETE PARKING
TXU
BUS STOP
BUS STOP
10" OAK
"V" FND IN CONC
14" OAK
6" PVC
SEWER MH
RIM= 1111.79
FL 6"(N)= 1006.21
FL 6"(E)= 1105.96
FL 6"(S)= 1105.96
(BOTTOM= 1105.96)
S19°58'13"W-159.45'
(PLAT S 19°58'13" W - 159.46')
S. 2ND STREET
6" PVC
MAG NL FND
W/ M&A WASHER
N73°39'28"W-142.14'
(PLAT N 73°39'20" W - 142.15')
WEST ROBERTSON AVE
1/2" IR FND
W/ M&A CAP
GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft.

KLEINFELDER
Bright People. Right Solutions.

October 23, 2015

Mr. Greg Mitchell
I.S. Director
City of Copperas Cove
914 S. Main St.
Copperas Cove, TX, 76522

Attention: Mr. Greg Mitchell

Subject: **GEOTECHNICAL ENGINEERING STUDY**
PROPOSED MUNICIPAL BUILDING
508 S. 2nd STREET
COPPERAS COVE, TEXAS

Dear Mr. Mitchell:

This report transmits the findings of our geotechnical study for the proposed Municipal Building in Copperas Cove, Texas. The results of the study are included along with our recommendations for use during the design of the Municipal Building. We appreciate the opportunity of working for you on this investigation.

As an additional service, we would be pleased to review the plans and specifications which relied on our geotechnical investigation report. We can also provide construction phase services such as materials engineering, materials testing, and foundation installation observation.

If you have any questions regarding our report or wish to discuss any additional services, please call us at (512) 926-6650.

Sincerely,

KLEINFELDER, INC.
Texas Registered Engineering Firm F-5592

Jayson Buffkin, E.I.T.
Staff Professional

Endeson Juanda, P.E.
Vice President

GEOTECHNICAL ENGINEERING STUDY
PROPOSED MUNICIPAL BUILDING
508 S. 2nd STREET
COPPERAS COVE, TEXAS
20162588.001A

October 23, 2015

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A Report Prepared for:

Mr. Greg Mitchell
I.S. Director
City of Copperas Cove
914 S. Main St.
Copperas Cove, TX, 76522

GEOTECHNICAL ENGINEERING STUDY
PROPOSED MUNICIPAL BUILDING
508 S. 2nd STREET
COPPERAS COVE, TEXAS

Prepared by:

Jayson Buffkin, E.I.T.
Staff Professional

Reviewed by:

STATE OF TEXAS
ENDESON JUANDA
109607
LICENSED
PROFESSIONAL ENGINEER

October 23, 2015

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October 23, 2015
20162588.001A

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APPENDIX A

GBA Document

APPENDIX B

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GEOTECHNICAL ENGINEERING STUDY
PROPOSED MUNICIPAL BUILDING
COPPERAS COVE, TEXAS

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

This report presents the results of a geotechnical study for the proposed Municipal Building in Copperas Cove, Texas. The project is located at 508 South 2nd street, Copperas Cove, Texas. The project will consist of a single-story building with a footprint area of approximately 6,132 square feet. The proposed building will be constructed with a combination of wood and steel frame with wall loads of 2 kips per lineal foot and column loads less than 20 kips per square foot. It is anticipated that finished floor elevation will be within two feet of the current elevation. An additional light parking lot area will also be constructed.

Our recommendations are based on the provisions outlined in the Limitations section of this report. We recommend that all individuals read the report limitations along with the document from the Geoprofessional Business Association provided in Appendix A.

1.2 PURPOSE AND SCOPE

The purpose of this geotechnical study was to provide geotechnical design recommendations and construction considerations for the proposed Municipal Building. To accomplish the intended purpose, the study has been conducted based on the following scope:

1. Drill and sample a total of 5 borings to assess general subsurface conditions and to obtain samples for testing.
2. Perform laboratory tests on representative samples to assess pertinent engineering properties of the subsurface materials.
3. Perform engineering analyses, using the field and laboratory data to develop geotechnical recommendations for the proposed structure.

The recommendations contained herein are based on our understanding of the project described above, information provided by Ramtech Building Systems, and our stated assumptions. Once

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the design is complete and available, this report should be reviewed based on the project plans and specifications. It is possible that modification of our recommendations may be required based upon the final design.

1.3 FIELD EXPLORATION

Subsurface materials at the site were explored by drilling five (5) borings to depths ranging from 7 to 20 feet on October 9th, 2015. The borings were drilled with a truck-mounted drill rig at the locations indicated on the Plan of Borings. Logs of the borings showing the types of soils encountered are presented in Appendix A of this report. Soil and rock descriptions on the boring logs are a compilation of field data as well as from laboratory testing of samples. The stratification lines represent the approximate boundary between soil types and the transition can be gradual. Soil profiles (if presented in the report) are based on interpolation between borings and may not represent actual subsurface conditions.

Relatively undisturbed samples of cohesive soils encountered in the borings were taken by rapidly pushing a 3-inch OD thin wall Shelby tube sampler (ASTM D 1587) a distance of approximately 1-1/2 feet into the soil with hydraulic cylinders from the drill rig. Depths at which these samples were taken designated "U" are indicated in the "Sample" column of the boring logs. After a Shelby tube was recovered from a boring, the sample was carefully extruded in the field, examined visually and logged. A representative portion was selected, wrapped and sealed to prevent loss of moisture and to protect the sample during transportation. Estimates of the consistency of the cohesive soil samples were obtained in the field using a hand penetrometer. The result of a hand penetrometer reading is recorded at a corresponding depth in the "Penetrometer, TSF" column of the boring logs. When the capacity of the hand penetrometer is exceeded, the value of 4.5+ is recorded.

Samples of granular soils encountered in the borings were taken by driving a standard ASTM 2-in. OD split-spoon sampler (ASTM D 1586) a distance of 18 in. into the soil with a 140-lb hammer falling freely a distance of 30 in. Where resistance was high, the number of inches of penetration for 50 blows of the hammer was recorded. Depths at which the split-spoon samples were taken in these borings are designated "S" in the "Sample" column of the boring logs. The number of blows required to drive the sampler the final 12 in. of penetration or the inches of penetration for 50 blows is recorded at a corresponding depth in the "Blows per Ft" column of the

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boring logs. Representative portions of each split-spoon sample were selected and sealed in plastic bags to prevent loss of moisture.

The bedrock was evaluated in place by the Texas Highway Department (THD) cone penetrometer test utilizing a 3 inch steel cone driven by a 170 pound hammer dropped 24 inches. Either the number of blows required to produce 12 inches of penetration, or the inches of penetration due to 100 blows of the hammer are noted on the boring logs designated "T" in the "Penetration Resistance" column.

1.4 LABORATORY TESTING

Laboratory testing was performed on selected samples collected from the borings during drilling. These samples were selected as being generally representative of that stratum and/or boring(s). Testing was performed to allow for material classification according to the Unified Soil Classification System (ASTM D2487), and to evaluate the engineering properties of the materials. These tests included:

- Moisture content;
- Atterberg limits (liquid and plastic limits);
- Percent passing No. 200 sieve; and
- Unconfined Compressive Strength

The results of the laboratory tests are presented in Appendix B.

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2.0 SUBSURFACE MATERIALS AND CONDITIONS

2.1 REGIONAL GEOLOGY

Based on a review of the UT Bureau of Economic Geology Geologic Atlas of Texas, Waco Sheet, 1974 edition, reprinted 1995, and the contents of the borings, it is our opinion that all the natural materials are part of the Walnut Clay Formation. The Walnut Clay consists of clay, limestone and shale. The clay is calcareous, and the limestone is chalky, marly, nodular and thickly bedded. When present, the shale is thinly bedded and typically present in the upper portions of the formation.

Refer to the Logs of Borings in the Appendix for more detailed subsurface descriptions. Note that demarcation lines are interpretive of the field conditions, and that actual strata transitions in the field may be gradual.

2.2 SUBSURFACE STRATIGRAPHY

The various types and depths of subsurface strata observed in the Borings drilled for this study are shown on the “Boring Logs” contained in Appendix B. The strata thickness and general descriptions on the boring logs are based solely on the material observed in the borings drilled for this study.

The descriptions are general and depth ranges are approximate because boundaries between different strata are seldom clear and abrupt in the field. In addition, the lines separating major strata types on the Log of Boring sheets do not necessarily represent distinct lines of demarcation for the various strata.

2.3 GROUNDWATER OBSERVATIONS

Groundwater was not encountered within the project borings during drilling. The short-term field observations conducted for this study generally do not permit an accurate evaluation of the subsurface water levels at this location and should not be interpreted as a groundwater study. It is not unusual to encounter groundwater within the more pervious strata during and after periods of rainfall.

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It should be noted that the observations made during this study may not represent conditions at the time of construction and the presence of groundwater may affect certain construction activities and long-term performance of the foundations. The quantity of transient water is variable and is highly dependent on climatic conditions before and during construction. The foundation contractor should check the subsurface water conditions just prior to foundation excavation activities.

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3.0 ANALYSIS AND RECOMMENDATIONS

3.1 GENERAL

Based on the results of our evaluation, in our professional opinion, the project site can be developed using conventional grading and construction techniques.

3.2 EXPANSIVE SOIL CONSIDERATIONS

The most significant soil-related factor for design of structure at this site is the high shrink/swell potential of the clay soils observed in the borings. Clay soils in the Central Texas area are subject to expansive soil movement, which include swelling under moist conditions and shrinking under dry conditions. The moisture fluctuations occur due to seasonal wet and dry cycles, but can also be influenced after construction by grading and drainage, landscaping, groundwater conditions, and the presence of paving. Therefore, the soil movement is difficult to determine due to the many unpredictable variables involved. Lightly loaded items founded on these soils such as floor slabs, pavements, sidewalks, and utility lines will move in response to the movement of the supporting soils. In addition, expansive soils will also exert large upward pressures when restrained from vertical movements such as with load-bearing beams or shallow foundation footings.

The potential magnitude of the shrink/swell movements has been estimated using the Texas Department of Transportation (TxDOT) Potential Vertical Rise (PVR) procedure. The results of the laboratory tests, engineering judgment, and experience have also been considered. Based on TxDOT's method for estimating shrink/swell movements, the potential vertical rise (PVR) for a typical ground supported slab in a dry condition is approximately 2 ½ inches.

Recognize these values are not exact values but are only an indication of the potential movements due to expansive soil for seasonal moisture fluctuations. Actual movements may be significantly larger than estimated due to inadequate site grading, poor drainage, ponding surface water, and/or leaks in utility lines. Significant changes to existing site grading can also alter actual vertical movements by changing the thickness of the expansive soil and/or altering the active moisture zone depth.

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3.3 SHALLOW FOOTINGS

Structural loads may be supported on shallow spread footings bearing on either select fill or weathered limestone/shale bedrock, but may not be founded on a combination of select fill and bedrock for the given structure. In order to reduce differential settlement, that portion of the foundation that lies in cut areas of bedrock should be over excavated to a depth of a least 2 feet below the bottom of the footing and replaced with engineered select fill. This will provide a more uniform layer of support beneath the foundations.

The spread footings will have an allowable bearing pressure of 2,500 pounds per square foot (psf) for bearing on select fill and 4,000 (psf) for bearing on shale/weathered limestone bedrock. Allowable bearing pressures are dependent on foundation dimensions, depth of embedment, and tolerable settlement. The allowable bearing pressures assume minimum column and continuous footing widths of 24 inches and 18 inches, respectively. Shallow footings should have a minimum embedment depth of 24 inches below the finished subgrade elevation. The embedment depth is measured from finished grade for perimeter foundations and finished floor level for interior foundations. Larger footings and/or greater embedment depths will results in higher allowable bearing capacities. Kleinfelder can evaluate different footing dimensions and embedment depths upon request.

3.2 SLAB-ON-GRADE FOUNDATION SYSTEM

We anticipate that finished floor elevation is expected to be within 2 feet of existing grade. As discussed previously, potential vertical rise can occur up to 2 ½ inches. To reduce the potential movement to less than 1-inch, the floor slab should be placed on a prepared structural fill with a minimum thickness of 4 feet. The proposed select fill area of excavation should extend laterally a minimum of 5 feet beyond the exterior edge of the perimeter footing when the floor slab is used in conjunction with shallow footings. The site can then be brought up to grade using engineered fill as outlined in section 4.2.

The concrete slab should be designed and reinforced to minimize cracking as a result of shrinkage. Reinforcement should be installed at mid-height in the slab or as required by the structural design.

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Special precautions must be taken during the placement and curing of the concrete slab. Excessive slump (high water-cement ratio) of the concrete and/or improper curing procedures used during hot, cold, or excessively windy weather conditions could lead to excessive shrinkage, cracking, and/or curling in the slabs.

3.3 SEISMIC CONSIDERATIONS

For structural designs based upon the 2012 IBC, the following Criteria will apply. The Site Class is C. The Mapped Spectral Response Acceleration at short periods (S_S) is about 0.061g, and the Mapped Spectral Response Acceleration at a 1 second period (S_1) is about 0.036g. Site Coefficients F_a and F_V are 1.2 and 1.7 respectively. Hazards associated with slope stability, soil liquefaction, surface rupture, and lateral spreading are not considered to be a significant constraint with this site, due to the study area being in a seismically inactive area.

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4 CONSTRUCTION CONSIDERATIONS

4.1 SITE PREPARATION, GRADING, AND DRAINAGE

Existing structures, surficial vegetation, root systems, utilities, and any other underground structures must be removed beneath planned structure areas prior to construction. The stripping depth must be based on field observations with particular attention given to old drainage areas, uneven topography, and wet soils. The stripped subgrade must be firm and able to support the construction equipment without displacement. Soft or yielding subgrade must be corrected and made stable before construction proceeds. Proof-rolling should be used to detect soft spots or pumping subgrade areas. Proof-rolling should be performed using a heavy pneumatic tired roller, loaded dump truck, or similar piece of equipment weighing at least 25 tons.

Proof-rolling is intended to achieve additional compaction and to locate unstable areas, and must be observed by Kleinfelder. Soft spots or areas of pumping subgrade observed must be undercut and reworked. Where fill placement is planned, the proof-rolling must occur once the existing soils have been excavated and before the fill is placed and compacted. Proof-rolling is intended not only for the foundation area, but also within all areas of pavement, sidewalks, walls and other locations that will support surface loads. Prior to fill placement, the exposed subgrade must be scarified to a depth of approximately 6 inches; moisture conditioned, and recompacted to the density specified for fill.

Decorative vegetation and irrigation systems must not be located near foundations. It is important to provide proper grading and drainage around the foundation to not only prevent ponding of water but also to quickly remove the water to limit infiltration. As a general guideline, we suggest the following criteria be used for perimeter drainage:

- The building pad or the finished floor elevation must be elevated from the exterior finished grade to assist in draining the surface water away from the structure.
- Where possible extend paved surfaces up to the building line to serve as a barrier to soil moisture evaporation and infiltration. These surfaces must slope away from the structure.
- Outlets for gutter systems must discharge water either into storm drains or onto paved surfaces, which quickly remove the water from the area.
- In areas where grassed ditches are used to direct surface water away from the structure, the ditch must be designed hydraulically to accommodate the volume of water. In addition,

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the ditch centerline must be located well away from the foundation, preferably at least 10 feet, and must be provided with a slope of 3 to 5 percent. The slope from the structure to the ditch must be at least 5 percent.

- Area drains connected to storm drains and/or concrete lined ditches may also be considered to facilitate drainage where other measures are insufficient to quickly remove surface water.

4.2 TEMPORARY EXCAVATIONS

4.2.1 General

Excavations will be required for general site grading, construction of foundation elements, and installation of utilities at this site. It is anticipated that excavations will be in existing overburden soil and the underlying bedrock. Excavation of the soils should be possible with conventional heavy equipment such as backhoes, loaders, etc.

Weathered limestone and shale bedrock was encountered at approximate depths of ranging from 2 to 3 feet below existing grades. In some instances, the bedrock may be encountered at shallower depths. Rock excavation methods are anticipated to be required where rock is encountered during grading and in foundation and utility excavations. Weathered rock with a Standard Penetration Resistance (N) value of less than 25 blows per foot can generally be excavated with conventional heavy equipment such as rubber tired backhoes, loaders, etc. Excavation of harder, less weathered rock will most likely require the use of single-tooth rippers mounted on large tractors such as a Caterpillar D-8 or larger, pneumatic breakers, large trackhoes, or other rock excavating techniques to complete the excavations. Excavation of these materials in confined excavations will most likely be difficult. The contractor should perform his own explorations to evaluate the equipment required for the proposed excavations.

If encountered, typical temporary dewatering techniques or sumps should be sufficient to remove the water from the shallow excavations.

4.2.2 Excavation Slopes

Excavations should be cut to a stable slope or be temporarily braced, depending on the excavation depths and the subsurface conditions encountered. ***Temporary construction slopes should be designed in strict compliance with the most recent governing regulations.*** The contractor

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should also be aware that slope height, slope inclination or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state and/or federal safety regulations, such as OSHA Health and Safety Standard for Excavations, 29 CFR Part 1926, or successor regulations.

Construction slopes should be closely observed for signs of mass movement: tension cracks at the crest, bulging at the toe, etc. If potential stability problems are observed, a geotechnical engineer should be contacted immediately. ***The responsibility for excavation safety and stability of temporary construction slopes lies solely with the contractor.*** Shoring, bracing or underpinning, may be required to provide structural stability and to protect personnel working within the excavation.

4.3 SELECT FILL MATERIAL

Select fill material must be a non-expansive, well-graded soil with sufficient binder material for compaction purposes. Select Fill should meet the requirements of 2004 TxDOT Item 247, Type A, Grade 3 or better. If another, non-organic local source of select fill is desired, the following specification may also be used as a guide.

Maximum Aggregate…….…….....3 inches
Percent Retained on #4 Sieve……..25 - 50
Percent Retained on #40 Sieve……50 - 75
Plasticity Index ……..5 - 15
Non-Organic

The select fill material and near surface onsite soils must be compacted to at least 95 percent of ASTM D698 maximum dry density within 3 percentage points (wet or dry) of optimum moisture content. A maximum compacted lift thickness of six inches must be specified, with each lift tested for compliance prior to the addition of subsequent lifts. The placement and compaction of fill material must be observed, monitored, and tested by Kleinfelder on a full-time basis.

4.4 COMPACTION AND TESTING

Fill must be placed in horizontal lifts. Field density tests must be taken as each lift of fill material is placed. Generally, one field density test per lift for each 5,000 square feet of compacted area

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is recommended. For small areas or critical areas, the frequency of testing may need to be increased to one test per 2,500 square feet. At a minimum, three tests per lift must be required. Each lift must be compacted, tested, and approved before another lift is added. The purpose of field density tests is to provide some indication that uniform and adequate compaction is being obtained. The actual quality of the fill, as compacted, must be the responsibility of the contractor and satisfactory results from the tests must not be considered as a guarantee of the quality of the contractor's filling operations.

Backfill placed within utility trenches that cross under pavement or structure areas must be properly compacted. Numerous parking, drive, sidewalk, and landscape areas have undergone settlement due to soft backfill within utility trenches. Backfill placed in utility trenches or other excavated areas within the structure or paved area must be placed in lifts, compacted, and tested in accordance with these earthwork recommendations. Trenches should be opened a sufficient width to safely allow compaction equipment access to the backfill and to safely allow for confirmation testing to occur. Backfill must be placed in horizontal lifts, and if the trench is over 4 to 5 feet deep, the side slopes must be benched before placing the backfill.

4.5 FOUNDATION DESIGN AND CONSTRUCTION CRITERIA

The following criteria and general guidance must be observed during foundation design and construction:

- Footings for the foundation system should preferably be neat excavated. Excavation should be accomplished with a smooth-mouthed bucket. If a toothed bucket is used, excavation with this bucket should be stopped twelve (12) inches above final grade and the grade beam excavation completed with a smooth-mouthed bucket or by hand labor.
- The foundation excavation should be sloped sufficiently to create internal sumps for runoff collection and removal. Foundation excavations subject to rainfall and possible deterioration from accumulated water should be protected using a protective “mud-slab” (concrete) of not less than 4 inches thickness. If surface runoff water or groundwater seepage accumulates at the bottom of the foundation excavation, it should be collected and removed and not allowed to adversely affect the quality of the bearing surface.

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- The foundation construction must be observed by a qualified geotechnical engineer to evaluate if the proper bearing material has been reached in accordance with the recommendations given herein.
- The foundation excavations must be evaluated with respect to project plans and specifications for size and other construction tolerances and cleaned of loose material prior to the placement of concrete. Precautions must be taken during the placement of reinforcement and concrete to prevent the loose excavated material from falling into the excavation.
- Prior to the placement of concrete, water, if present, must be removed from the foundation excavation. Prolonged exposure or inundation of the bearing surface with water may result in changes in bearing strength and compressibility characteristics. If delays occur, the footing excavations should be deepened and cleaned, in order to provide a fresh bearing surface.
- Prompt placement of concrete in the excavation is strongly recommended. Under no circumstances should a footing be excavated that cannot be filled with concrete before the end of the work day.

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5.0 PAVEMENT RECOMMENDATIONS

5.1 DESIGN CONSIDERATIONS

Pavement thickness designs have been developed for the pavements at the proposed Municipal Building. The performance and structural thickness of the pavement depends on several factors including:

- Characteristics of the support soil;
- Magnitude and frequency of wheel load applications;
- Quality of available construction materials;
- Site drainage characteristics; and
- Pavement design life.

5.2 SUBGRADE SUPPORT CHARACTERISTICS

Based on the subsurface materials observed at the boring locations, the predominant subgrades at this site will be native FAT CLAY. The pavement support characteristics of the subgrade materials were estimated from correlations presented in the literature between soil index properties and resilient modulus values. The results are summarized in Table 5.1.

TABLE 5.1: SUBGRADE SUPPORT VALUES

Subgrade	Resilient Modulus (ksi)
Clay Soils	4.0

5.3 TRAFFIC ESTIMATES

The types of traffic anticipated to use access the facility will include passenger cars, small delivery trucks, and garbage collection vehicles. Traffic volumes are expressed as the number of Equivalent 18-kip single axle load applications (ESALs) over the pavement design life. An ESAL value of 25,000 was used for the light duty parking areas, and a value of 250,000 ESALs was used for the bus and truck access area parking. These numbers are only estimates and should be reviewed if detailed traffic information becomes available.

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5.4 PAVEMENT THICKNESS DESIGNS FOR A NEW PAVEMENT

Pavement thickness calculations for the new rigid and flexible pavement sections were performed using Pavement Analysis Software (WinPAS), Version 1.0.4, which is based on the AASHTO pavement design procedures. Values used in the analysis of the pavement capacity are as follows:

- 85% Reliability
- 0.35 Overall Deviation (rigid)
- 0.45 Overall Deviation (flexible)
- 4,000 (psi) Concrete compressive strength at 28 days
- 4,252,500 psi Concrete Modulus of Elasticity
- 3.2 Load Transfer Coefficient
- 1.1 Drainage Coefficient (assumes slow, positive drainage)
- 4.2 Initial Serviceability
- 2.0 Terminal Serviceability
- 20 year design life

TABLE 5.2: PAVEMENT THICKNESS – RIGID

Traffic	Pavement Section
Light Duty Pavement (Automobile Parking only)	5.0" Portland Cement Concrete Pavement 6.0” Crushed Limestone Base
Heavy Duty Pavement (Bus and Truck Access Areas)	6.0" Portland Cement Concrete Pavement 6.0” Crushed Limestone Base

TABLE 5.3: PAVEMENT THICKNESS – FLEXIBLE

Traffic	Pavement Section
Light Duty Pavement (Automobile Parking only)	3" Hot-Mix Asphalt Concrete 12.0” Crushed Limestone Base
Heavy Duty Pavement (Bus and Truck Access Areas)	5" Hot-Mix Asphalt Concrete 12” Crushed Limestone Base

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5.5 PAVEMENTS ON EXPANSIVE SOILS

As discussed in Section 3.2, we anticipate potential vertical movement of approximately 2 ½ inches. If the pavement cannot withstand this type of movement, subgrade modification may be used. If subgrade modification is considered an option, Kleinfelder should be notified to provide recommendations based on allowable tolerance.

The sub base should extend a minimum of 12 inches outside the curb line. This will improve the support for the edge of the pavement and also lessen the "edge effect" associated with shrinkage during dry periods. The use of sand as a leveling course below pavement in expansive clay areas should be prevented as these porous soils can allow water inflow between the pavement and subgrade, facilitating heave and strength loss within the subgrade soil.

It is important to reduce moisture changes in the pavement subgrade and sub base. The pavement and adjacent areas should be well drained. The pavement and surrounding grades must have positive drainage that quickly removes surface water and inhibits the absorption of surface water into the subgrade soils. Regular maintenance should be performed on cracks in the pavement surface to reduce water passing through to the base or sub base material. Even with these precautions, some distress may still occur, which will require periodic maintenance.

Consideration should be given to the location of existing and proposed trees, as they have been documented to desiccate surrounding subgrade soil and result in soil shrinkage and settlement. The zone of the desiccation varies by tree, but it is generally recommended that trees are set back so that the drip-line of the mature tree will not extend over or near the pavement structure. If existing mature trees are allowed to remain adjacent to the roadway, we recommend the installation of root barriers to keep these trees from causing differential movement of the new roadway.

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5.6 MATERIAL SPECIFICATIONS

The subgrade and pavement should be specified, constructed, and tested to meet the following requirements:

- Hot Mix Asphaltic Concrete Surface Course - Texas Department of Transportation (TxDOT) Item 340, Type C or D.
- Portland Cement Concrete - TxDOT Item 360 - Concrete with a minimum 28 day compressive strength of 4,000 psi is recommended for the pavement. Concrete should be reinforced with dowels at joints for load transfer. Concrete should include air entrainment to increase temperature resistance.
- Crushed Limestone Base Material - TxDOT Item 247, Type A, Grade 2 or better. The material should be compacted in lifts not to exceed 6 inches compacted thickness at a minimum of 100% of TEX-113-E maximum dry density.
- Subgrade - The subgrade should be compacted to at least 95% of TEX-113-E (or ASTM D698) maximum dry density at a moisture content range of -1 to +3 percent of optimum moisture content. Fill material should be placed in 6-inch compacted lifts.

Jointing and reinforcement should conform to the American Concrete Institute Guide for Design and Construction of Concrete Parking Lots, ACI Report 330, latest edition. The gradient of paved surfaces should ensure positive drainage. Water should not pond in areas directly adjoining paved sections.

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6.0 DESIGN REVIEW

Kleinfelder was provided with preliminary boring location plan and design information. We must be consulted of any changes so that we may re-evaluate our recommendations. We also must be given the opportunity to review construction documents to affirm that our recommendations have been interpreted correctly. We cannot be responsible for misinterpretations if not given the opportunity to review aspects of the project that are based on the contents of this report. Such a review is considered an additional service.

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7.0 LIMITATIONS

This work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions and at the date the services are provided. Our conclusions, opinions and recommendations are based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated. Kleinfelder makes no other representation, guarantee or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

This report may be used only by the Client and the registered design professional in responsible charge and only for the purposes stated for this specific engagement within a reasonable time from its issuance, but in no event later than two (2) years from the date of the report.

The work performed was based on project information provided by the Client. If the client/owner does not retain Kleinfelder to review any plans and specifications, including any revisions or modifications to the plans and specifications, Kleinfelder assumes no responsibility for the suitability of our recommendations. In addition, if there are any changes in the field to the plans and specifications, Client must obtain written approval from Kleinfelder's engineer that such changes do not affect our recommendations. Failure to do so will invalidate Kleinfelder's recommendations

The scope of services was limited to conducting five (5) borings to depths of up to 20 feet along with associated laboratory testing. It should be recognized that definition and evaluation of subsurface conditions are difficult. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the subsurface conditions present due to the limitations of data from field studies. The conclusions of this assessment are based on the information obtained from the borings, the laboratory test results, and the engineering analysis.

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. Although risk can never be eliminated, more detailed and extensive studies yield more information, which may help understand and manage the level of risk. Since detailed study and analysis involves greater expense, our clients participate in determining levels of service, which provide information for their purposes at acceptable levels of risk. The client and

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key members of the design team should discuss the issues covered in this report with Kleinfelder, so that the issues are understood and applied in a manner consistent with the owner's budget, tolerance of risk and expectations for future performance and maintenance.

Recommendations contained in this report are based on our field observations and subsurface explorations, limited laboratory tests, and our present knowledge of the proposed construction. It is possible that soil, rock or groundwater conditions could vary between or beyond the points explored. If soil, rock or groundwater conditions are encountered during construction that differ from those described herein, the client is responsible for ensuring that Kleinfelder is notified immediately so that we may reevaluate the recommendations of this report. If the scope of the proposed construction, including the estimated building loads, and the design depths or locations of the foundations, changes from that described in this report, the conclusions and recommendations contained in this report are not considered valid unless the changes are reviewed, and the conclusions of this report are modified or approved in writing, by Kleinfelder.

As the geotechnical engineering firm that performed the geotechnical evaluation for this project, Kleinfelder should be retained to confirm that the recommendations of this report are properly incorporated in the design of this project, and properly implemented during construction. This may avoid misinterpretation of the information by other parties and will allow us to review and modify our recommendations if variations in the soil conditions are encountered. As a minimum Kleinfelder should be retained to provide the following continuing services for the project:

- Review the project plans and specifications, including any revisions or modifications;
- Observe and evaluate the site earthwork operations to confirm subgrade soils are suitable for construction of foundations, slabs-on-grade, and placement of engineered fill;
- Confirm engineered fill for the structure and other improvements is placed and compacted per the project specifications;
- Observe foundation bearing soils to confirm conditions are as anticipated.

The scope of services for this subsurface exploration and geotechnical report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

Kleinfelder cannot be responsible for interpretation by others of this report or the conditions encountered in the field. Kleinfelder must be retained so that all geotechnical aspects of

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construction will be monitored on a full-time basis by a representative from Kleinfelder, including site preparation, preparation of foundations, installation of piles, and placement of engineered fill and trench backfill. These services provide Kleinfelder the opportunity to observe the actual soil, rock and groundwater conditions encountered during construction and to evaluate the applicability of the recommendations presented in this report to the site conditions. If Kleinfelder is not retained to provide these services, we will cease to be the engineer of record for this project and will assume no responsibility for any potential claim during or after construction on this project. If changed site conditions affect the recommendations presented herein, Kleinfelder must also be retained to perform a supplemental evaluation and to issue a revision to our original report.

The scope of this investigation does not include specific activities and investigations designed to reveal whether a solid waste landfill exists upon the subject land tract other than what may be determined through incidental encounter in the soil borings. Such investigations designed for this specific purpose are described and required by TCEQ rules (30 TAC 330.951-330.964) effective March 2006. The scope of this investigation does not include environmental evaluations of surface and subsurface conditions, and the lack of that information in this report does not indicate an absence of potential environmental problems.

This report, and any future addenda or reports regarding this site, may be made available to bidders to supply them with only the data contained in the report regarding subsurface conditions and laboratory test results at the point and time noted. Bidders may not rely on interpretations, opinion, recommendations, or conclusions contained in the report. Because of the limited nature of any subsurface study, the contractor may encounter conditions during construction which differ from those presented in this report. In such event, the contractor should promptly notify the owner so that Kleinfelder's geotechnical engineer can be contacted to confirm those conditions. We recommend the contractor describe the nature and extent of the differing conditions in writing and that the construction contract include provisions for dealing with differing conditions. Contingency funds should be reserved for potential problems during earthwork and foundation construction. Furthermore, the contractor should be prepared to handle contamination conditions encountered at this site, which may affect the excavation, removal, or disposal of soil; dewatering of excavations; and health and safety of workers.

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APPENDIX A

Important Information about Your

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical-Engineering Report Is Based on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical-engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical-engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold-prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your GBA-Member Geotechncial Engineer for Additional Assistance

Membership in the GEOPROFESSIONAL BUSINESS ASSOCIATION exposes geotechnical engineers to a wide array of risk confrontaton techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your GBA-member geotechnical engineer for more information.

GEOPROFESSIONAL BUSINESS ASSOCIATION

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

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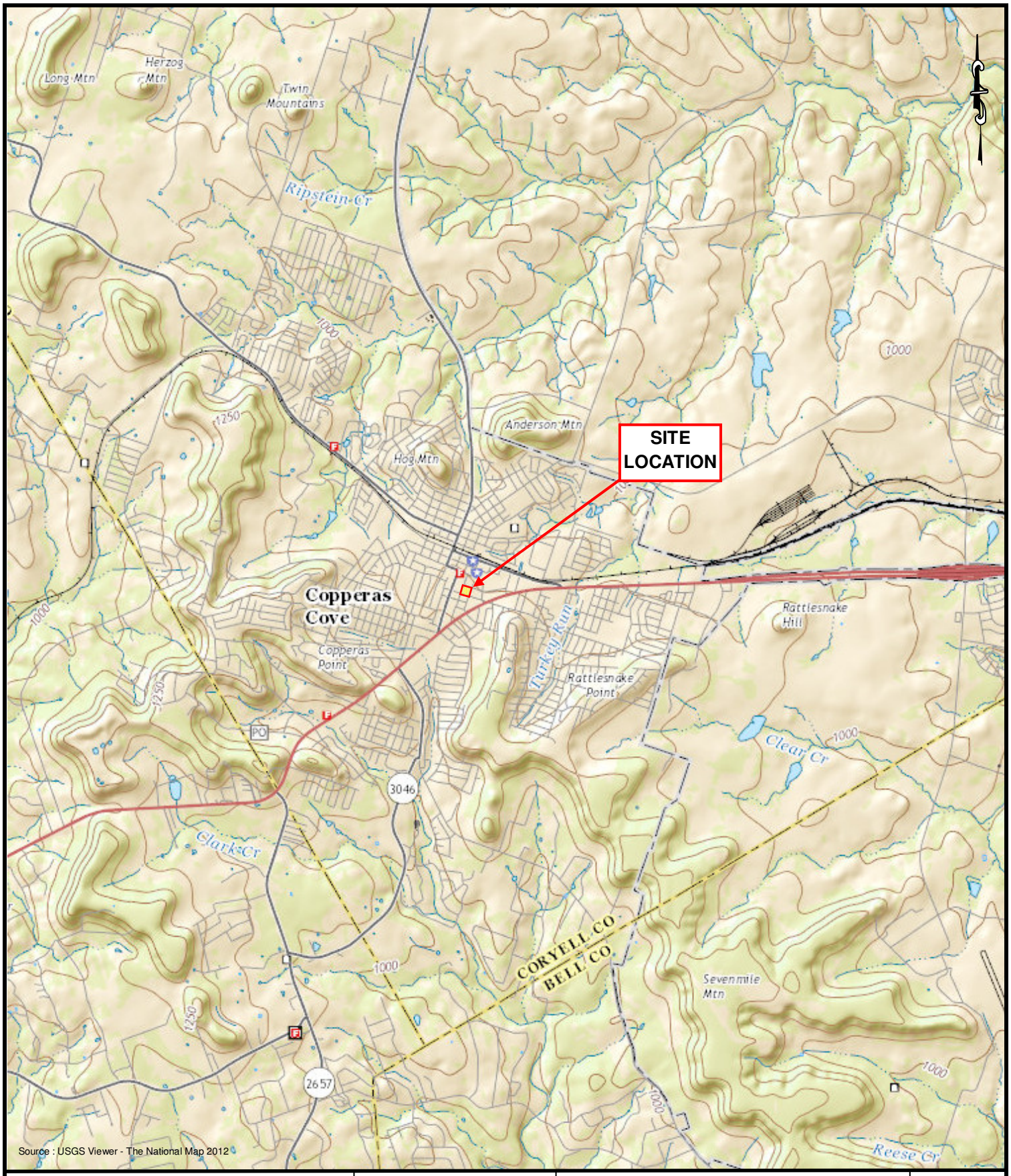
APPENDIX B



Source : USGS Viewer - The National Map 2012

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PROJECT NO.	20162588.001A
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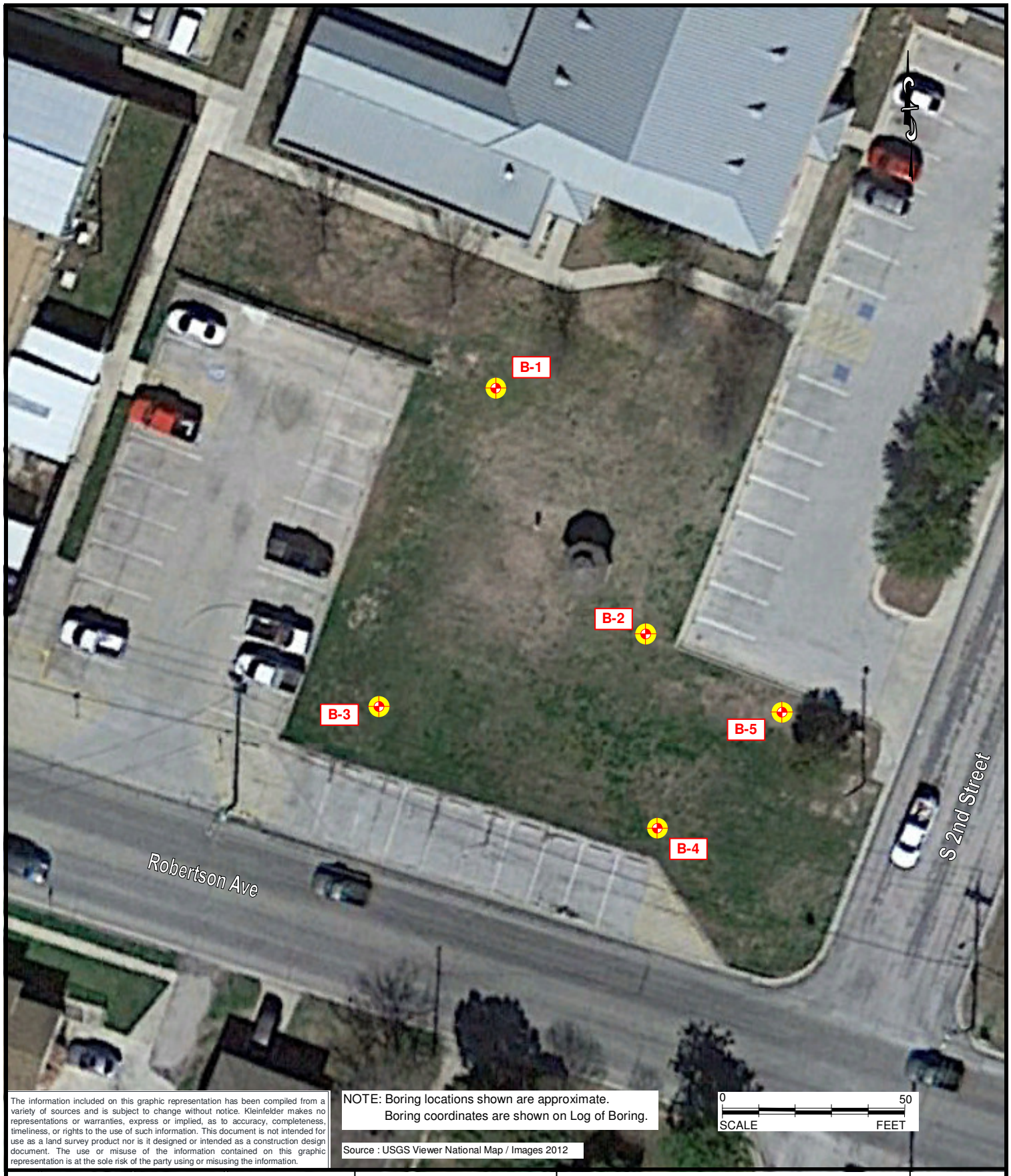
CHECKED BY:	JB
FILE NAME:	G:/ Geotech / 2015 Projects / 20162588 Copperas Cove Maint Bldg / Fig 1

SITE LOCATION MAP

Proposed Municipal Building
508 S. 2nd Street
Copperas Cove, Texas

FIGURE

1



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NOTE: Boring locations shown are approximate.
Boring coordinates are shown on Log of Boring.

Source : USGS Viewer National Map / Images 2012

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PLAN OF BORINGS

Proposed Municipal Building
508 S. 2nd Street
Copperas Cove, Texas

FIGURE
2

SAMPLE/SAMPLER TYPE GRAPHICS

- AUGER CUTTINGS
- NO RECOVERY
- SHELBY TUBE SAMPLER
- STANDARD PENETRATION SPLIT SPOON SAMPLER (2 in. (50.8 mm.) outer diameter and 1-3/8 in. (34.9 mm.) inner diameter)
- TEXAS CONE PENETRATION

GROUND WATER GRAPHICS

- WATER LEVEL (level where first observed)
- WATER LEVEL (level after exploration completion)
- WATER LEVEL (additional levels after exploration)
- OBSERVED SEEPAGE

NOTES

- The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.
- Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown.
- No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
- Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
- In general, Unified Soil Classification System designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.
- Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing the No. 200 sieve require dual USCS symbols, ie., GW-GM, GP-GM, GW-GC, GP-GC, GC-GM, SW-SM, SP-SM, SW-SC, SP-SC, SC-SM.
- If sampler is not able to be driven at least 6 inches then 50/X indicates number of blows required to drive the identified sampler X inches with a 140 pound hammer falling 30 inches.
- TCP-Texas Cone Penetrometer: A 3 inches diameter by 2.5 inches long 60 degree conical point driven with a 170 ±2 pound hammer dropped 24 ±0.5 inches.

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	**GRAVELS** (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu ≥4 and 1≤Cc≤3	**GW**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			Cu <4 and/ or 1>Cc >3	**GP**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH 5% TO 12% FINES	Cu ≥4 and 1≤Cc≤3	**GW-GM**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
				GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
			Cu <4 and/ or 1>Cc >3	**GP-GM**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
				GP-GC	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
		GRAVELS WITH > 12% FINES		**GM**	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
				GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu ≥6 and 1≤Cc≤3	**SW**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			Cu <6 and/ or 1>Cc >3	**SP**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH 5% TO 12% FINES	Cu ≥6 and 1≤Cc≤3	**SW-SM**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
				SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
			Cu <6 and/ or 1>Cc >3	**SP-SM**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
				SP-SC	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
		SANDS WITH > 12% FINES		**SM**	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
				SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES

FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid Limit less than 50)	**ML**	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid Limit greater than 50)	**MH**	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
		OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY

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CHECKED BY:	JB
DATE:	10/16/2015
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GRAPHICS KEY

Proposed Municipal Building
508 South 2nd Street
Copperas Cove, Texas

FIGURE
3

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gINT FILE: PROJECTWISE: 20162588 Copperas Cove Maintenance Building.gpj
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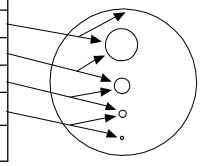
GRAIN SIZE

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		>12 in. (304.8 mm.)	>12 in. (304.8 mm.)	Larger than basketball-sized
Cobbles		3 - 12 in. (76.2 - 304.8 mm.)	3 - 12 in. (76.2 - 304.8 mm.)	Fist-sized to basketball-sized
Gravel	coarse	3/4 -3 in. (19 - 76.2 mm.)	3/4 -3 in. (19 - 76.2 mm.)	Thumb-sized to fist-sized
	fine	#4 - 3/4 in. (#4 - 19 mm.)	0.19 - 0.75 in. (4.8 - 19 mm.)	Pea-sized to thumb-sized
Sand	coarse	#10 - #4	0.079 - 0.19 in. (2 - 4.9 mm.)	Rock salt-sized to pea-sized
	medium	#40 - #10	0.017 - 0.079 in. (0.43 - 2 mm.)	Sugar-sized to rock salt-sized
	fine	#200 - #40	0.0029 - 0.017 in. (0.07 - 0.43 mm.)	Flour-sized to sugar-sized
Fines		Passing #200	<0.0029 in. (<0.07 mm.)	Flour-sized and smaller

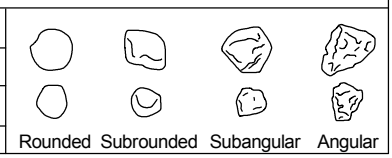


Munsell Color

NAME	ABBR
Red	R
Yellow Red	YR
Yellow	Y
Green Yellow	GY
Green	G
Blue Green	BG
Blue	B
Purple Blue	PB
Purple	P
Red Purple	RP
Black	N

ANGULARITY

DESCRIPTION	CRITERIA
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular	Particles are similar to angular description but have rounded edges
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges
Rounded	Particles have smoothly curved sides and no edges



Particles Present

Amount	Percentage
trace	<5
few	5-10
little	15-25
some	30-45
and	50
mostly	50-100

PLASTICITY

DESCRIPTION	LL	FIELD TEST
Non-plastic	NP	A 1/8-in. (3 mm.) thread cannot be rolled at any water content.
Low (L)	< 30	The thread can barely be rolled and the lump or thread cannot be formed when drier than the plastic limit.
Medium (M)	30 - 50	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump or thread crumbles when drier than the plastic limit
High (H)	> 50	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump or thread can be formed without crumbling when drier than the plastic limit

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

REACTION WITH HYDROCHLORIC ACID

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT-N_{60} (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)
Very Loose	<4	<4	<5	0 - 15
Loose	4 - 10	5 - 12	5 - 15	15 - 35
Medium Dense	10 - 30	12 - 35	15 - 40	35 - 65
Dense	30 - 50	35 - 60	40 - 70	65 - 85
Very Dense	>50	>60	>70	85 - 100

NOTE: AFTER TERZAGHI AND PECK, 1948

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (q_u)(psf)	CRITERIA
Very Soft	< 1000	Thumb will penetrate soil more than 1 in. (25 mm.)
Soft	1000 - 2000	Thumb will penetrate soil about 1 in. (25 mm.)
Firm	2000 - 4000	Thumb will indent soil about 1/4-in. (6 mm.)
Hard	4000 - 8000	Thumb will not indent soil but readily indented with thumbnail
Very Hard	> 8000	Thumbnail will not indent soil

STRUCTURE

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4-in. thick, note thickness
Laminated	Alternating layers of varying material or color with the layer less than 1/4-in. thick, note thickness
Fissured	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided	Fracture planes appear polished or glossy, sometimes striated
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness
Homogeneous	Same color and appearance throughout

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

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SOIL DESCRIPTION KEY

Proposed Municipal Building
508 South 2nd Street
Copperas Cove, Texas

FIGURE
4

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Date Begin - End:	10/09/2015	**Drilling Company:**	Texas GeoBore		**BORING LOG B-1**
Logged By:	J. Buffkin	**Drill Crew:**	C. Garcia		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	B59 Mobile	**Hammer Type - Drop:**	140 lb. Cathead - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Continuous Flight Auger		
Weather:	Not Available	**Bore Diameter:**	6 in. O.D.		

FIELD EXPLORATION

Latitude: 31.12009° N
Longitude: -97.90289° W
Surface Condition: Grass

Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf Texas Cone(TC)= blows/6	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		TOPSOIL: 6 inches thick											
		Fat CLAY with Gravel (CH): dark brown, moist, hard		PP=4.5+		CH	19.2			95	78	52	
				PP=4.5+		CH	15.7		99	94	77	52	
		Weathered LIMESTONE with Clay Seams: tan, moist		BC=50/6"									
5				BC=50/6"									
		SHALE with thin bedded Limestone Seams: tan, moist, marly											
				BC=50/5.5"									
				BC=50/3"									
10													
15				TC=50/1" 50/1"									
20				TC=50/1.5" 50/0.5"									

LABORATORY RESULTS

The boring was terminated at approximately 20 ft. below ground surface. The boring was backfilled with auger cuttings on October 09, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
GENERAL NOTES:

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BORING LOG B-1

Proposed Municipal Building
508 South 2nd Street
Copperas Cove, Texas

FIGURE
5

PAGE: 1 of 1

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gINT TEMPLATE: PROJECTWISE: KLF_STANDARD_GINT_LIBRARY_2016.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End:	10/09/2015	**Drilling Company:**	Texas GeoBore		**BORING LOG B-2**
Logged By:	J. Buffkin	**Drill Crew:**	C. Garcia		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	B59 Mobile	**Hammer Type - Drop:**	140 lb. Cathead - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Continuous Flight Auger		
Weather:	Not Available	**Bore Diameter:**	6 in. O.D.		

FIELD EXPLORATION

Latitude: 31.11992° N
Longitude: -97.90273° W
Surface Condition: Grass

Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf Texas Cone(TC)= blows/6	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		TOPSOIL: 6 inches thick											
		Fat CLAY with Gravel (CH): dark brown, moist, hard		PP=4.5+		CH	15.0	103.8		87	57	35	**Unc. Comp. Str.=** q_u: 11.363 tsf Strain at Failure: 2.3%
		SHALE with thin bedded Limestone Seams: tan, moist, hard, marly		BC=24 50/6"									
5		- little recovery		BC=50/3.5"									
				BC=50/6"									
				BC=50/3"									
10													
15				TC=50/1" 50/0.5"									
20				TC=50/1" 50/0.25"									

The boring was terminated at approximately 20 ft. below ground surface. The boring was backfilled with auger cuttings on October 09, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
GENERAL NOTES:

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BORING LOG B-2

Proposed Municipal Building
508 South 2nd Street
Copperas Cove, Texas

FIGURE
6

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Date Begin - End:	10/09/2015	**Drilling Company:**	Texas GeoBore		**BORING LOG B-3**
Logged By:	J. Buffkin	**Drill Crew:**	C. Garcia		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	B59 Mobile	**Hammer Type - Drop:**	140 lb. Cathead - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Continuous Flight Auger		
Weather:	Not Available	**Bore Diameter:**	6 in. O.D.		

FIELD EXPLORATION

Latitude: 31.11979° N
Longitude: -97.90301° W
Surface Condition: Grass

Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf Texas Cone(TC)= blows/6	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		TOPSOIL: 6 inches thick											
		Lean CLAY with Sand and Gravel (CL): brown to tan, moist, top soil, little recovery		BC=50/5.5"		CL	7.4		94	84	44	26	
		SHALE with thin bedded Limestone Seams: tan, dry, highly fractured		BC=28 50/4"									
5		- little recovery		BC=50/2"									
				BC=50/3.5"									
				BC=50/2.5"									
10													
15				TC=50/2" 50/0.25"									
20				TC=50/0.5" 50/0.5"									

The boring was terminated at approximately 20 ft. below ground surface. The boring was backfilled with auger cuttings on October 09, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
GENERAL NOTES:

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PROJECT NO.:	20162588
DRAWN BY:	GW
CHECKED BY:	JB
DATE:	10/16/2015
REVISED:	-

BORING LOG B-3

Proposed Municipal Building
508 South 2nd Street
Copperas Cove, Texas

FIGURE
7

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gINT FILE: PROJECTWISE: 20162588 Copperas Cove Maintenance Building.gpj
gINT TEMPLATE: PROJECTWISE: KLF_STANDARD_GINT_LIBRARY_2016.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End:	10/09/2015	**Drilling Company:**	Texas GeoBore		**BORING LOG B-4**
Logged By:	J. Buffkin	**Drill Crew:**	C. Garcia		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	B59 Mobile	**Hammer Type - Drop:**	140 lb. Cathead - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Continuous Flight Auger		
Weather:	Not Available	**Bore Diameter:**	6 in. O.D.		

FIELD EXPLORATION

Latitude: 31.11977° N
Longitude: -97.90270° W
Surface Condition: Grass

Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf Texas Cone(TC)= blows/6	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		TOPSOIL: 6 inches thick											
		Lean CLAY with Gravel (CL): brown, moist, hard, little recovery		BC=50/6"		CL	8.4		99	89	44	27	
		SHALE with thin bedded Limestone Seams: tan, moist, hard, marly											
				BC=50/2.5"									
5				BC=50/6"									
10													
15													
20													

The boring was terminated at approximately 7 ft. below ground surface. The boring was backfilled with auger cuttings on October 09, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.:	20162588
DRAWN BY:	GW
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DATE:	10/16/2015
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BORING LOG B-4

Proposed Municipal Building
508 South 2nd Street
Copperas Cove, Texas

FIGURE
8

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Date Begin - End:	10/09/2015	**Drilling Company:**	Texas GeoBore		**BORING LOG B-5**
Logged By:	J. Buffkin	**Drill Crew:**	C. Garcia		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	B59 Mobile	**Hammer Type - Drop:**	140 lb. Cathead - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Continuous Flight Auger		
Weather:	Not Available	**Bore Diameter:**	6 in. O.D.		

FIELD EXPLORATION

Latitude: 31.11982° N
Longitude: -97.90263° W
Surface Condition: Grass

Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf Texas Cone(TC)= blows/6	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		TOPSOIL: 6 inches thick											
		Fat CLAY with Gravel (CH): dark brown, moist, hard		PP=4.5+		CH	17.0		100	90	55	35	
		SHALE with thin bedded Limestone Seams: tan, moist, hard, marly											
				BC=33 50/3.5"									
5				BC=19 50/6"									
10													
15													
20													

The boring was terminated at approximately 7 ft. below ground surface. The boring was backfilled with auger cuttings on October 09, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
GENERAL NOTES:

KLEINFELDER
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PROJECT NO.:	20162588
DRAWN BY:	GW
CHECKED BY:	JB
DATE:	10/16/2015
REVISED:	-

BORING LOG B-5

Proposed Municipal Building
508 South 2nd Street
Copperas Cove, Texas

FIGURE
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PAGE: 1 of 1

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Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
B-1	0.5	FAT CLAY (CH)	19.2				95	78	26	52	
B-1	2.0	FAT CLAY (CH)	15.7			99	94	77	25	52	
B-2	0.5	FAT CLAY (CH)	15.0	103.8			87	57	22	35	**Unconfined Compressive Strength=**
											q_u: 11.363 tsf Strain at Failure: 2.3%
B-3	0.5	LEAN CLAY WITH SAND (CL)	7.4			94	84	44	18	26	
B-4	0.5	LEAN CLAY (CL)	8.4			99	89	44	17	27	
B-5	0.5	FAT CLAY (CH)	17.0			100	90	55	20	35	

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
NP = NonPlastic

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DRAWN BY: GW
CHECKED BY: JB
DATE: 10/16/2015
REVISED: -

LABORATORY TEST RESULT SUMMARY

Proposed Municipal Building
508 South 2nd Street
Copperas Cove, Texas

FIGURE
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