

PROJECT MANUAL

For

Deer Park Hike & Bike Trail Phase 1



Located in
City of Deer Park
Harris County, Texas

Prepared for

The City of Deer Park

Project No.: 1039.003

February 10, 2021

Prepared by:



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CITY SECRETARY

Shannon Bennett

**CONTRACT DOCUMENTS AND
BID FORM**

City of Deer Park

Hike and Bike Trail Phase 1

Deer Park, Harris County, Texas

CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS
FOR
Hike and Bike Trails Phase 1

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NOTICE TO BIDDERS

Sealed proposals, in triplicate, on the forms prescribed by and addressed to the City of Deer Park, Texas will be received at the office of the City Secretary, City Hall, 710 E. San Augustine Street, Deer Park, Harris County, Texas, until **2:00pm** on **Thursday, March 18, 2021** at which time the bids are to be opened and publicly read in the Council Chambers, for the following:

Golf Course Bunker Renovation Project Contract

Plans and specifications may be obtained from the Public Works Engineering Office, 710 E. San Augustine Street or on www.civcastusa.com. A **MANDATORY** pre-bid meeting will be held at **11:00am on Wednesday, March 3, 2021** at Deer Park Community Center 610 E. San Augustine and WebEx. No proposal may in any way qualify, modify, substitute or change any part of the plans, specifications or contract documents.

Cashiers check, certified check, or bidder's bond satisfactory to the City Council, payable to the City for at least 10% of the largest possible total for the bid submitted must accompany each bid as a guarantee that the bidder will enter into a contract and execute performance and payment bonds within ten (10) days after the notice of award of contract to him. The requirement for a performance and payment bond will be waived if the successful bidder's total bid amount on the project is under \$100,000.00, and if no partial payment will be required.

The City reserves the right to reject any and all bids, or parts of bids to waive any and all technicalities, and to accept any bid, or part of bid, which it deems advantageous to itself. Contracts for work under the proposal will obligate the contractors and subcontractors not to discriminate in the employment practices.

BY ORDER OF THE CITY COUNCIL OF DEER PARK, TEXAS

Dated, this _____ day of _____ 2020.

Shannon Bennett
City Secretary

TO BE PUBLISHED TWICE **February 10&17, 2021.**

INSTRUCTION TO BIDDERS

1. INTERPRETATION OF CONTRACT DOCUMENTS

If any bidder is in doubt as to the true meaning of any part of the Plans, Specifications, or other proposed Contract Documents, he may submit to the Engineer a written request for an interpretation thereof. The persons submitting the request will be responsible for its prompt delivery. Any interpretation of the bid documents will be made only by addendum duly issued, and a copy of each addendum will be mailed or delivered to each person receiving a set of such documents. The Engineer will not be responsible for any other explanation or interpretation of the proposed documents.

2. BIDS, PREPARATION AND SUBMITTAL

Bids will be submitted upon the standard form of bid proposal furnished, without modifications or provisions, except those required, and each proposal submitted must be completely filled out. Three separate copies of the proposal forms will be furnished to each bidder. The proposals shall be made out in triplicate, and the original and two copies shall be submitted to the Owner. Do not fill out and submit the proposal form in the bound book containing the Proposal, Specifications, and Contract Documents. The bids will be submitted in sealed envelopes. The envelopes shall be marked in the upper left hand corner with the name of the project.

If erasures or other changes appear on the forms, each such erasure or change must be initialed by the person signing the bid.

Each bid must contain the name of the bidder and the address of his place of business or his post office address, and be manually signed with the usual signature. Bids by partnership must contain the full names of all partners and must be signed with the partnership name by one of the partners or by an authorized representative. Bids by corporations must be signed with the legal name of the corporation, followed by the name of the state of incorporation, and by the signature and destination of the president, secretary, or other person authorized to bind it in the matter. Corporation seal must be attached following signatures.

The signing of the bid proposal submitted shall certify that the bid prices quoted have been carefully checked and are submitted as correct and final.

Each bid submitted will be tabulated for accuracy by using the middle column of the proposal as the one to control the unit prices written in words.

3. BID GUARANTEE

All proposals shall be accompanied by a Cashier's or Certified Check upon a National or State Bank in the amount of ten percent (10%) of the total maximum bid price, payable without

recourse to the Owner or a Bid Bond in the amount from a reliable surety company, as a guarantee that bidder will enter into a contract and execute Performance and Payment Bonds within ten (10) days after the notice of award of contract. The bid security must be enclosed in the same envelope with the bid. Bids without check or bid bond are not acceptable and will not be considered.

The bid bond shall be forfeited and become the property of the Owner in the event the bidder neglects or refuses to enter into contract and furnish bonds acceptable to the Owner within ten (10) days after notice of award of contract.

All bid securities will be returned to the respective bidders, within seven (7) working days after the bid opening, except the three (3) lowest responsible bidders, whose bids will be held by the Owner until the successful bidder has executed the Contract, and furnished Performance and Payment Bonds. Thereafter all remaining securities, including security of the successful bidder, will be returned within ten (10) working days.

4. PERFORMANCE AND PAYMENT BONDS

If required, the successful bidder must furnish a Performance and a Payment Bond on forms included herein, each in the amount of one hundred percent (100%) of the total contract price, from an approved surety company holding a permit from the State of Texas to act as a surety (and acceptable according to the latest list of companies holding certificates of authority from the Secretary of the Treasury of the United States), or other surety or sureties acceptable to the Owner.

The requirement for a Performance and Payment Bond will be waived if the successful bidder's total bid amount on the project is under \$100,000.00, and if no partial payment will be required.

5. STATEMENT OF BIDDER'S QUALIFICATIONS

After bids have been opened and prior to making an award, the Owner reserves the right to require the lowest bidder to furnish a statement on a form to be furnished for that purpose, of the bidders financial resources, his construction experience, and his organization for the work contemplated.

The Owner shall have the right to take such steps as he deems necessary to determine the ability of the bidder to perform the work and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The right is reserved to reject any bid where an investigation of the evidence or information submitted by such bidder does not satisfy the Owner that the bidder is qualified to carry out properly the terms of this contract.

In determining the lowest responsible bidder, the following elements shall be considered: Whether the bidder involved (a) maintains a permanent place of business; (b) has adequate plant

equipment to do the work properly and expeditiously; (c) has a suitable financial status to meet obligations incidental to the work; (d) has appropriate technical experience, and (e) has a satisfactory past performance record.

The bidder, to be eligible for the award of the contract, must be able to show his financial ability to carry on the work until such time as he receives the first payment on the contract and to finance the work between payments.

6. MANDATORY PRE-BID CONFERENCE

A conference with prospective bidders will be held at 610 E. San Augustine and WebEx, on Wednesday, March 3, 2021 at 11:00am. In order to assure that the requirements of this project are thoroughly understood, all contractors desiring to bid the work will be required to have a qualified representative attend the pre-bid conference. Failure of the contractor to attend the pre-bid conference will result in his bid being rejected.

7. DELIVERY OF BIDS

Bids received prior to the time of opening will be securely kept unopened. The office whose duty it is to open them will decide when the specified time has arrived for the opening of bids. No bids received thereafter will be considered, except those bids which arrive by mail after the time fixed for opening bids before the award is made and which show, to the satisfaction of the office authorized to make the award, that the non-arrival on time was due solely to delay in the mail for which the bidder was not responsible. No responsibility will attach to an officer for the premature opening of a bid not properly addressed and identified. Unless specifically authorized, telegraphic bids will not be considered, but modifications by telegraph of bids already submitted will be considered if received prior to the hour set for opening, provided that such modifications are confirmed in writing over the signature of the bidder within forty-eight (48) hours thereafter.

Bidders are cautioned that while telegraphic modifications of bids may be received as provided above, such modifications, if not explicit and if in any sense subject to misinterpretation, shall make the bid so modified or amended subject to rejection.

Bidders are cautioned to allow ample time for transmittal of bids by mail or otherwise. Bidders should secure correct information relative to the probable time of arrival and distribution of mail at the place where bids are to be opened, and so far as practicable, make due allowances for possible delays in receipt of bids.

8. WITHDRAWAL OF BIDS

Bids may be withdrawn by written or telegraphic requests dispatched by the bidder in time for delivery in the normal course of business prior to the time fixed for opening, provided that telegraphic withdrawal is confirmed in writing over the signature of the bidder within forty-eight (48) hours thereafter. Negligence on the part of the bidder in preparing the bid covers no rights for the withdrawal of the bid after it has been opened.

9. AWARD OF CONTRACT

The notice of award of contract shall be given by the Owner within thirty (30) days following the date of the opening of bids. The award will be made to the lowest responsible bidder whose bid, in the opinion of the Owner, is in the best interest, price and other factors considered, and is most advantageous to the Owner.

The right is reserved, as the interest of the Owner may require, to reject any and all bids, and to waive any informality in bids received.

If at the time this contract is to be awarded, the lowest base bid submitted by a responsible bidder does not exceed the amount of funds then estimated by the Owner as available to finance the contract, the contract will be awarded on the base bid only. If such bid exceeds such amount, the Owner may reject all bids or may award the contract on the base bid combined with such deductible alternates applied in numerical order in which they are listed in the Form of Bid, as produces a net amount which is within the available funds.

10. CONDITIONS OF SITE AND WORK

Bidders should carefully examine the Plans, Specifications and other documents, visit the site of the work, and fully inform themselves as to all conditions and matters which can in any way affect the work or costs thereof. Should a bidder find discrepancies in, or omissions from the Plans, Specifications or other documents, or should he be in doubt as to their meaning or intent, he should notify the Engineer at once and obtain clarification prior to submitting a bid. The submission of a bid by bidder shall be conclusive evidence that the bidder is fully acquainted and satisfied as to the character, quality and quantity of work to be performed and materials to be furnished.

11. LAWS AND REGULATIONS

The attention of all bidders is directed to the Federal, State and local laws and regulations, in reference to labor, materials, equipment, Contract Documents, proposal or bids, bonds, and all other matters pertaining to the relationship between the Owner, Contractor and Engineer.

12. UNBALANCED BIDS

Any bid which, in the opinion of the Engineer, is unbalanced and in which the total amount of the bid is not properly allocated and distributed to the respective items of work in the proposal may be rejected by the Owner.

13. PRICE OF MATERIALS AND STATE SALES TAX

Under the Amended Ruling No. 9 of the State Comptroller of Public Accounts with reference to the sales tax on city contracts, charges for skill and labor may be billed separately from charges for materials for the purpose of causing the exempt Owner to be the ultimate consumer of the materials. This does not apply to subdivisions.

After the award of the contract, the successful bidder will be required to separate, on the forms furnished for that purpose, the amount of his bid, which is charged for skill and labor from the amount of his bid, which is charged for materials and tangible personal property.

The Owner will then furnish the contractor with a certificate of exemption from the Texas Limited Sales, Excise and Use Tax for portion of his bid which is charged for materials and tangible work covered by the Contract, and in an amount not less than the actual cost of such materials to the Contractor.

14. TEMPORARY CONSTRUCTION OFFICE BUILDINGS

If the Contractor plans to have a temporary construction office building or any other temporary building for storage of materials, the contractor must first obtain written authorization from the Public Works Department, for additional information call our office at 281-478-7270.

15. PREQUALIFICATION

Manufacturers of materials, articles, or processes not named in these Technical Specifications must prequalify their equipment, material, article, or process by submitting to Engineer, at least ten (10) calendar days prior to bid date, detailed information on their equipment, material, article, or process. Information required to be submitted on each item to be prequalified must include a list of previous installation (including names and phone numbers of personnel who are familiar with specific equipment, material, article or process), catalog data, material list, published performance data, and typical installation drawings and specifications. Any deviation from Plans and Specifications must be noted and attached to information submitted for approval. Two (2) complete sets of information are required on each item. Five (5) calendar days prior to bid opening Engineer will advise, by Addendum, all Plan holders having Plan deposits on file of manufacturers whose equipment, material, article, or process has been prequalified for this project. No notice will be given to a manufacturer, supplier, or fabricator of failure to prequalify.

UNIT PRICE BID FORM

CONTRACTOR:

Work includes but is not limited to the following. Quantities shown here are a guide and for courtesy only, the Contractor shall verify the quantities required to complete the design intent. If work detailed in plans and specifications are not itemized on this bid schedule, they are still required (mandatory) and are incidental to the bid item(s), Additionally, these unit numbers will be used as adds or deducts from the contract if required.

Base Bid Items	Size	Unit	Qtys	Unit Cost	Total Cost (Unit Cost X Quantity)
Mobilization		LS	1		
Payment & Performance Bonds		LS	1		
Rough/ Fine Grading		LS	1		
SWPPP Implementation and preservation		LS	1		
Demolition and Haul Away		LS	1		
8' Decomposed Granite Trails (Complete)		LF			
Concrete Walks and Ramps (Complete)		LS	1		
Concrete Flumes		EA			
Retaining Block Wall (Complete)		EA	2		
Site Furnishings - installed		LS	1		
Bermuda Hydroseed - repairs		ALLOW	1		
Texas Native Bermuda (SOD)		ALLOW	1		
Project Total					

(Total Bid Price in words)

I, _____, certify this bid . I agree to abide by all conditions of this bid and certify that I am authorized to sign this bid for the bidder.

Date

Signature

Name (please print)

Company

Email

Phone Number

Addendum Acknowledgement.

Please indicate that you received the addenda by signing your name along with the date received.

Addendum # Date Signature

CONTRACT

STATE OF TEXAS
COUNTY OF HARRIS

§
§

KNOW ALL MEN BY THESE PRESENTS:

That this Contract made and entered into this ____ day of _____, _____, by and between **THE CITY OF DEER PARK, TEXAS** (the "City") and _____, a _____ located at _____ (the "Contractor").

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned to be made and performed by the City, the Contractor hereby agrees with the City to commence and complete the construction of certain improvements at the prices set forth in the Contractor's Proposal for the City Job No ____ the same being designated as Deer Park Hike and Bike Trail Phase 1 contract.

The Contractor shall perform all work shown on the Plans and described in the Specifications and shall meet all requirements of the Agreement as defined herein. The General and Special Conditions of the Agreement, and such Orders and Agreements for Extra Work as may subsequently be entered by the above named parties to the Agreement.

The Contractor shall not offer, confer or agree to confer any benefit or gift to any City employee.

The Contractor hereby agrees to commence work under this Contract within seven (7) days after issuance by the City of the written Authorization to Proceed. Under no circumstances shall the work commence prior to the Contractor's receipt of the City's issued, written Authorization to Proceed. Computation of Contract Time will begin upon actual commencement of Work by the Contractor during the seven (7) calendar day period referenced above, or upon the eighth (8th) calendar day (assuming the eighth day is a day upon which Work may lawfully and Contractually be performed), *whichever occurs first*. All work specified in these Contract Documents shall be completed within 180 **calendar days**.

It is agreed and understood by the City and the Contractor that the provisions of Chapter 252, Local Government Code apply to this contract. The terms of the aforementioned state law are incorporated herein by reference. Contractor and City Agree that as a public body, City is authorized by such state law to negotiate change orders up to and including the amount of \$50,000.00 acting by and through its duly designated administrative officer. It is agreed and understood that any change orders which increase the work of the contract in excess of 25% of the bid contract price, must be subject of a supplemental agreement approved by the City Council of the City, or its designee, as in case of original contracts. The work of the contract may be decreased over 25% with the consent of the Contractor.

The City agrees to pay the Contractor in current funds, and to make payments on account, for the performance of the work in accordance with the Contract, at the prices set forth in the Contractor's Proposal, subject to additions and deductions, all as provided in the General Conditions of the Agreement.

The following documents, together with this Contract, comprise the Agreement, and they are as fully a part thereof as if herein repeated in full:

1. The Bid Proposal
2. The Contract
3. The Payment Bond
4. The Performance Bond
5. The General Conditions of the Contract
6. The Special Conditions of the Contract

- 7. The Construction Specifications
- 8. The Standard Drawings
- 9. The Plans
- 10. Addenda
- 11. Change Orders

In witness thereof of the Parties of these presents have executed this Agreement in the Year and day of first above written.

OWNER:

CITY OF DEER PARK, TEXAS, a Texas municipal corporation

By _____

Name _____

Title _____

Date _____

CONTRACTOR:

By _____

Title _____

Date _____

Contractor hereby acknowledges and understands that this Contract is subject to Section 151.311 of the Texas Tax Code, as amended. The following amount of money represents that part of the total contract price representative of the value of tangible personal property which is to be incorporated into the project realty, or which is otherwise exempt from taxation under Section 151.311 of said Code: \$ _____

GENERAL CONDITIONS

ARTICLE I. CONTRACT DEFINITIONS:

Wherever in these General Conditions or in other parts of the Contract Documents, the following terms, or pronouns in place of them are used, the intent and meaning shall be interpreted as follows:

1. ACPA – American Concrete Pipe Association.
2. ANSI – American National Standards Institute,
3. ASTM – American Society for Testing Materials.
4. AUTHORIZATION TO PROCEED – (Work Project Authorization) A written notice given by OWNER to CONTRACTOR establishing the date on which the Contract Time will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR's obligations under the Contract Documents.
5. AWWA – American Water Works Association.
6. BIDDER – An individual, partnership, corporation, etc., submitting a proposal.
7. CITY COUNCIL – The duly elected members of the council of the City of Deer Park, Texas.
8. CONDITIONAL LETTER OF APPROVAL – The date certified in writing by the OWNER when the Construction of the Project is sufficiently completed in accordance with the Contract Documents.
9. CONSTRUCTION OBSERVER/INSPECTOR "COI" – The authorized representative of the OWNER assigned by the OWNER to observe and inspect any or all parts of the Project and the materials to be used therein.
10. CONSULTANT – A person registered as a professional engineer pursuant to Texas Occupations Code employed to provide professional engineering services and having overall responsibility for the design of a project or a significant portion thereof, together with administrative supervision of any subconsultants Consultant may retain. The term "Consultant", unless the context clearly indicates otherwise, means an engineer in private practice retained for a specific project under a contractual agreement with the OWNER.
11. CONTRACT – The signatory agreement (Standard Form) between the OWNER and the CONTRACTOR governing the furnishing of material and performance of the Work. The Contract will include the Contract Documents.
12. CONTRACT DOCUMENTS – The Contract Documents consist of Bidding Documents such as: the Invitation to Bid, the Instructions to Bidders, the CONTRACTOR's completed Bid Proposal form, the Addenda, the Contract, the Conditions of the Contract (General, Supplemental and Special Conditions), the Plans, the Specifications, the Change Orders, the Payment and Performance Bonds.
 - (a) The Contract Documents form the complete CONTRACT, which represents the entire and integrated agreement between the OWNER and the CONTRACTOR and supersedes all prior negotiations, representations or agreements, either written or oral.
13. CONTRACT SUM – The total compensation payable to the CONTRACTOR for performing the Work as originally contracted or as subsequently adjusted by Change Orders.
14. CONTRACT TIME – The total time allowed the CONTRACTOR for completion of the Work. Contract Time will commence as per Paragraph 8.1 and shall include the number of days set forth in the Contract plus any extended days granted under the provisions of Paragraph 6.1.

15. CONTRACTOR – The individual, partnership, corporation, etc., contracting with the OWNER to complete the Work.
16. ENGINEER – The person, firm or corporation named as such in the Agreement.
17. CHANGE ORDER – A written order issued by the OWNER to the CONTRACTOR authorizing additions, deletions, or revisions to the Work to be performed by CONTRACTOR within the general scope of construction services outlined in the Contract Documents.
18. HAZARDOUS MATERIAL/SUBSTANCES – Pursuant to Section 26.263 of the Water Code hazardous material means any material/substance designated as such by the administrator of the Environmental Protection Agency pursuant to the Comprehensive Environmental Response Compensation and Liability Act (42 U.S.C. Sec. 9601 et seq.) regulated pursuant to Section 311 of the Federal Clean Water Act (33 U.S.C. Sec. 1321 et seq.) or designated by the Commission.
19. INSTRUCTIONS TO BIDDERS – OWNER Instructions of a general nature outlining the duties and responsibilities of a prospective bidder.
20. LABORATORY – The testing laboratories of the OWNER or any other testing laboratory that may be designated or approved by the OWNER.
21. MAJOR BID ITEM – Any individual Bid Item submitted by CONTRACTOR that constitutes five percent (5%) minimum of the total Contract Sum proposed by the successful low bidder CONTRACTOR or, the dollar amount shown in the Special Conditions as constituting a “Major Bid Item”, whichever is less. In spite of the general criteria above, the OWNER and Consultant reserve the right to identify or exclude specific Bid Items as being “Major”, in the Special Conditions for each Project.
22. MINORITY BUSINESS ENTERPRISE – (hereinafter referred to as MBE) a corporation, partnership, sole proprietorship or any other such legal entity which is owned, operated and controlled by a minority group member(s) who, when combined, have 51 percent ownership. The minority group member(s) must have operational and managerial control, interest in capital and earnings commensurate with the percentage of minority ownership. For purposes of the SMWBP, the following are recognized as minority groups:
 1. African-Americans – persons having origins in any of the black racial groups of Africa as well as those identified as Jamaican, Trinidadian or West Indian.
 2. Hispanic Americans – persons of Mexican, Puerto Rican, Cuban, Spanish, or Central or South America origin.
 3. American Indians – persons having no less than 1/16 percentage origin in any of the American Indian tribes, as recognized by the U.S. Department of the Interior, Bureau of Indian Affairs and as demonstrated by possession of personal tribal documents.
 4. Asian-Pacific Americans – persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent or the Pacific Islands.
 5. Asian-Indian Americans – includes persons whose origins are from India, Pakistan, Bangladesh and Sri Lanka.
 6. Disabled Individual – persons (1) with one or more disabilities as defined by the Americans with Disabilities Act (ADA) and amendments thereto, (2) having a record of such disabilities and (3) regarded as having such disabilities.
23. MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) – A conveyance or system of conveyances (including roads with drainage systems, municipal streets catch basins, curbs, gutters, ditches, man-made channels or storm drains:
 1. Owned or operated by a State, City, town, borough, county, district association or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial waters, storm

water or other wastes including special districts under State law such as a sewer district, flood control district or drainage district or similar entity or a designated and approved management agency under Section 208 of the Clean Water Act that discharges to water of the United States;

2. Designated or used for collection or conveying storm water.
3. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.
24. NEMA – National Electrical Manufacturers Association.
25. NFPA – National Fire Protection Association
26. NON-HAZARDOUS MATERIAL(S)/SUBSTANCES – Any material(s)/substance which is not designated as hazardous pursuant to Definition 18 herein and the continued presence of such on the site is determined by the OWNER's representative not to be detrimental to the completion of the Project.
27. OWNER – City of Deer Park, Texas.
28. OWNER'S REPRESENTATIVE – The duly authorized representative of the OWNER, as identified by the OWNER.
29. PAYMENT BOND – The security furnished by the CONTRACTOR, through the Surety, in the full amount of the Contract Sum for the protection of all persons supplying labor and material in the prosecution of the Work who properly follow statutory requirements for perfecting claims against such security. If the contract amount does not exceed \$50,000, a Payment Bond is not required.
30. PERFORMANCE BOND – The security furnished by the CONTRACTOR, through the Surety, in the full amount of the Contract Sum as a guaranty that the Work will be faithfully performed and completed and that the OWNER will be saved harmless from all costs and damages which the OWNER may suffer by reason of the CONTRACTOR's default or failure to perform the Work. If the contract amount does not exceed \$100,000, a Performance Bond is not required.
31. PLANS – The Plans, drawings, details and supplemental drawings, or reproductions thereof, produced and sealed by the ENGINEER and approved by the OWNER, showing the location, character, dimensions and details of the Work and which are a part of the Contract. Plans include standard details issued and sealed by the Engineer or his representative.
32. PROJECT – Work site and Work elements with all appurtenances and construction to be performed thereon under the Contract.
33. PROPOSAL – The offer of the bidder, made out on the prescribed forms, giving prices for performing the work described in the plans and specifications.
34. SAMPLES – Physical examples furnished by the CONTRACTOR to OWNER to illustrate intended or anticipated materials, equipment or workmanship, and to assist OWNER and ENGINEER in the establishment of workmanship and quality standards by which the Work will be judged.
35. SEPARATED CONTRACT – A contract in which the agreed contract price is divided into a separately stated agreed contract price for materials and a separately stated agreed contract price for skill and labor. If prices of materials and labor are separately stated the fact that the charges are added together and a sum total given is irrelevant. Cost-plus contracts are generally regarded as separated contracts.
36. SEQUENCE OF CONSTRUCTION – The logical and proper order in which the CONTRACTOR shall accomplish the Work by OWNER directed stages and phases, as shown in the Contract Documents, unless OWNER orders otherwise by a properly executed Change Order.

37. SHOP DRAWINGS – Drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are furnished by the CONTRACTOR and prepared by CONTRACTOR, first-tier or sub-tier subcontractors, manufacturer, supplier or distributor, and which illustrates and details some portion of the Work.
38. SMALL, MINORITY AND WOMAN BUSINESS – (hereinafter referred to as SMWB) includes all those business enterprises inclusive of sole proprietorships, partnerships, corporations and all other such legal entities that are either classified as small, or are owned, operated and controlled by minority group members, women, or disabled individuals.
39. SMALL BUSINESS ENTERPRISE – (hereinafter referred to as SBE) a corporation, partnership, sole proprietorship or other such legal entity which is independently owned and operated and which is less than 20 percent of the U.S. Small Business Administration (SBA) size standard for a small business, except in cases where the reduced definition drops below \$1 million average gross receipts (as based on three years of sales) or less than 100 employees.
40. SPECIFICATIONS – The specific instructions to the CONTRACTOR as to the requirements for materials, equipment, certain construction procedures, standards and quality of workmanship for the Work and performance of related services and forming a part of the Contract.
41. SUPERINTENDENT – The on project site representative of the CONTRACTOR authorized to communicate with the OWNER's representative, pursuant to the terms of the contract. The Superintendent or his designee shall supervise and direct the construction Work.
42. SUPPLEMENTARY CONDITIONS – The part of the Contract Documents, which amends or supplements these General Conditions.
43. SURETY – The corporate body licensed to conduct business in the State of Texas that provides assurance that the CONTRACTOR, or his substitute will faithfully perform the Work covered by the Contract and make payment of any due, unpaid, eligible labor and supply claims arising thereunder.
44. THD TEST METHOD – (TX DOT) Materials and Test Division manual outlining testing methods and procedures.
45. UNDERGROUND FACILITIES – All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments and appurtenances thereto, and any encasement containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, sewage and drainage removal, traffic or other control systems.
46. UNIT PRICE WORK – Work to be paid for by OWNER on the basis of CONTRACTOR quoted unit prices in the Bid Proposal based upon OWNER estimated quantities.
47. WAGE RATES – The general prevailing wage rate as established by the City Council of the City of Deer Park.
48. WOMAN BUSINESS ENTERPRISE – (hereinafter referred to as WBE) a corporation, partnership, sole proprietorship or any other such legal entity which is owned, operated and controlled by women who, when combined, have 51 percent ownership. The women must have operational and managerial control interest in capital and earnings commensurate with the percentage of women Ownership.
49. WORK – The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of CONTRACTOR performing services, furnishing labor and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

50. WRITTEN NOTICE – Shall be considered to have been duly given if delivered in person to an authorized representative of the CONTRACTOR or OWNER, or to an officer of the corporation for whom it is intended, or if delivered at, or sent by registered or certified mail to the last business address known to the person who gives the notice.

ARTICLE II. LEGAL RELATIONSHIPS AND RESPONSIBILITIES

- 2.1 LEGAL RESPONSIBILITIES – The CONTRACTOR in the performance of the Work shall comply with all pertinent Ordinances of the City of Deer Park, Texas (OWNER), Laws of the State of Texas, and of the United States, including Rules and Regulations of the United States Department of Labor, pertaining to Occupational Safety and Health Administration standards as presently existing or as may hereinafter be modified or amended.
1. Where construction projects cross or run along state highways, the CONTRACTOR shall comply with governing Texas Department of Transportation Regulations as outlined in State Permits for each crossing. In cases where State Regulations do not apply, City Regulations shall be binding.
 2. Where construction projects cross or run along country roads, the CONTRACTOR shall comply with governing County Public Works Regulations as outlined in the County Permit for each crossing.
- 2.2 GENERAL UNDERSTANDING – CONTRACTOR at his own cost and expense shall furnish all supervision, tools, implements, machinery, labor, materials and accessories, such as are necessary and proper for the purpose, and secure all required permits and licenses, and shall at his own cost and expense construct build and complete, in a good, first class and workmanlike manner, the structures, work and improvements herein described and/or referred to in the Contract Documents.
- 2.3 SAFETY – CONTRACTOR shall protect the public and 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 any way connected with the performance of this contract, the CONTRACTOR shall provide and maintain reasonable warning of such danger or nuisance. The CONTRACTOR shall not create excavation, 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 nondelegable, and the CONTRACTOR's compliance with the specific recommendations and requirements of the City of Deer Park, 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.
- 2.4 INDEMNITY– THE CONTRACTOR SHALL INDEMNIFY, DEFEND AND HOLD HARMLESS OWNER AND ITS 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 OWNER, AND ITS AGENTS AND EMPLOYEES FOR THE DEATH OR INJURY TO PERSONS OR FOR DAMAGE TO PROPERTY CAUSED, OR ALLEGEDLY CAUSED, BY ANY WILLING ACTS, NEGLIGENCE, NUISANCE, OR BREACH OF ANY TERM OR CONDITION OF THIS CONTRACT IN CONNECTION WITH WORK TO BE PERFORMED PURSUANT TO SAID CONTRACT, BY THE CONTRACTOR, HIS AGENTS, SUBCONTRACTORS, OR EMPLOYEES. THE CONTRACTOR SHALL FURTHER INDEMNIFY, DEFEND AND HOLD HARMLESS OWNER AND ITS AGENTS AND EMPLOYEES FROM ALL DEMANDS OF SUBCONTRACTORS, WORKMEN, MATERIALMEN, OR SUPPLIERS INCURRED IN CONNECTION WITH WORK TO BE PERFORMED UNDER THIS CONTRACT. PROPERTY OF ANY DESCRIPTION, INCLUDING PROPERTY HELD BY 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.

SUCH INDEMNITY SHALL APPLY WHERE THE CLAIMS, LOSSES, DAMAGES, CAUSES OF ACTION, SUITS, JUDGMENTS, DECREES, OR LIABILITY ARISE IN PART FROM THE NEGLIGENCE OF OWNER. IT IS THE EXPRESS INTENTION OF THE CONTRACTOR AND OWNER THAT THE INDEMNITY PROVIDED FOR IN THIS PARAGRAPH IS INDEMNITY BY CONTRACTOR, TO INDEMNIFY AND PROTECT OWNER FROM THE CONSEQUENCES OF THEIR OWN NEGLIGENCE, WHERE THE NEGLIGENCE IS A CONCURRING CAUSE OF THE INJURY, DEATH, OR DAMAGE. FURTHERMORE, THE INDEMNITY PROVIDED FOR IN THIS PARAGRAPH SHALL HAVE NO APPLICATION TO ANY CLAIM, LOSS, DEATH OR DAMAGE THAT RESULTS FROM THE SOLE NEGLIGENCE OF OWNER.

In any claims against OWNER or its agents or employees by CONTRACTOR, any employee of CONTRACTOR, any subcontractor, anyone directly or indirectly employed by CONTRACTOR, or any subcontractor or anyone for whose acts any of them may be liable, the indemnification obligation under this Paragraph shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for CONTRACTOR or any subcontractor under workers' compensation acts, disability benefit acts of other employer's benefit acts.

- 2.4 ROYALTIES AND PATENTS – The CONTRACTOR shall pay all royalties and license fees, and defend all suits or claim for infringement of any patent rights and shall save the OWNER harmless from loss on account thereof, except that the OWNER shall be responsible for all such royalties and license fees and loss when a particular design or process, or the product of a particular manufacturer or manufacturers is specified; provided, however, if the CONTRACTOR has reason to believe the design, process or product specified constitutes an infringement of a patent, he shall be responsible for such royalties, license fees and loss unless he promptly gives such information to the OWNER.
- 2.5 NO WAIVER OF OWNER RIGHTS – Unless specifically and unambiguously set out in the Contract Documents at the time of bid opening, no observation/inspection or approval by said OWNER or any COI, officer, employee or other representative of the OWNER, or any order, measurement or certificate by said OWNER, or any estimate or payment by the OWNER for any part of said Work, or material or method or equipment, or any extension of time, or any possession of the Work, at any time shall operate as a waiver of any provision or obligation of this Contract or any right or power herein given or reserved to said OWNER, or of any right to claim any indemnity or damages for patent or latent defects in the work or otherwise as herein provided for; nor shall any OWNER waiver of any CONTRACTOR breach of this Contract be deemed as a waiver of any other or subsequent CONTRACTOR breach; and every OWNER right or remedy under the Contract Documents shall be cumulative, and in addition to all other OWNER rights and remedies.
- 2.6 INTEREST IN OWNER CONTRACT PROHIBITED – No officer or employee of the OWNER shall have a financial interest, direct or indirect, in any contract with the OWNER, or shall be financially interested, directly, in the sale to the OWNER of any land, materials, supplies or service, except on behalf of the OWNER as an officer or employee. This prohibition extends to City boards and commissions other than those, which are purely advisory.
- 2.7 PREVAILING WAGE RATES– On this Contract full compliance with Chapter 2258 of the Texas Government Code, as amended, requiring that not less than the general prevailing wage rate (basic hourly and fringe, if applicable) for Work of a similar character, as has been established by the appropriate governmental agency, and a copy of the most recent wage rates and all other administrative policies as incorporated into the Contract Documents, shall be required.
1. Payrolls will be subject to review by the OWNER and the CONTRACTOR will be notified of any discrepancies noted. Any discrepancy in the payrolls may be cause for withholding periodic, interim or final payment to the CONTRACTOR until such discrepancies are properly corrected.
- 2.8 EQUAL EMPLOYMENT OPPORTUNITY REQUIREMENTS/NONDISCRIMINATION CLAUSE – The Owner highly encourages CONTRACTOR to implement Affirmative Action practices in their employment programs. This means CONTRACTOR should not discriminate against any employee or applicant for employment because of race, color, national origin religion, sex, age, handicap or political belief or affiliation.

- 2.9 SMALL, MINORITY, AND WOMEN BUSINESS PROGRAM (SMWBP) REQUIREMENTS – The Owner highly encourages CONTRACTOR to form joint ventures and/or provide subcontract opportunities to small, minority and woman firms.
- 2.10 STATE SALES TAX – The OWNER qualifies for exemption from state and local sales tax and will furnish the CONTRACTOR with a tax exemption certificate. It is the CONTRACTOR's responsibility to claim exemption from payment of applicable state and local sales taxes by complying with such procedures as may be prescribed by the State Comptroller of Public Accounts. The Contract separates the cost of materials and tangible equipment from skill, labor and other associated costs of construction. This is in accordance with the Texas Tax Code to allow tax exemption on the Contract price for materials. Certain construction equipment that is owned or rented by the CONTRACTOR may be subject to State and Local Sales Tax.

ARTICLE III. CONTRACT DOCUMENTS & BONDS

- 3.1 PLANS AND SPECIFICATIONS – The Plans and the accompanying Specifications are essential parts of the Contract and a requirement occurring in one is as binding as though occurring in all. They are intended to be cumulative and complementary and to provide for a complete Work. In cases of disagreement, figured dimensions shall govern over scaled dimensions, detailed Plan Drawings and accompanying notations shall govern over General Plan Drawings, and Special Conditions shall govern over Specifications, Plan Drawings and General Conditions.
- 3.2 INTENT OF THE CONTRACT DOCUMENTS is to describe a functionally complete Project (or integral component part thereof) to be constructed in accordance with the Contract Documents. Any work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result will be supplied by CONTRACTOR whether or not specifically called for by OWNER or its ENGINEER. When words, which have a well-known technical or trade meaning are used to describe work, materials or equipment such words shall be interpreted in accordance with that meaning. Where phrases “directed by”, “ordered by” or “to the satisfaction of” the ENGINEER or the COI or the OWNER's Representative occur, it is to be understood that the directions, orders, or instructions to which they relate are within the scope of, and authorized by the Contract Documents. Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or Laws or Regulations in effect at the time of opening of Bids except as may be otherwise specifically stated.
- 3.3 DISCREPANCY IN CONTRACT DOCUMENTS – If, during the performance of the Work, CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents, CONTRACTOR shall so report to ENGINEER or OWNER in writing at once and before proceeding with the Work affected thereby and shall obtain a prompt written interpretation or clarification from ENGINEER; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict error or discrepancy in the Contract Documents unless CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.
- 3.4 PLANS AND SPECIFICATIONS AT THE WORK SITE – The CONTRACTOR shall maintain at the Work site at least one copy of all Plans Specifications, Addenda, approved Shop Drawings and Change Orders, in good order and marked to record all changes to the Plans and/or existing physical conditions made during construction.
1. RECORD DRAWINGS – Each month, as the Work progresses and before monthly payment is made, the CONTRACTOR shall present to the ENGINEER, for review, the current as-built drawings.
 2. Prior to the final payment to the CONTRACTOR, the CONTRACTOR who has control of the Work and is in a position to know how the Project was constructed, shall submit to the ENGINEER, within 10 days after Final Acceptance of the Project, a set of clearly marked Plans and related documents suitable for ENGINEER's use in preparing OWNER's final “Record Drawings” on reproducible mylar for the OWNER's permanent file.
- 3.5 PERFORMANCE BOND – CONTRACTOR shall furnish Performance Bond in favor of OWNER in an amount equal to 100% of the total construction cost under this Contract. Total construction cost are defined as the entire cost of materials and their installation, and include, but are not limited to, the cost of labor, equipment, supplies, materials and additional construction costs. The Performance Bond shall: (1) guarantee the completion of the entire construction herein identified in conformity with the Plans and Specifications approved by OWNER, and

(2) guarantee the work against defects in workmanship and materials for a period of twelve (12) months after Final Acceptance of the work by the Owner. The Performance Bond shall have a corporate Surety that is licensed to conduct business in Texas. CONTRACTOR agrees that all Performance Bonds required by this Paragraph 3.5 shall be with an insurance company or surety that is A.M. Best Rated "B+" or better. If the Surety on any bond furnished by the CONTRACTOR to the OWNER is declared bankrupt or becomes insolvent, or has its right to do business revoked in the State of Texas, then the CONTRACTOR will have ten (10) days to substitute another bond and Surety therefor which shall be acceptable to OWNER and which shall be at the expense of the CONTRACTOR.

- 3.6 PAYMENT BOND – CONTRACTOR shall furnish Payment Bond in favor of OWNER in an amount equal to 100% of the total construction cost under this Contract. Total construction costs are defined as the entire cost of materials and their installation, and include, but are not limited to, the cost of labor, equipment, supplies, materials and additional construction costs. The Payment Bond shall be security for the payment of all persons supplying labor and material in the prosecution of the Work provided for in the Contract Documents. The bonds shall have a corporate Surety that is licensed to conduct business in Texas. CONTRACTOR agrees that all Payment Bonds required by this Paragraph 3.6 shall be with an insurance company or surety that is A.M. Best Rated "B+" or better. If the surety on any bond furnished by the CONTRACTOR to the OWNER is declared bankrupt or becomes insolvent, or has its right to do business revoked in the State of Texas, then the CONTRACTOR will have ten (10) days to substitute another bond and Surety therefor which shall be acceptable to OWNER and which shall be at the expense of the CONTRACTOR.
- 3.7 CONTRACTOR AND SURETY STILL BOUND – No assignment, transfer or subletting, without the written consent of OWNER, and no order of OWNER for or approval of any alterations or modifications in said Specifications, Plans, or Work, and no change in the requirements or order for extra work made by the OWNER as provided in this Contract, shall ever in any manner release or diminish the responsibility of CONTRACTOR or any Surety on any bond of CONTRACTOR, but on the contrary, such responsibility shall extend to and comprehend all such changes and other matters. If any Surety upon any bond furnished in connection with the Contract becomes insolvent, or otherwise not authorized to do business in this State, the CONTRACTOR shall within ten (10) days furnish equivalent substitute forms of security while seeking substitute bonding, to protect the interests of the OWNER and of persons supplying labor or materials in the prosecution of the Work contemplated by the Contract, or may be liable for breach of Contract and default termination.

ARTICLE IV. CONTRACT ADMINISTRATION

- 4.1 GENERAL ADMINISTRATION – The ENGINEER will provide general administration of the Contract during construction in accordance with the ENGINEER's scope of work as defined in the ENGINEER's Contract with the OWNER.
1. The ENGINEER has the authority to act on behalf of the OWNER to the extent provided in the Contract Documents. The ENGINEER will advise and consult with the OWNER. The OWNER's instruction to the CONTRACTOR may be issued through the ENGINEER but the OWNER reserves the right to issue instructions directly to the CONTRACTOR through other designated OWNER representatives. CONTRACTOR understands that OWNER may modify the authority of such ENGINEER as provided in the terms of its contract relationship with the ENGINEER, and the OWNER shall, in such event be vested with powers formerly exercised by such ENGINEER, provided written notice of such modification shall be immediately served on the CONTRACTOR. Nothing herein shall authorize independent agreements between CONTRACTOR and such ENGINEER, nor shall the ENGINEER be deemed to have a legal relationship with the CONTRACTOR.
 2. All oral instructions shall be confirmed expeditiously in writing with copies furnished the ENGINEER, the OWNER's designated representatives, and the CONTRACTOR by the party issuing the oral instruction.
 3. Upon the ENGINEER's written recommendation, the OWNER shall have the final authority to reject Work performed by the CONTRACTOR which does not meet the requirements of the contract and to order such Work repaired, removed, or replaced in accordance with Paragraph 5.11.
- 4.2 ACCESS TO AND OBSERVATION/INSPECTION OF THE WORK – The CONTRACTOR shall provide

sufficient, safe and proper facilities at all reasonable times for the observation/inspection of the Work by the duly authorized representative of the OWNER. The ENGINEER and the OWNER will make visits to the site at intervals appropriate to the various stages of construction to observe the progress of the executed Work and to determine if the Work is proceeding in accordance with the Contract Documents.

1. On the basis of such visits and on-site observations as an experienced and qualified design professional, ENGINEER will keep OWNER informed of the progress of the Work and will guard OWNER against defects and deficiencies in the Work which are the responsibility of the CONTRACTOR to prevent and/or cure.
2. No Approval of any phase of the construction Project by any of the OWNER's representatives or observer/inspectors shall relieve the CONTRACTOR from full compliance with the Contract Documents regarding the ultimate Work product. Any additional cost, damages, or delays occasioned by patent or latent defects in the Work, and/or failure to meet the requirements of the Contract Documents, at any Project phase, shall be borne by the CONTRACTOR.

4.3 ASSIGNMENTS AND SUBLETTING – CONTRACTOR shall not assign, transfer, convey, sublet or otherwise dispose of this Contract, or any portion thereof, or any right, title or interest in, to or under the same, without the previous written consent of the OWNER. CONTRACTOR shall not assign by power of attorney or otherwise any of the monies or other considerations to become due and payable by the OWNER under this Contract, without the previous written consent of the OWNER. The CONTRACTOR shall notify the OWNER, by written notification by certified mail to the OWNER, that such assignment, transfer, conveyance or subletting, or other disposition of this contract or any portion thereof, or any right title or interest in, to or under the same, is contemplated. If the CONTRACTOR does not receive written approval of such contemplated action by the OWNER, within thirty days of receipt of such initial request by the OWNER, such contemplated assignment transfer, conveyance or subletting, or other disposition of this contract or any portion thereof, or any right, title or interest in, to, or under the same, shall be deemed disapproved. In no event shall the OWNER be liable in excess of the consideration of this Contract in the case of any such assignment, transfer, conveyance or subletting of the Work or performance which is subject hereof.

1. The OWNER reserves the right to withhold any monthly payment hereafter provided for in the event of an assignment or subletting of a portion of the work without the previous consent and knowledge of the OWNER and by reserving such right the OWNER shall not be deemed to have waived its right to declare a full breach of this Contract for CONTRACTOR's failure to comply with provisions hereof, such remedy being alternative only and exercisable at the option of the OWNER.

4.4 SUBCONTRACTORS – The CONTRACTOR shall upon executing the Contract, notify the OWNER in writing of the names of all proposed first tier subcontractors for the Work.

1. SUBCONTRACTUAL RELATIONS:

By an appropriate written agreement, the CONTRACTOR shall require each subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the CONTRACTOR by the terms of the Contract Documents, and to assume toward the CONTRACTOR all the obligations and responsibilities which the CONTRACTOR, by these Documents, assumes toward the OWNER and the ENGINEER. Said agreement shall preserve and protect the rights of the OWNER and the ENGINEER under the Contract Documents with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, the benefit of all rights, remedies and redress against the CONTRACTOR that the CONTRACTOR, by these Documents, has against the OWNER. Where appropriate, the CONTRACTOR shall require each Subcontractor to enter into similar agreements with his Sub-subcontractors, The CONTRACTOR shall make available to each proposed Subcontractor, prior to the execution of the Subcontract copies of the Contract Documents to which the Subcontractor will be bound by this Paragraph and identify to the Subcontractor any terms and conditions of the proposed Subcontract which may be at variance with the Contract documents. Each Subcontractor shall similarly make copies of such Documents available to his Sub-subcontractor.

4.6 SEPARATE CONTRACTS

1. The OWNER reserves the right to let other contracts in connection with this Work. The CONTRACTOR shall afford other CONTRACTOR's reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate his Work with their work.
2. When separate contracts are awarded for different portions of the Project, the "CONTRACTOR" in the Contract Documents in each case shall be the CONTRACTOR who executes each separate Contract. This CONTRACTOR shall properly connect and coordinate his Work with the work of other CONTRACTOR's. If any part of this CONTRACTOR's Work depends for proper execution or proper results on the work of any other separate CONTRACTOR, this CONTRACTOR shall inspect and promptly report in writing to the ENGINEER and OWNER's Representative any discrepancies or defects he may find in the work of any separate CONTRACTOR that render it unsuitable to achieve proper connection, execution and results. Failure of this CONTRACTOR to so inspect and report obvious discrepancies or defects shall constitute an acceptance of the other CONTRACTOR's work as fit and proper to receive this CONTRACTOR's Work, except as to defects which may develop in the other separate CONTRACTOR's work after the execution of this CONTRACTOR's work.
3. Should this CONTRACTOR negligently cause damage to the work or property of any separate CONTRACTOR on the Project, this CONTRACTOR shall, upon due notice, endeavor to settle with such other CONTRACTOR by agreement. A reciprocal clause shall be placed in the Contract Documents between the OWNER and the separate CONTRACTOR if involving other OWNER work. If such separate CONTRACTOR sues the OWNER and/or it's agents on account of any damage alleged to have been so sustained, the OWNER and/or it's agents shall notify this CONTRACTOR who shall defend the OWNER's and/or its agents' interests and CONTRACTOR's own interests in such proceedings and pay all attorney fees, and costs in connection therewith, and if any judgment against the OWNER results therefrom, this CONTRACTOR shall pay or satisfy that judgment.

4.8 CONTRACT TERMINATION

1. **TERMINATION BY CONTRACTOR** – If the Work in bid proposal is stopped by OWNER for a period of ninety (90) consecutive days (working or calendar days depending upon the type of Contract entered into) under an order of any court or other public authority having jurisdiction, or as a result of an act of a higher governmental authority, such as a declaration of a national emergency making materials unavailable, through no act or fault of the CONTRACTOR or a subcontractor or their agents or employees or any other persons performing any of the Work under a contract with the CONTRACTOR, then the CONTRACTOR may upon ten (10) additional days written notice to the OWNER and the ENGINEER, terminate the Contract and recover from the OWNER payment for all Work previously executed and for any loss sustained upon any materials, equipment, tools, construction equipment and machinery, including reasonable profit and damages related to the Work stoppage. If the Work is re-commenced during the ten (10) day notice period, the CONTRACTOR may not terminate the Contract.
2. **TERMINATION BY OWNER** – If the CONTRACTOR is adjudged as bankrupt, or if he makes a general assignment for the benefit of his creditors, without the consent of the OWNER or if a receiver is appointed on account of his insolvency, or if he persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction pertaining to the Work, or otherwise is guilty of a substantial violation of a provision of the Contract Documents warranting OWNER default of CONTRACTOR, then the OWNER may, without prejudice to any right or remedy and after giving the CONTRACTOR and his Surety, if any, ten (10) days written notice, terminate the employment of the CONTRACTOR and/or take possession of the site and of all materials, and may upon order of a court of competent jurisdiction take possession of equipment, tools, construction equipment and machinery thereon owned by the CONTRACTOR. Should the Surety fail to pursue completion of the Work with reasonable speed, the OWNER may arrange for completion of the Work and deduct the cost thereof from the unpaid Contract sum remaining, including the cost of additional OWNER administration and ENGINEER services made necessary by such default or neglect, in which event no further payment shall then be made by the OWNER until all cost of completing the Work shall have been paid.
3. In the event that OWNER shall be prevented from completing performance of its obligations under this

Contract by an act of God or other occurrence whatsoever which is beyond the control of OWNER, then OWNER shall be excused from any further performance of its obligation and undertakings.

4. If the unpaid balance of the Contract sum exceeds the costs of finishing the Work, including compensation for the ENGINEER's additional services made necessary thereby, such excess shall be paid to the CONTRACTOR. If such costs exceed the unpaid balance, the CONTRACTOR or his surety shall pay the difference to the OWNER. This obligation for payment shall survive the termination of the Contract.

4.9 SUSPENSION OF WORK BY OWNER

1. The OWNER may suspend said Work either partially or totally by his written order whenever, in his opinion, the interest of the OWNER requires the suspension of such Work. In the event that the OWNER suspends Project Work, the CONTRACTOR hereby acknowledges and agrees that so long as the total suspension(s) is (are) for a period not to exceed ten (10) cumulative days (working or calendar days, depending upon the type of Contract entered into) accruing throughout the entire Contract Time, that the CONTRACTOR is not entitled to request a negotiated adjustment of the Contract Sum nor an extension of the Contract Time. Such right to suspend Project Work for periods not to exceed ten (10) cumulative days (working or calendar days depending upon the type of Contract entered into) accruing throughout the entire Contract Time without compensation to the CONTRACTOR, is expressly reserved by the OWNER.
2. Any total suspension of Project Work by the OWNER that extends beyond ten (10) cumulative days (working or calendar days depending upon the type of Contract entered into) accrued throughout the entire Contract Time, shall entitle the CONTRACTOR to request either a negotiated adjustment of Contract Sum or an extension of Contract Time, or both, as directly attributable to such extended total suspension of Project Work.
3. Any partial suspension of the Work by the OWNER that extends beyond the mutually determined point in time when the ten (10) cumulative days (working or calendar days depending upon the type of Contract entered into) accruing throughout the entire Contract Time, are effectively exceeded, shall entitle the CONTRACTOR to request either a negotiated adjustment of Contract Sum or an extension of Contract Time, or both, as directly attributable to such extended partial suspension of Project Work.
 - a. In the event that the OWNER partially suspends the Work in such a manner that some work is able to continue, the CONTRACTOR and OWNER hereby agree to discuss the impact of the partial suspensions upon dependent Contract Work, and to mutually determine when the ten (10) cumulative days (working or calendar days depending upon the type of Contract entered into) accruing throughout the entire Contract Time and expressly reserved by the OWNER without compensation to the CONTRACTOR, would effectively be exceeded.
 - b. The OWNER's Representative shall have the right to stop the Work whenever such stoppage may be necessary to insure proper execution of the Contract. Such temporary stoppage shall be followed by a Written Order as outlined in Paragraph 4.10.1.
4. The OWNER and the Representative of OWNER shall at any time during the Contract Time have the right to suspend or stop the Work under Paragraph 4.9.1 or Paragraph 4.9.3.2, when the COI of OWNER or any other authorized representative of the OWNER reasonably believes that there exists any dangerous condition, nuisance or safety risk to workers, the general public or property on the site or on property adjacent thereto. Notwithstanding the foregoing provisions of Paragraph 4.9, the CONTRACTOR shall not be entitled to any adjustment of the Contract Sum or extension of the Contract Time relating to any suspension of the Work by the OWNER or the Representative of OWNER for any safety reasons under this Paragraph 4.9.4 and the OWNER shall have no other liability of any kind to the CONTRACTOR with respect to any suspension of the Work for safety reasons under this Paragraph 4.9.4.
5. The OWNER and the Representative of OWNER shall at any time during the Contract Time have the right to suspend or stop the Work under Paragraph 4.9.1 or Paragraph 4.9.3.2 when the Representative of OWNER reasonably believes that there exists on the site any environmental condition which could reasonably be expected to result in any liability, costs or expense to the OWNER or the CONTRACTOR

arising under any laws, statutes, ordinances, rules and regulations (“Laws”) of any governmental, quasi-governmental or regulatory authority which relate to the transportation, storage, placement handling, treatment discharge, generation, production, removal, or disposal (collectively, “Treatment”) of any waste, petroleum product (including without limitation, gasoline and diesel fuel), waste products, or any other substance, the Treatment of which is regulated by any Laws (collectively, “Waste”). Notwithstanding the foregoing provisions of Paragraph 4.9, the CONTRACTOR shall not be entitled to any adjustment of the Contract Sum or extension of the Contract Time relating to any suspension of the Work by the OWNER or the Representative of OWNER for environmental reasons under this Paragraph 4.9.5., and the OWNER shall have no other liability of any kind to the CONTRACTOR with respect to any suspension of the Work for environmental reasons under this Paragraph 4.9.5. At all times during the performance of the work by the CONTRACTOR under this Contract the CONTRACTOR will comply with all Laws which relate to the Treatment of any Waste. The CONTRACTOR agrees to (a) give notice to the OWNER immediately upon CONTRACTOR’s acquiring knowledge of the existence of any Waste on the site with a full description thereof, (b) promptly comply with any Laws applicable to the CONTRACTOR or the site requiring the removal treatment or disposal of such Waste and provide OWNER with satisfactory evidence with such compliance and (c) provide OWNER within thirty (30) days after demand by OWNER with a bond, letter of credit or similar financial assurance evidencing to the OWNER’s satisfaction that adequate funds are available to pay the costs of removing, treating and disposing of such waste.

- 4.10 PROTECTION OF PRIVATE PROPERTY – The OWNER has secured right-of-way and easements, as shown on the plans, to be occupied by the finished construction, with only such additional temporary construction easements as shown for use by the CONTRACTOR in carrying out his Work. The CONTRACTOR shall take proper measures to protect all property within all construction easements, and adjacent or adjoining property which might be injured by any process of construction; and, in case of any injury or damage, he shall restore at his own expense the damaged property to a condition equal to or better than that existing before such injury or damage was done, or he shall make good such injury or damage in a manner acceptable to the private or public owner.
1. The CONTRACTOR shall correct customer complaints for such items as (but not limited to) driveway access, mailboxes, privacy fences, public safety hazards, public nuisances, water and sewer services as specified by the OWNER’s Representative.
 2. The CONTRACTOR shall not, except upon procuring written consent from proper private parties, enter or occupy with men, tools, materials, or equipment any privately owned land except for those on easements provided herein by OWNER.

ARTICLE V. CONTRACT RESPONSIBILITIES

- 5.1 OWNER-CONTRACTOR OBLIGATIONS – The OWNER and the CONTRACTOR each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, agreements and obligations contained in the Contract Documents. The CONTRACTOR shall not assign the Contract or sublet it as a whole without the prior written consent of the OWNER, nor shall the CONTRACTOR assign any monies due or to become due to him hereunder, without the prior written consent of the OWNER and in the manner established in Paragraph 4.4 herein.
- 5.2 OWNER’S RESPONSIBILITY – Projects contracted through other outside entities and containing utility work by OWNER shall be managed by the other entity with support by OWNER personnel. CONTRACTOR shall report directly to the other entity. Utility projects contracted through OWNER, which contain secondary street work, shall be managed by OWNER with support by other entity personnel. CONTRACTOR shall report directly to OWNER.
1. The design of this Project was performed by a professionally licensed engineer who is an authorized representative of the OWNER, who will exercise the authority and functions of the OWNER as the Project ENGINEER in the following respects:
 - a. Staking the Work for construction as indicated in Paragraph 5.16.

- b. Checking of Shop Drawings furnished by the CONTRACTOR in compliance with Paragraph 5.13 herein.
 - c. Consultation and advice during construction and rendering those decisions requiring interpretation of the Plans and Specifications.
 - d. Review of the monthly and final quantity and pay estimates as prepared by CONTRACTOR.
 - e. Provide the OWNER with a final set of "Record Drawings" on reproducible Mylar prepared from monthly CONTRACTOR's submittal of marked Plans in accordance with Paragraph 3.4.1.
 - f. Review laboratory, mill and shop tests of materials and equipment for general compliance with the Plans and Specifications.
 - g. Observation/inspection of the authorized construction, administration for the OWNER, and review of all Work performed for general compliance with the Plans and Specifications.
 - h. Conduct final observation/inspection.
 - i. Determine acceptability of the finally completed Work.
2. Unless otherwise directed in the contract documents, sampling and testing of materials, laboratory inspection of materials and processes shall be performed at the expense of the OWNER in a commercial testing laboratory designated by the OWNER. The CONTRACTOR shall furnish reasonable assistance and material required of him by the OWNER's Representative in obtaining Samples at the expense of the CONTRACTOR.
- a. All Work on integral components of the Project, (e.g. such as precasting members, steel fabrications, large pump testing, etc.), performed outside of Harris County shall be regulated as follows: Sampling and testing of materials, laboratory inspection of materials and processes shall be performed at the expense of the CONTRACTOR or supplier by an independent commercial laboratory approved by OWNER or his duly authorized representative. All test reports and Shop Drawings shall be submitted to the OWNER or his Representative and shall be signed and sealed by a Registered Professional Engineer. All structural members shall be marked or stamped individually with an identifying number for the purpose of cross-referencing all reports.

5.3 CONTRACTOR'S RESPONSIBILITIES

1. The CONTRACTOR shall supervise and direct the Work using the best skill and attention. The CONTRACTOR shall be solely responsible for all construction means, methods, techniques, sequences and procedures, and for the implementation of safety precautions and for coordinating all portions of the Work under this Contract.
2. In connection with the OWNER's visual observation/inspection of the Work or materials testing contemplated herein, it is clearly understood that the CONTRACTOR is responsible for performing quality control inspection and testing services to assure Project compliance with Contract Documents. The CONTRACTOR shall give the OWNER's Representative reasonable advanced notice of the readiness of any Work for observation/inspection, and when practicable, twenty-four (24) hours' notice. If any underground Work is performed without the proper prior notification to the OWNER's Representative, it shall be uncovered for observation/inspection and properly restored at the CONTRACTOR's expense.
3. If the CONTRACTOR, in the course of the Work, finds any discrepancies between the Plans and the physical conditions of the locality, or any errors or omissions in the Plans or the layout as given by survey points and instructions, he shall immediately inform the ENGINEER in writing, and the ENGINEER shall promptly investigate the same. Any Work impacted by the discrepancy performed by CONTRACTOR after such discovery, until authorized, will be done at the CONTRACTOR's risk and/or expense.
4. Contractor's Risk – CONTRACTOR shall be responsible for the complete and timely, performance of the Work under this Contract and compliance with the Contract Documents. CONTRACTOR shall be

responsible for the safe storage and inventory control of all materials on the project site and/or within off-site storage facilities either owned or leased by the CONTRACTOR, if any. CONTRACTOR shall protect materials and Work from all theft, loss, vandalism, or damage from any cause whatsoever until final Project completion by CONTRACTOR and acceptance by OWNER; and shall deliver said Work and improvements to the OWNER in a completed and acceptable condition in accordance with the Contract Documents.

5. It is the intention of the OWNER to be sensitive to the needs and concerns of the citizenry. It is the CONTRACTOR's responsibility to adhere to this policy to the best of his ability. The CONTRACTOR, subcontractor and his employees should, whenever possible, address citizen inquiries about the project, provide names and numbers of OWNER personnel, relay citizen complaints, and provide continuous access to the citizen's property.

5.4 SUPERINTENDENT – The CONTRACTOR shall keep on-site for this Project during its progress a competent Superintendent or a designee and any necessary assistants, all satisfactory to the OWNER. Any Superintendent designee shall be identified in writing to the OWNER or his duly authorized representative, promptly after OWNER issued written Authorization to Proceed. The Superintendent or appointed designee shall represent the CONTRACTOR and all directions given to either of them shall be binding. Other Oral directions from the OWNER's representatives involving critical situations or Work elements shall be immediately confirmed in writing by OWNER to the CONTRACTOR. OWNER shall confirm other oral directions on written request in each case. The CONTRACTOR shall give sufficient supervision to the Work, using the best skill and attention.

5.5 INCIDENTAL WORK, CONNECTIONS AND PASSAGEWAYS – The CONTRACTOR shall perform all incidental Work necessary to complete this Contract, including, but not by way of limitation, the following: Shall make and provide all suitable reconnections with existing improvements as are necessarily incidental to the proper completion of the Project; shall provide passageways or leave open such thoroughfares in the Work area as may be reasonably required by OWNER and shall protect and guard same at CONTRACTOR's own risk, and shall continuously maintain the Work area in a clean, safe and workmanlike manner.

5.6 CONDITIONS AT SITE

1. CONTRACTOR declares that prior to the submission of the Bid Proposal on this Contract, the CONTRACTOR has thoroughly examined the locations of the Work to be performed, has become familiar with typical local geophysical conditions at or near this Project, and has read and has thoroughly understood the "Contract Documents" and any other document made available prior to the bid opening, as they may relate to the physical conditions prevalent or likely to be encountered in the performance of the Work at such location(s). CONTRACTOR, by the performance of the above, hereby generally acknowledges that such "Contract Documents" are not obviously deficient and will enable the CONTRACTOR to accomplish the proper performance of the Work at the Project site.
2. The CONTRACTOR shall promptly, and before such discovered conditions and/or structures are disturbed, notify the OWNER in writing of (1) subsurface or latent physical and/or structural conditions at the site differing materially from those indicated in the Plans, Specifications, and other Contract Documents or (2) newly discovered, unknown physical conditions at the site of an unusual nature differing materially from those geophysical conditions typically encountered in the type Work being performed and generally being recognized as not indigenous to the local environs. The OWNER, or designated representative, shall promptly investigate the reported physical and/or structural conditions, and shall determine whether or not the physical and/or structural conditions do materially so differ and thereby cause an increase or decrease in the CONTRACTOR's cost of, and/or the time required for performance of any part of the Work under this Contract. In the event that the OWNER reasonably determines that the physical and/or structural conditions do materially so differ, a negotiated, equitable, adjustment shall be made to either the Contract Time or Contract Sum or both, and a Contract Change Order shall be promptly issued in writing accordingly.
 - a. No claim of the CONTRACTOR under this clause shall be allowed unless the CONTRACTOR has given the written notice called for above, prior to disturbing the discovered conditions and/or structures.

- b. No claim by the CONTRACTOR for an equitable adjustment hereunder shall be allowed if claimed by the CONTRACTOR after final payment as defined in Paragraph 7.4 herein has been made by the OWNER under the terms of this Contract.

5.7 CONTRACTOR'S INSURANCE REQUIREMENTS

1. Commencing on the date of this Contract, the CONTRACTOR shall, at CONTRACTOR's expense, purchase, maintain and keep in force such insurance as will protect the CONTRACTOR, OWNER and OWNER employees, Representative, Consultant, and agents from claims which may arise out of or result from operations under this Contract, whether such operations are performed individually, by any subcontractor, supplier or by anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable, including, without limitation, the following:

- a. Workers' Compensation (WC) insurance that will protect the CONTRACTOR, OWNER and OWNER employees, Representative, Consultant, and agents from claims under statutory Workers' Compensation laws, disability laws or such other employee benefit laws and that will fulfill the requirements of the jurisdiction in which the work is to be performed. This insurance will be endorsed to provide coverage for multiple jurisdictions and other such indicated coverage (U.W. Longshoremen and Harbor Workers' Admiralty, etc.) as may be applicable. The CONTRACTOR shall provide to OWNER proof of Worker's Compensation Insurance for all persons involved in each project.
- b. Employers' Liability (EL) insurance that will protect the CONTRACTOR, OWNER and OWNER employees, Representative, Consultant, and agents for damages because of bodily injury, sickness, disease of vendor's employees apart from that imposed by Workers' Compensation laws. This employer liability insurance shall have a minimum limit of liability of not less than:

\$ 500,000.00	Bodily Injury by Accident
\$ 500,000.00	Bodily Injury by Disease – Each Employee
\$ 500,000.00	Bodily Injury by Disease – Policy Limit

- c. COMMERCIAL LIABILITY (CL) insurance that will cover the entire scope of work and protect the CONTRACTOR, OWNER and OWNER employees, Representative, Consultant, and agents from claims for damages because of bodily injury, personal injury, sickness or death and insurance that will protect the CONTRACTOR, OWNER and OWNER employees, Representative, Consultant, and agents from claims for damages to or destruction of tangible property of others, including loss of use thereof. This coverage shall include Broad Form Property Damage and shall cover independent CONTRACTORS and shall not include any exclusions relating to blasting, explosion, collapse of buildings or damage to underground property where applicable.

The minimum limits of liability shall be:

\$2,000,000.00	General Aggregate
\$1,000,000.00	Occurrence Limit
\$1,000,000.00	Products/Completed Operations Aggregate
\$1,000,000.00	Personal and Advertising Injury
\$ 50,000.00	Fire Legal Liability
\$ 5,000.00	Medical Expense
\$1,000,000.00	Contractual Liability

- d. Comprehensive Automobile Liability (AL) insurance that will protect the CONTRACTOR, OWNER and OWNER employees, Representative, Consultant, and agents from claims for damages arising out of the maintenance, operation, or use of any OWNER, non-owned or hired vehicles. Minimum limits of liability for bodily injury and property damage combined shall be not less than \$1,000,000.00 each occurrence.
- e. An Umbrella Liability (UL) insurance in the amount of \$2,000,000.00. This policy shall be of an "Occurrence" type and the limit of liability shall be concurrent with and in excess of the EL, CL, and AL insurance coverage described in Paragraphs 5.7.1.b, 5.7.1.c, and 5.7.1.d of this contract.

- f. An OWNER and CONTRACTOR Protective Liability Insurance policy which insures OWNER and OWNER employees, Representative, Consultant, and agents with the same coverage specified in Paragraph 5.7.1.c.
 - g. In the event, the project contracted for herein requires the building of structures or facilities used for storage, housing equipment or the occupancy of personnel, the CONTRACTOR shall provide Physical Damage Insurance on Builder's Risk Form which insures OWNER for damages to all property purchased for, or assigned to, the Project commencing on the start date through completion. Policy limits shall be in an amount equal to the total construction cost contracted herewith. The policy form shall be an All Risk Builders' Risk form and shall include the flood and earthquake endorsements.
2. Contractor shall issue a waiver of subrogation in favor of the OWNER with respect to coverage described in Paragraphs 5.7.1.a and 5.7.1.b. CONTRACTOR shall name OWNER as an additional insured with respect to coverage described in Paragraphs 5.7.1.c and 5.7.1.d.
 3. CONTRACTOR shall be liable for all Subcontractor's insurance coverage appropriate to their scope of Work, and in the event a Subcontractor is not insured with respect to any and all insurance required by law, including, but not limited to, Automobile Insurance and Workers' Compensation Insurance, then the CONTRACTOR shall endorse the Subcontractor onto the applicable CONTRACTOR policies as another named insured.
 4. The insurance that is required under this Paragraph 5.7 shall be written so that OWNER will be notified in writing in the event of cancellation, restrictive endorsement or non-renewal at least thirty (30) days prior to such action. Certificates of Insurance on the form attached to this Contract shall be filed with the OWNER prior to the execution of this Contract. CONTRACTOR shall be responsible for obtaining Certificates of Insurance from all Subcontractors and upon request, furnish copies to OWNER.
 5. CONTRACTOR is responsible for all deductibles under all of the insurance policies required by this Paragraph.
 6. The stated limits of insurance required by this Paragraph are MINIMUM ONLY and it shall be CONTRACTOR's responsibility to determine what limits are adequate and the length of time the coverage shall be maintained. The minimum limits may be basic policy limits or any combination of basic limits and umbrella limits. The CONTRACTOR is fully responsible for all losses arising out of, resulting from or connected with the construction, and installation of the Facilities, and in support of its operations under this Contract and those of its subcontractors, whether or not said losses are covered by insurance. The OWNER acceptance of Certificates of Insurance that in any respect do not comply with the requirements of this Paragraph 5.7 does not release the CONTRACTOR from compliance herewith. CONTRACTOR shall and will cause Subcontractors to carry any and all insurance required by law, including, but not limited to, Automobile Insurance and Workers' Compensation Insurance.
 7. CONTRACTOR shall and will cause Subcontractors to issue a waiver of subrogation in favor the OWNER with respect to coverage described in Paragraphs 5.7.1.a and 5.7.1.b. CONTRACTOR shall and will cause Subcontractors to name OWNER as an additional insured with respect to coverage described in Paragraph 5.7.1.d. CONTRACTOR agrees that all insurance policies required by this Paragraph 5.7 shall be with insurance companies, firms or entities that are A.M. Best Rated "A-" or better. All insurance policies shall be of an "Occurrence" type.

5.8 SURVIVAL

Any and all representations, conditions and warranties made by CONTRACTOR under this Contract including, without limitation, the provisions of Paragraphs 5.7.1.c, 5.7.1.d and 5.7.1.e of this Contract are of the essence of this Contract and shall survive the execution and delivery of it, and all statements contained in any document required by the OWNER whether delivered at the time of the execution, or at a later date shall constitute representations and warranties hereunder.

5.9 MATERIALS & WORKMANSHIP

1. MATERIALS – Unless otherwise specified, all materials incorporated in the permanent Work shall be new, and both workmanship and materials shall be of good quality in accordance with Specifications. The CONTRACTOR shall, if required, furnish satisfactory evidence as to the supply or manufacture, and quality of materials supplied.
 2. USE OF MATERIALS WITHIN THE RIGHT-OF-WAY – The CONTRACTOR, with the approval of the OWNER's Representative and/or Engineer, may use in the Work any suitable stone, gravel, or sand found in the excavation that otherwise meets or exceeds Contract Specifications. The CONTRACTOR shall not over excavate any material from within the right-of-way, which is not within the excavation limits, if any, as may be indicated by the lines and grades, without written authorization from the OWNER.
 3. SALVAGEABLE MATERIAL – Salvageable material as determined by the Specifications or the OWNER's Representative shall remain the property of the OWNER and shall be relocated and stored at the job site by CONTRACTOR as directed by the OWNER's Representative unless stated elsewhere in the Specifications.
 4. DISPOSAL OF NON-HAZARDOUS WASTE MATERIAL/SUBSTANCES – The CONTRACTOR shall be responsible for disposing of all non-hazardous material as the term is defined in Article I herein including old concrete or any other non-hazardous material which is required to be removed from the project. Such material shall not be deposited in any sanitary sewer, creek, river, water course or municipal separate, storm sewer system (MS4) as the term is defined herein.
 5. DISPOSAL OF HAZARDOUS MATERIAL/SUBSTANCES – The CONTRACTOR shall be responsible for disposing of all hazardous materials/substances, as that term is defined in Article I herein in accordance with all applicable Federal, State and local laws, and in accordance with any specific instructions set out in the plans and specification herein.
 6. RECLAMATION OF LOW AREAS – The CONTRACTOR may undertake the reclamation of low areas with the prior approval of the OWNER.
 7. BLOCKAGE OF THE MS4 – The CONTRACTOR shall comply with the provisions of the appropriate City Ordinances. In no event shall the CONTRACTOR block any portion of the MS4 with fill. Should any blockage occur the CONTRACTOR shall remove such fill, at CONTRACTOR's expense, as directed by the OWNER's COI.
- 5.10 TESTING – The OWNER or the ENGINEER may require special inspection, testing or approval of material or Work for determining compliance with the requirements of the Contract Documents. Upon OWNER-authorized direction of the ENGINEER the CONTRACTOR shall promptly arrange for such special testing, inspection or approval procedure. Should the material or Work fail to comply with the requirements of the Contract Documents, the CONTRACTOR shall bear all costs of the special testing, inspection or approval as well as the cost of replacement of any unsatisfactory material or Work as provided by Paragraph 5.11, otherwise, should the Work prove not defective, the OWNER shall bear such costs and an appropriate Change Order shall be issued. The costs of routine testing required by the OWNER shall be borne by the OWNER, as provided by Paragraph 5.2.3.
- 5.11 REMOVAL OF DEFECTIVE WORK – If any materials furnished under this Contract fails to perform in the manner such material is expected to perform in accordance with ordinary usage, the CONTRACTOR shall proceed to remove from the Project at his sole expense all such materials, whether worked or unworked, and to remove all portions of the condemned Work.
- 5.12 EQUAL MATERIALS – It is not the intent of these Specifications to unreasonably limit materials to the product of any particular manufacturer or supplier. Where definite materials, equipment and/or fixtures have been specified by name, manufacturer or catalog number, it has been done so as to set a definite standard and/or a reference for comparison as to quality, application, physical conformity, and other characteristics. It is not the intention to discriminate against or prevent any dealer, jobber or manufacturer from furnishing materials, equipment, and/or fixtures that meet or exceed the characteristics of the specified items. CONTRACTOR's

substitution of materials, equipment and/or fixtures shall not be made without prior written approval from the ENGINEER and the OWNER.

5.13 SHOP DRAWINGS AND SAMPLES

1. Contractor shall reasonably check and verify all field measurements and after complying with applicable procedures specified in the Contract Documents, CONTRACTOR shall submit (in accordance with the CONTRACTOR's schedule of Shop Drawing submissions submitted to the OWNER and ENGINEER for information purposes); to ENGINEER for review and approval or for other appropriate action, six (6) copies, of all Shop Drawings bearing a stamp or specific written indication that CONTRACTOR has satisfied the CONTRACTOR's responsibilities under the Contract Documents with respect to his review of his submissions. All CONTRACTOR submissions will be clearly identified as required by the ENGINEER. The CONTRACTOR data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable ENGINEER to review the information.
2. Contractor shall also promptly submit to ENGINEER for review and approval any Samples required by the Contract Documents. All Samples will be accompanied by a specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission identity of materials, suppliers, and other pertinent data such as catalog numbers, and use for which intended.
 - 2.1 Before CONTRACTOR's submission of each Shop Drawing or sample, CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.
 - 2.2 At the time of each CONTRACTOR submission, CONTRACTOR shall give ENGINEER specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents, and, in addition, shall cause a specific CONTRACTOR notation to be made on each Shop Drawing submitted to ENGINEER for review, approval, or other appropriate action highlighting each such variation.
 - 2.3 Shop Drawings for alternate designs not shown in the plans shall be reviewed and approved by the Engineer and shall not be implemented without an approved Change Order.
3. ENGINEER will review, approve, or take other appropriate action with the Shop Drawings and samples with reasonable promptness so as to cause no delay in the Work. ENGINEER's review, approval, or other appropriate action regarding CONTRACTOR's submissions will be only to check conformity with the design concept of the Project and for compliance with the information contained in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate component item will not indicate approval of the assembly into which the item is functionally integrated. CONTRACTOR shall make corrections required by ENGINEER and shall return the required number of corrected copies of Shop Drawings to the CONTRACTOR. CONTRACTOR may be required to resubmit as required revised Shop Drawings or Samples for further review and approval. Contractor shall direct specific attention in writing to any new revisions not specified by CONTRACTOR on previous CONTRACTOR submissions.
4. ENGINEER's review, approval, or other appropriate action regarding Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission as required by Paragraph 5.13.2.2 and ENGINEER has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from

responsibility for CONTRACTOR errors or omissions in the Shop Drawing submissions or from CONTRACTOR's responsibility to comply with the provisions of Paragraph 5.13.2.1.

5. Where ENGINEER requires by written request an approved CONTRACTOR Shop Drawing or Sample, any related Work performed by CONTRACTOR prior to ENGINEER's review and approval of the affected submission will be at the risk of CONTRACTOR.

5.14 PROGRESS SCHEDULE

1. The CONTRACTOR shall provide a Construction Progress Schedule to the OWNER within ten (10) calendar days after receipt of the Authorization to Proceed. The schedule shall show the order in which the CONTRACTOR proposes to carry out the Work in accordance with the final approved phasing plan, and the anticipated start and completion dates of each phase of the Work. The schedule shall be in the form of a time scaled Work progress chart to indicate the percentage of Work scheduled for completion at various critical milestones.
2. If the CONTRACTOR's operations are materially affected by changes in the Plans or in the amount of Work, or if he has failed to comply with the anticipated progress, the CONTRACTOR shall submit a revised schedule reflecting the change in progress, within ten (10) calendar days of the occurrence of such event. The schedule may also be revised by the CONTRACTOR in response to the reasonable request of the OWNER.
3. The Construction Progress Schedule will be used as the basis for establishing the critical items of Work and analyzing the Contract Time in relation to Work progress.
4. The CONTRACTOR shall submit in conjunction with his monthly request for payment, a copy of the current adjusted Construction Progress Schedule showing the progress of the Work to date. If OWNER determines that the CONTRACTOR is not maintaining his anticipated progress, then the OWNER may withhold approval of the monthly progress payment as outlined in Paragraph 7.3.

5.15 SEQUENCE OF WORK

1. PHASES OF CONSTRUCTION – The CONTRACTOR shall perform the Work as outlined in the Contract Documents, or as shown on the Plans. The CONTRACTOR may submit to OWNER a revised CONTRACTOR phasing plan prior to start of construction for review by the OWNER. If the OWNER determines that the revised CONTRACTOR's phasing plan is not acceptable as being in the best interest of the OWNER, then the CONTRACTOR shall proceed with the Work in accordance with the OWNER's phasing plan at no additional cost to the OWNER.
2. DETOUR ROUTES – A detour route for through traffic as determined by the OWNER may be included in the Plans where the proposed construction is located within the limits of a street designated as "Collector", "Secondary" or Primary". The CONTRACTOR shall not begin construction of the Project or close any streets until adequate barricades and detour signs have been provided, erected and maintained in accordance with the detour route and details shown on the Plans. The CONTRACTOR shall notify the OWNER's Representative forty-eight (48) hours in advance of closing any street to through traffic. Local traffic shall be permitted the use of streets under construction where feasible.

5.16 CONSTRUCTION STAKES

1. The CONTRACTOR will be supplied with one set of construction stakes delineating the Project and appropriate benchmark information. Detailed transfers of elevation, line and grades to structures and other features of the Work shall be the responsibility of the CONTRACTOR.
2. WATER MAINS – Construction stakes will consist of a single line of stakes with guard stakes showing the stationing, and offset of PI, PC and PT of the pipe alignment.
3. STREETS – Construction stakes will consist of a single line of offset hubs at PC and PT of horizontal and vertical curves and at special features with guard stakes showing the stationing. Hubs will be offset as per

contractor's preference within the Right of Way..

4. SANITARY AND STORM SEWERS – Construction stakes will consist of a single line of offset hubs at manhole locations and at other special features with guard stakes showing the stationing, the offset.
5. STRUCTURES – Construction stakes will consist of property corners and one benchmark on the site.
6. LASER BEAMS – The use of Laser Beams for vertical control of water mains and sanitary sewers shall be required and the CONTRACTOR shall make available to the OWNER's Representative a level and rod of sufficient sensitivity to accurately determine differences in elevation between points 300 feet apart with one instrument set-up.
7. CONTRACTOR'S RESPONSIBILITY – When the construction stakes have been set, the preservation of such stakes as to position, elevation and marking shall become the responsibility of the CONTRACTOR. Should any of the original stakes be destroyed by the CONTRACTOR's operations, or by any other non-OWNER related third parties or means whatsoever, the replacement of such stakes by ENGINEER and/or Engineer will be at the expense of the CONTRACTOR. Prompt payment by CONTRACTOR to ENGINEER for replacement staking is expected and OWNER may withhold periodic or final payments to CONTRACTOR to secure said payment.

5.17 PUBLIC UTILITIES

1. OWNER's Responsibility:

The OWNER shall cause to be sent a set of plans to the utilities listed on the plans. The OWNER shall request that the utilities review such plans and specifications to determine and/or verify the location of any utilities within the project site. The utility shall further be requested to communicate in writing the results of such review to the OWNER.

2. Contractor's Responsibility:

- a. The CONTRACTOR is hereby required to become familiar with all the existing utility structures, lines and mains that are known to exist and may be encountered within and/or adjacent to the limits of the work covered by the Contract. While the existence and location of underground utilities indicated on the Plans are taken from the most current utility records available to the OWNER and/or Engineer, the CONTRACTOR understands and acknowledges that the notation of such underground utilities on the Plans does not constitute a guarantee by the OWNER or ENGINEER. CONTRACTOR further understands and acknowledges that OWNER and ENGINEER are under no obligation to indicate the location of private service lines on the Plans.
- b. The CONTRACTOR shall go to the Project site and locate and verify any utilities indicated on the Plans prior to the Commencement of Work. The CONTRACTOR shall further investigate the possible location of any private service lines prior to the Commencement of Work. To facilitate this obligation on the part of CONTRACTOR, the CONTRACTOR shall communicate with the utilities listed on the plans, call for locations and subsequently visit the project site with a qualified utility representative of each utility listed on the plans, prior to the Commencement of Work. The information resulting from such on-site investigations shall govern over the information notation on the Plans, when and if a conflict between such information arises. In the event such investigations on the part of CONTRACTOR result in a utility location adjustment CONTRACTOR shall not commence work until the completion of such adjustment has been completed.
- c. The CONTRACTOR acknowledges and agrees that maintaining continuity of utility service to utility customers is critical.
- d. The CONTRACTOR shall be responsible for protecting the integrity of all utilities (public or private) either shown on the Plans or discovered during the CONTRACTOR investigations required in Paragraph 5.17.2.b herein. Such method of protection shall first be reviewed and approved by the affected utility.

- e. The CONTRACTOR shall be responsible for any damages to any utilities (public or private) either shown on the Plans or discovered during CONTRACTOR investigations acquired in Paragraph 5.17.2.b herein. Any existing utilities shown on the plans or discovered during CONTRACTOR investigations set out herein which cannot be relocated shall be protected by the CONTRACTOR as part of the original Bid Proposal price submitted by CONTRACTOR. The CONTRACTOR shall pay for temporary relocation of utilities for the CONTRACTOR's convenience.
 - f. Contractor shall be responsible for damage to utilities not shown on the Plans and not discovered during CONTRACTOR's investigations required in Paragraph 5.17.2.b herein when the existence of such a utility or the suspected existence of such a utility should have been anticipated and investigated by the CONTRACTOR, based upon certain physical manifestations observed during the course of construction or other tangible evidence which constitutes common knowledge in the construction industry of the probable existence of a utility. A CONTRACTOR shall not be responsible for damages to utilities not shown on the Plans and not discovered during CONTRACTOR's investigation required herein when, in accordance with the common knowledge in the construction industry, the existence of such utility could not reasonably be anticipated.
3. Temporary clearance of high voltage (600 volts and above) and overhead electrical lines is required prior to the operation of equipment within 10 feet of such lines (Texas Health and Safety Code, Sections 752.003 and 752.006). The CONTRACTOR shall bear the expense to obtain the necessary temporary clearance from the high voltage line operator or utility company. Temporary clearance shall be a temporary barrier separating and preventing contact of material, equipment persons, communications with high voltage electrical lines, or temporary de-energizing and grounding or temporary relocation, or raising of the lines.
 4. In the case of sewer, water, gas, electric, telephone, cablevision cable, or any other utility shown on the Plans and/or discovered during the CONTRACTOR's investigations required in Paragraph 5.17.2.b herein, the CONTRACTOR will use care in excavating over, under and around such lines and will provide all necessary temporary bridging during construction so as to maintain continuous service of the utility line. The CONTRACTOR shall backfill around the main and complete its construction operations in such a manner as to leave the utility line firmly and securely bedded in its original position without damage to any protective coatings.
 5. In instances where gas or water mains are exposed during construction, the utility company owning or operating the service shall be given at least twenty-four (24) hours' notice by the CONTRACTOR prior to backfilling in order that the protective coating on the mains may be inspected and/or repaired by utility company.
 6. BRACING AND SUPPORTING – In areas where utilities are known to be near the project site, and could be damaged by soil movement, slips or cave-ins, the CONTRACTOR shall take all precautions necessary to protect such utilities from damage and shall pay for the repair of any such damages caused by CONTRACTOR failure to properly protect the utility.
- 5.18 SUBSURFACE CONDITIONS – Reports of explorations and tests of subsurface conditions at the construction site, where applicable, are available for review. The OWNER in order to generally forecast soil conditions at various depths to assist the ENGINEER in designing the Project procured these reports. The logs and descriptive data are NOT PART OF THE CONTRACT DOCUMENTS but are made available for the general information of bidders and neither the OWNER nor the ENGINEER assumes any obligation or responsibility, either specific or implied, for the accuracy or completeness of any information contained therein. Sub-surface conditions along and across the Project site may vary significantly from those shown on the test reports.
- 5.19 WORKING HOURS – No Work, with the exception of such items as curing of concrete, maintenance of barricades, etc., will be allowed by the OWNER between the hours of 6:00 p.m. and 7:00 a.m. of the following day, unless directed by OWNER or requested in writing by CONTRACTOR and approved by the OWNER.
- 5.20 USE OF CITY STREETS RIGHT OF WAY – The CONTRACTOR shall confine the movements of all steel tracked equipment to the limits of the Project and any such equipment will not be allowed to use City streets unless being transported on pneumatic tired vehicles. Any damage to existing City streets caused by the

CONTRACTOR's equipment shall be repaired by CONTRACTOR at his own expense upon direction, and in the manner prescribed by City's specifications and the OWNER's COI.

- 5.21 DAMAGES TO CITY STREETS – caused by the CONTRACTOR, within the limits of the project but not within the current phase being constructed, shall be repaired by the CONTRACTOR at his own expense upon direction by the OWNER's COI.
- 5.22 SANITARY PROVISIONS – The CONTRACTOR shall provide and maintain in a neat, sanitary condition, rest room facilities for the use of his employees and authorized on-site visitors as may be necessary to comply with the requirements and regulations of the City Health Department and of the State Department of Health.
- 5.23 DUST CONTROL – The CONTRACTOR will apply appropriate amounts of water (or other appropriate substance), to the area under construction and on detours as required to maintain sufficient moisture content in the surface layer for dust control.
- 5.24 USE OF EXPLOSIVES – The CONTRACTOR may not employ the use of explosives on this project.
- 5.25 WATER – Unless otherwise provided for in the specifications or Special Conditions, the responsibility shall be upon the CONTRACTOR to provide and maintain an adequate supply of water for construction and on-site domestic consumption. Any connections and piping that the CONTRACTOR deems necessary for providing and maintaining an adequate water supply to the jobsite shall be installed at his expense and at locations approved by the OWNER's Representative. Before final Project acceptance, all temporary connections and piping installed by the CONTRACTOR in accordance with this Paragraph shall be removed in a manner satisfactory to the OWNER.
- 5.26 ELECTRICITY – All electric current required by the CONTRACTOR at the jobsite shall be procured by CONTRACTOR. All necessary meters, switches, connections and wiring shall be installed at locations approved by the OWNER. Before final acceptance, all meters, switches, connections and wiring installed by the CONTRACTOR pursuant to this Paragraph shall be removed in a manner satisfactory to the OWNER's COI.
- 5.27 CLEANING
1. The CONTRACTOR shall at all times keep the Project premises safe and free from accumulation of waste materials or rubbish caused by the Work under this Contract.
 2. Upon completion of the Work, and prior to the OWNER's final inspection, the CONTRACTOR shall present the premises in a neat and clean condition, prepared for acceptance by OWNER.
 3. Prior to final acceptance of the Work, CONTRACTOR shall reasonably restore the Project site to its pre-Project condition (accounting for such restoration concerns as cosmetic appearance, landscaping, drainage gradients, accessibility, etc.) to the extent permitted by the Project improvements. All of this incidental Work to be performed by CONTRACTOR to the satisfaction of the OWNER.
- 5.28 ACCESS REQUIREMENTS – The CONTRACTOR shall provide access to residents and businesses affected by the construction of this project to the greatest extent possible.
- 5.29 SAFETY PRECAUTIONS AND PROGRAMS
1. In the performance of this Contract the CONTRACTOR shall protect the public and the OWNER 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 that are in any manner connected with the performance of this Contract, the CONTRACTOR shall provide and maintain reasonable warning of such danger or nuisance. The CONTRACTOR shall not create any dangerous condition or nuisance of any nature whatsoever in connection with the performance of this Contract including, but not limited to, excavations and obstructions, 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 so created. The duties of the CONTRACTOR in this Paragraph shall be nondelegable and the CONTRACTOR's compliance with

the specific recommendation and requirements of 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. The CONTRACTOR shall take reasonable precautions for the safety of and shall provide protection to prevent damage, injury, or loss to:

- 1.1 All employees on the Work, and all other persons who may reasonably be foreseen to be affected by the Work.
 - 1.2 All the Work and all materials to be incorporated at street crossings, along proposed detour routes, and at material stockpiles. Where directed by the Director of Public Works or his duly authorized representative, the CONTRACTOR shall provide and maintain suitable warning signs, barricades and lights, in accordance with the details included in the Contract Documents, to direct traffic around the Work in progress and to assure the safety of the public. The CONTRACTOR shall provide adequate warning signs, barricades, lights and, where necessary, flagmen for the Project or portions of the Project within which operations are being prosecuted in any one day or which will be closed overnight.
 - 1.3 Other property at the site or adjacent thereto including but not limited to, trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
2. The CONTRACTOR shall comply with the U.S. Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (Public Law 91-596 and all subsequent amendments) and under Section 107 of the Contract Work Hours and Safety Standards Act (Public Law 91-54 and all subsequent amendments). This project is subject to all of the Safety and Health Regulations (CFR 29, Part 1926 and all subsequent amendments) as promulgated by the U.S. Department of Labor on June 24, 1974 and CFR 29, Part 1910 and all subsequent amendments, General Industry Safety and Health Regulations Identified As Applicable to Construction. CONTRACTOR shall be knowledgeable with the requirements of these regulations and any amendments thereto.
 3. Trench excavation protection shall be accomplished as required by the most current provisions of part 1926 subpart P – Excavations, of the Occupational Safety and Health Administration’s Standards and Interpretations and as further defined in the note(s) on the Plans and other Contract Documents.
 4. In any emergency affecting the safety of persons or property, the CONTRACTOR shall act to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the CONTRACTOR resulting from emergency Work shall be considered by OWNER in accordance with Articles VI and VIII for Completion Time.
 5. The CONTRACTOR shall provide, at the site, such equipment and medical facilities as are necessary to supply first aid service to anyone who may be injured in connection with the Work. Such equipment shall comply with the most current regulations of the Occupational Safety and Health Administration of the United States Department of Labor.
 6. The CONTRACTOR must promptly report in writing to the OWNER all accidents whatsoever arising out of, or in connection with, the performance of the Work whether on or adjacent to the site which caused death, personal injury, or property damage, giving full details and any statements of witnesses. In addition, if death, serious injury, or serious damage is caused, the accident then shall be reported immediately by telephone or messenger to the OWNER.
 7. OWNER requires all CONTRACTOR job sites shall be immediately accessible to appropriate local, State and Federal agency safety officials.

ARTICLE VI. CONTRACT CHANGES

- 6.1 Change Orders – The Contract Sum and/or the Contract Time may be increased or decreased only by written change order. A Change Order signed by the CONTRACTOR indicates his acceptance and approval thereof including the adjustment in the Contract Sum and/or the Contract Time.

Any compensation paid in conjunction with the terms of a Change Order shall comprise total compensation due the CONTRACTOR for the work or the change defined in the Change Order. By signing the Change Order, the CONTRACTOR acknowledges that the stipulated compensation includes payment for the Work of Change plus all payment for the interruption of schedules, stop work orders, extended overhead, delay, or any other impact, claim or ripple effect and by such signing specifically waives any reservation or claim for additional compensation in respect to the subject of the Change Order. Except as modified by Change Order, all Work performed under a Change Order shall be completed in accordance with these Contract Documents.

- 6.2 The OWNER, without invalidating the Contract, may order changes in the Work within the general scope of the Contract and applicable law consisting of additions, deletions or other revisions and the Contract Sum and/or the Contract Time will be adjusted accordingly. All such changes in the Work shall be authorized by written Change Order and shall be performed by CONTRACTOR under the applicable provisions of the Contract Documents.
1. Major Changes In The Work – any significant change in a Major Bid Item constitutes a major change in The Work and shall be implemented by a Change Order that shall be binding on the OWNER and CONTRACTOR. A significant change shall be defined as follows:
 - a) An increase or decrease of twenty-five percent (25%) or more in the number of units of each Major Bid Item as included in the ENGINEER’s estimated quantities included in the bid of Contract Documents;
 - b) An increase or decrease of twenty percent (20%) or more in the dollar value of a lump sum, Major Bid Item. Any change in the Contract Sum resulting from a major change in the work, which reflects among other things, quantity changes, market price changes, and any quantity or volume discounts that might apply, shall be determined as specified in Para. 6.4.
 2. Minor Changes In The Work – The OWNER’s Representative will have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be implemented by a written directive and shall be binding on the OWNER and CONTRACTOR. The CONTRACTOR shall carry out any written directive promptly.
 - a) If the CONTRACTOR does not agree with the OWNER’s Representative that a minor change in the work will result in no adjustment in Contract Sum or Contract Time, he must so notify the OWNER in writing, within seven (7) calendar days of issuance of the written directive and prior to beginning any disputed work. If the CONTRACTOR fails to file such written notification he shall waive his rights to file a claim under this section.
- 6.3 The entire cost of extra Work resulting from Change Orders including the incremental cost of extra Work resulting from any prior Change Orders, modifications, or additions so ordered, shall not cumulatively exceed twenty-five percent (25%) of the original Contract Sum, and provided further that the price is agreed upon in writing by OWNER and CONTRACTOR before materials are furnished or the Work is done.
- 6.4 Changes or Credits for the Work covered by an approved Change Order shall be determined by one or a combination of the following methods:
1. UNIT PRICE – Submitted by the CONTRACTOR in the original CONTRACTOR Bid Proposal as part of the base bid or as a designated additive or deductive alternate, and if agreed to by the CONTRACTOR and the OWNER, appropriately adjusted either upward or downward to reflect any increases or decreases in the amount of labor, material or equipment as they relate to Major Bid Items.
 2. AGREED CONTRACT CHANGES – Lump Sum Agreement between OWNER and CONTRACTOR as to the price, quantity and time for changes in the Work. The CONTRACTOR shall submit an itemized, estimated cost breakdown together with supporting data. This itemized breakdown shall be in accordance with the requirements established in Paragraph 6.4.3.
 3. FORCE ACCOUNT – If no Agreed Contract Change or unit price can be reached after good faith negotiations between the OWNER and CONTRACTOR, the OWNER may direct the Work be performed by the CONTRACTOR on a force account basis, and payment by the OWNER shall be upon the basis of

Actual Cost of the Work as specified in Paragraph 6.4.3.1 plus the participation allowances as specified in Paragraph 6.4.4.

3.1 ACTUAL COST OF THE WORK – Actual Cost incurred by the CONTRACTOR to perform the additional Work. CONTRACTOR shall provide a complete breakdown of the actual costs to the OWNER on a daily basis as follows:

- a. Labor including Foremen
- b. Materials comprising the Work
- c. The CONTRACTOR’s actual incremental ownership or rental cost of equipment during the time of use on the extra Work. (Rental cost may be based on current Southwest Regional AGC, Association of Equipment Distributors regional computations or equivalent)
- d. Power and consumable supplies for the operation of power equipment
- e. Insurance, any extra bond premiums, Social Security and unemployment contributions, and benefits.

4. PARTICIPATION ALLOWANCE

<u>Participant</u>	<u>Overhead</u>	<u>Profit</u>	<u>Commission</u>
To CONTRACTOR on the Project on Work performed by other than its own forces:	0%	0%	5%
To first tier Subcontractor on Work performed by its subtier Subcontractors:	0%	0%	5%
To CONTRACTOR and/or the first tier Subcontractors for that portion of the Work performed with their own respective forces:	10%	10%	0%

Not more than four categories of percentages, not to exceed the maximum percentages shown above, will be allowed regardless of the number of subtier subcontractors: For proposals covering both increases and decreases in the amount of the Contract the application of overhead and profit percentages shall be on the net increase in Actual Costs for the CONTRACTOR or Subcontractor performing the Work. However, where the CONTRACTOR or first tier Subcontractor receives proposals for additive and deductive amounts from separate subtier subcontractors, the commission shall be allowed on the added amounts prior to subtraction of the credit amounts. The cost of such extra Work shall be added to the Contract Sum by a Written Change Order as specified in Paragraph 6.1.

6.5 DELETION OF WORK – The OWNER may, pursuant to state statute, unilaterally order the CONTRACTOR to omit up to twenty-five percent (25%) of the original Contract Sum and associated Work, as specified in Paragraph 6.2. With consent of CONTRACTOR, this amount may exceed twenty-five percent (25%).

6.6 CLAIMS FOR ADDITIONAL COSTS

- 1. If the CONTRACTOR pursues a claim for an increase in the Contract Sum prior to final reconciliation, he shall give the OWNER written notice thereof with a simultaneous information copy to the ENGINEER within thirty (30) days after the CONTRACTOR knows, or should have known, of the events giving rise to such CONTRACTOR claim. This notice shall be presented in writing to the OWNER and ENGINEER by the CONTRACTOR before proceeding to execute the disputed Work, except in an emergency endangering life or property in which case the CONTRACTOR shall proceed in accordance with Paragraph 5.29.4. No such CONTRACTOR claim shall be valid unless the CONTRACTOR follows the procedure outlined herein. If the OWNER and the CONTRACTOR cannot agree on the amount of the adjustment in the

Contract sum, if any, it shall be determined by administrative procedures as provided by Article X. Any change in the Contract Sum resulting from such claim shall be authorized by Change Order.

2. If the CONTRACTOR claims that additional cost will be incurred because of, (1) any written OWNER or ENGINEER interpretation of the Contract Documents, (2) any order by the OWNER to stop the Work pursuant to Paragraph 4.10.1 where the CONTRACTOR was not at fault, (3) any written order involving a perceived minor change in the Work issued pursuant to Paragraph 6.2.2, the CONTRACTOR shall make such claim as provided in Paragraph 6.6. 1.

ARTICLE VII. CONTRACT PAYMENTS

7.1 ESTIMATED QUANTITIES AND MEASUREMENT – The estimated quantities of the various elements of Work to be done and material to be furnished are approximate only and are provided by ENGINEER and OWNER as a basis for OWNER comparison of proposals and award of Contract. It is expressly understood and agreed by OWNER and CONTRACTOR that the actual amounts of Work to be done and material to be furnished may differ somewhat from these estimates. Unless specified differently elsewhere, the quantities of Work actually performed by Contractor will be computed on the basis of measurements taken by the OWNER's representatives, and these measurements shall be final and binding on CONTRACTOR.

7.2 PROGRESS PAYMENTS – During the latter part of each month as the Work progresses on all OWNER contracts regardless of Contract Sum, said OWNER, or his designated representatives, and CONTRACTOR shall determine either the cost of the labor and materials or quantities incorporated into the Work during that month and actual invoiced cost of CONTRACTOR acquired materials stored on the Project site, and/or within off-site storage facilities either owned or leased by the CONTRACTOR. Upon receipt of a complete and mathematically accurate Construction Estimate Certification Form from the CONTRACTOR, the OWNER shall make payments to CONTRACTOR within thirty (30) calendar days on Contracts totaling four hundred thousand (\$400,000.00) dollars or less, based upon such cost determination and at the Contract unit prices in a sum equivalent to ninety percent (90%) of each such invoice. The remaining ten percent (10%) retainage shall be held by the OWNER until the final Contract Settlement. However, where the Contract amount exceeds four hundred thousand dollars (\$400,000.00), installments shall be paid to CONTRACTOR at the rate of ninety-five percent (95%) of each monthly invoice within thirty (30) calendar days of OWNER receipt of a complete and mathematically accurate Construction Estimate Certification Form from the CONTRACTOR, and the retainage held until final Contract Settlement shall be five percent (5%). OWNER's payment of installments shall not in any way be deemed to be a final acceptance of any part of the Work by OWNER, and will not prejudice OWNER in the final settlement of Contract account nor relieve the CONTRACTOR from completion of the Work as herein provided.

7.3 WITHHOLDING OF PAYMENT – In the event that the OWNER discovers evidence of CONTRACTOR and/or Work noncompliance with the Contract Documents subsequent to approval of the Construction Estimate Certification Form, the OWNER may revoke or otherwise amend that part of any Construction Estimate Certification Form to such extent as may be necessary to withhold monies to protect the OWNER from loss on account of:

- 1) Defective Work not remedied by CONTRACTOR.
- 2) Persistent and uncured CONTRACTOR non-compliance with the administrative provisions of the Contract Documents.
- 3) Damage to Work of another CONTRACTOR.
- 4) Liquidated Damages assessed by OWNER for CONTRACTOR failure to maintain scheduled progress in accordance with interim progress milestones, if any are specified in the Contract Documents, and/or CONTRACTOR failure to meet final completion date.
- 5) Receipt of written notice by the OWNER of CONTRACTOR's unpaid bills if the CONTRACTOR has not provided a payment bond and only if the Contract Sum does not exceed \$25,000.00. Any funds so withheld by OWNER shall be released to the CONTRACTOR if he furnishes either a bond to OWNER securing release of lien or CONTRACTOR proof of payment of disputed bills.

6) "Indemnification" as provided for in Paragraph 2.3.

When the above CONTRACTOR deficiencies are cured, OWNER will make payment for amounts withheld because of the deficiencies within (30) thirty calendar days.

7.4 FINAL PAYMENT – CONTRACTOR shall not be entitled to receive payment of any sum in excess of the cumulative amounts paid upon such monthly invoices as outlined above until forty-five (45) calendar days after OWNER transmittal of the Letter of Preliminary Acceptance and not before all the stipulations, requirements and provisions of this Contract are faithfully performed and complied with by CONTRACTOR, and unless and until said structures, Work and improvements shall be entirely completed, and delivered to, and accepted by the OWNER in accordance with the Contract Documents. Completion, delivery and acceptance of the Work is evidenced by the Final Acceptance issued by the OWNER and such Certificate of Acceptance is approved by the OWNER or his designated representative. The OWNER shall prepare the final invoice as the basis for final Contract settlement. OWNER may deduct from the amount of such final invoice and retain any and all sums which are to be deducted by OWNER or paid or allowed by CONTRACTOR to OWNER, or which are to be retained by OWNER for reasons previously stated in Paragraph 7.3.

1. NOTARIZED AFFIDAVIT – Before final payment for the work by the OWNER, the CONTRACTOR shall submit to the OWNER 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 who provided the Payment Bond for the work, to the effect that said Surety consents to final payment to the CONTRACTOR being made by the OWNER.

7.5 OWNER TO FINALLY DETERMINE ALL AMOUNTS PAYABLE OR CHARGEABLE – It is expressly understood and agreed by CONTRACTOR that subject only to the prices, terms and provisions specifically set forth in the Contract Documents including Change Orders, the written estimates and Certificates of the OWNER shall be final in fixing and determining amounts payable or chargeable hereunder to CONTRACTOR by OWNER as required by the other terms and conditions hereof. Also, in case of controversy, the monthly construction estimates and Final Acceptance shall be final in fixing and determining all sums to be deducted and retained by OWNER for reasons as stated in Paragraph 7.3, out of any funds otherwise estimated as payable to CONTRACTOR by OWNER.

7.6 CLAIMS BY THIRD PARTIES FOR LABOR OR MATERIALS

1. Contractor hereby agrees to promptly pay all persons supplying labor, services and materials in the prosecution of the Work provided for in this Contract and any and all duly authorized modifications or Change Orders of said Contract that may hereafter be made, and shall fully indemnify and hold harmless the OWNER and its agents against any and all claims, liens, suits or actions asserted by any person, persons, firm or corporation on account of labor, materials or services furnished such CONTRACTOR during the prosecution of the Work herein undertaken. CONTRACTOR shall execute a payment bond in accordance with other sections governing same herein for this purpose. Before the OWNER shall be obligated to pay any amount to CONTRACTOR on final Contract settlement, CONTRACTOR shall execute a sworn, written and notarized statement on an affidavit form to be supplied by the OWNER Director of Finance and filed with the OWNER, along with a "consent of surety" letter endorsing final payment to CONTRACTOR, evidencing that all labor employed and all equipment and materials incorporated into the Construction of the Work have been either fully paid for by CONTRACTOR and Subcontractors, or that any pending disputes over payment are being properly addressed by the surety.

2. Suppliers, any subcontractors, and persons claiming to have performed any labor, or to have supplied any equipment and materials toward the performance of this Contract, and who claim not to have received proper compensation from the CONTRACTOR or Subcontractors for same, shall be instructed by OWNER and CONTRACTOR that written and documented claims must be sent directly to the CONTRACTOR and its Surety in accordance with Chapter 2253 of the Texas Government Code. The OWNER will furnish to claimants, in accordance with that chapter, a copy of the CONTRACTOR's Payment Bond and Surety's address as provided therein upon claimants' written request. The OWNER shall further furnish a statement to claimants that claimants are cautioned that no legal or equitable lien exists on the OWNER funds yet

unpaid to the CONTRACTOR, and that reliance on notices sent only to the OWNER may result in loss of claimants' rights to timely perfect recovery against the CONTRACTOR and/or its Surety. The OWNER is not responsible in any manner to a claimant for collection of unpaid bills, and accepts no such responsibility because of any unauthorized representation by any agent or employee of OWNER to the contrary.

7.7 RIGHT TO AUDIT

1. Whenever the OWNER enters into any type of contractual arrangement with the CONTRACTOR, then the CONTRACTOR's "records" shall upon reasonable notice be open to inspection and subject to audit and/or reproduction during normal business working hours. The OWNER's representative, or an outside representative engaged by the OWNER, may perform such audits. The CONTRACTOR shall maintain all records relating to this Contract for four (4) years from the date of final payment under this Contract.
2. The OWNER shall have the exclusive right to examine the records of the CONTRACTOR. The term "records" as referred to herein shall include any and all information, materials and data of every kind and character, including without limitation records, books, papers, documents, contracts, schedules, commitments, arrangements, notes, daily diaries, reports, drawings, receipts, vouchers and memoranda, and any and all other agreements, sources of information and matters that may, in the OWNER's judgment, have any bearing on or pertain to any matters, rights, duties or obligations under or covered by any contract document. Such records shall include (hard copy, as well as computer-readable data if it can be made available), written policies and procedures, time sheets, payroll registers, cancelled checks, personnel file data, correspondence, general ledger entries, and any other record in the CONTRACTOR's possession which may have a bearing on matters of interest to the OWNER in connection with the CONTRACTOR's dealings with the OWNER (all of the foregoing are hereinafter referred to as "records"). In addition, the CONTRACTOR shall permit interviews of employees as well as agents, representatives, vendors, subcontractors and other third parties paid by the CONTRACTOR to the extent necessary to adequately permit evaluation and verification of the following:
 - a. The CONTRACTOR's compliance with contract requirements;
 - b. The CONTRACTOR's compliance with the OWNER's business ethics policies; and
 - c. If necessary, the extent of the Work performed by the CONTRACTOR at the time of contract termination.
3. The CONTRACTOR shall require all payees (examples of payees include subcontractors, insurance agents, material suppliers, etc.) to comply with the provisions of this Paragraph 7.7 by securing the requirements hereof in a written agreement between the CONTRACTOR and payee. Such requirements include a flow-down right of audit provision in contracts with payees that also apply to subcontractors and sub-subcontractors, material suppliers, etc. The CONTRACTOR shall cooperate fully and shall require Related Parties and all of the CONTRACTOR's subcontractors to cooperate fully in furnishing or in making available to the OWNER from time to time whenever requested, in an expeditious manner, any and all such information, materials, and data.
4. The OWNER's authorized representative or designee shall have reasonable access to the CONTRACTOR's facilities, shall be allowed to interview all current or former employees to discuss matters pertinent to the performance of this Contract, and shall be provided adequate and appropriate work space in order to conduct audits in compliance with this Paragraph 7.7.
5. If an audit inspection or examination in accordance with this Paragraph 7.7 discloses overpricing or overcharges of any nature by the CONTRACTOR to the OWNER in excess of one-half of one percent (.5%) of the total contract billings, then the reasonable actual cost of the OWNER's audit shall be reimbursed to the OWNER by the CONTRACTOR. Any adjustments and/or payments, which must be made as a result of any such audit or inspection of the CONTRACTOR's invoices and/or records, shall be made within a reasonable amount of time (not to exceed 90 days) from presentation of the OWNER's findings to the CONTRACTOR.

ARTICLE VIII. CONTRACT COMPLETION TIME

- 8.1 COMMENCEMENT OF WORK – The Work called for in this Contract shall be commenced by CONTRACTOR within seven (7) calendar days after issuance by the OWNER of the written Authorization To Proceed. Under no circumstances shall the Work commence prior to CONTRACTOR's receipt of OWNER issued, written Authorization To Proceed. Computation of Contract Time will begin upon actual commencement of Work by the CONTRACTOR during the seven (7) calendar day period referenced above, or upon the eighth (8th) calendar day (assuming the eighth calendar day is a day upon which Work may lawfully and Contractually be performed), whichever occurs first.
- 8.2 COMPLETION OF WORK – After commencement of Work as outlined in Paragraph 8.1, the CONTRACTOR shall prosecute the Work continuously, diligently and uninterruptedly throughout the Contract Time period, during which period of time CONTRACTOR, all subcontractors and suppliers are bound and obligated at all times to employ sufficient Work force and supervisory diligence to complete said structures, Work and improvements, and to deliver same over to the OWNER in a timely acceptable, completed, undamaged and clean condition. The time of beginning, rate of progress and time of completion of said Work are hereby declared by OWNER and understood by CONTRACTOR to be "OF THE ESSENCE" to this Contract. The OWNER may suspend said Work either partially or totally as provided for in Paragraph 4.8 and 4.9.
- 8.3 WORKING DAY/CALENDAR DAY CONTRACT
1. WORKING DAY – is defined as a day, not including Sundays or OWNER Designated Holidays, on which the weather or other jobsite conditions not under the control of the CONTRACTOR will permit the performance of this Work for a continuous period of not less than seven (7) hours between 7:00 a.m. and 6:00 p.m. If the CONTRACTOR elects to perform Work on Saturday, the CONTRACTOR will be charged a Working Day, if weather or other jobsite conditions permit continuous Work operation for seven (7) or more hours. Nothing in this Paragraph shall be construed as prohibiting the CONTRACTOR from working on Saturdays if so desired and gives OWNER' representative at least the prerequisite forty-eight (48) hours written notice of intent to perform Work on Saturday so that OWNER's representatives may be scheduled to observe/inspect said Work. Work on Sundays or OWNER Designated Holidays will not be permitted except in cases of extreme emergency, and then only with the written permission of the OWNER or OWNER's representative. If Sunday or OWNER Designated Holiday Work is permitted, Contract Time will be charged on the same basis as computing regular Working Days and the OWNER's Representative average salary costs at time and one half will be charged to the CONTRACTOR. Should the Work be delayed necessarily by any damage that may happen thereto by any unusual, unavoidable accident or by the condition of the weather, or by action of the elements, or by any general strike of employees, or by shortage of materials, or by any injunction, restraining order or other court of competent jurisdiction action, CONTRACTOR shall have no claim for any adjustment of the Contract Sum on account of such delay, but Working Days will not be charged by OWNER during the period of any such delays.
 2. CALENDAR DAY – Unless herein otherwise expressly defined, shall mean a calendar day or days of 24 hours each from midnight to the next consecutive midnight. Work on Sundays or OWNER Designated Holidays will not be permitted except in cases of extreme emergency, and then only with the written permission of the OWNER or his duly authorized representative. If Sunday or OWNER Designated Holiday Work is permitted, the OWNER representative average salary costs at time and one half will be charged to the CONTRACTOR. Nothing in this Paragraph shall be construed as prohibiting the CONTRACTOR from working on Saturdays if so desired and gives OWNER or OWNER'S representative at least the prerequisite forty-eight (48) hours written notice of intent to perform Work on Saturday so that OWNER's representative may be scheduled to observe/inspect said Work.
- 8.4 FAILURE TO COMPLETE WORK ON TIME – If the CONTRACTOR fails to complete the Contract in the time specified by OWNER in the Contract Documents and agreed to by CONTRACTOR through execution of this Contract, Contract Time charges will continue to be made for each Working or Calendar Day (depending upon which type Contract is entered into) thereafter. The time set forth in the Contract for the completion of the Work is an ESSENTIAL ELEMENT of the Contract. For each Working or Calendar Day that any Work shall not be complete, after the expiration of the Working or Calendar Days specified in the Contract, (to include Working or Calendar Days charged for correction of CONTRACTOR deficiencies found during the final inspection), plus, any

extended days allowed by OWNER, the amount of liquidated damages assessed per day as stipulated in the Contract will be deducted from the money owed or to become due the CONTRACTOR, not as a penalty but as liquidated damages owed the OWNER for extended expenses, loss and public inconvenience resulting from CONTRACTOR's failure to complete said Work within the Time CONTRACTOR agreed to by execution of this Contract. CONTRACTOR and OWNER agree that such liquidated damages as are set prior to the Contract execution are for projected reasonable costs that are otherwise difficult for either Party to forecast and will be incurred by the OWNER due to CONTRACTOR completion beyond the number of Working or Calendar Days calculated herein by the OWNER.

- 8.5 CONTRACT TIME STATEMENT – The OWNER, or authorized representative shall furnish a “Contract Time Statement” to the CONTRACTOR after the end of each calendar month, showing the number of Working or Calendar Days charged by OWNER and of such non-chargeable Days credited to the CONTRACTOR during each month. Such statement shall become final and binding upon the CONTRACTOR without exception, unless CONTRACTOR notifies the OWNER, in writing of any Contract Time Statement discrepancies claimed by the twentieth (20th) calendar day following OWNER issuance date on the Contract Time Statement
- 8.6 LIQUIDATED DAMAGES FOR FAILURE TO COMPLETE ON TIME – The CONTRACTOR agrees that time is of essence of this contract and that for each day of delay beyond the number of days herein agreed upon for the completion of 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 for the CONTRACTOR's total compensation, not as a penalty but as liquidated damages. The sum of one-hundred fifty (\$250) dollars per day for each day of delay.

ARTICLE IX. PROJECT COMPLETION AND ACCEPTANCE

- 9.1 FINAL ACCEPTANCE – Final Acceptance of the Project will be considered only after all stipulations, requirements and provisions of this Contract are faithfully completed and the Project is delivered to the OWNER by CONTRACTOR in an acceptable condition for the intended use by OWNER. In the event that all major Contract pay items are complete and only minor clean-up operations remain for Contract completion, the OWNER has the discretionary authority to issue a Letter of Conditional Approval. Should the OWNER or OWNER's Representative's Letter of Conditional Approval contain conditions for the final Acceptance of the Work, Contract Time will continue to be charged against the CONTRACTOR until such conditions have been corrected to the satisfaction of the OWNER.

- 1 OWNER may at any time request CONTRACTOR in writing to permit OWNER to beneficially occupy any such part of the Work which OWNER believes to be ready for its intended use, finally complete and ready for Final Acceptance. If CONTRACTOR agrees, CONTRACTOR will certify to OWNER and ENGINEER that said part of the Work is finally complete and request OWNER to issue a Letter of Conditional Approval or Final Acceptance for that part of the Work. Within a reasonable time after such request, OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the completed and Finally Accepted Work to determine its status of completion. Warranties on that part of the Work beneficially occupied by OWNER will commence upon issuance of the Letter of Conditional Approval. Any Work items remaining to be completed and Finally Accepted as outlined in the Letter of Conditional Approval will have Warranty commencement upon final completion and Final Acceptance by OWNER.
2. OWNER may at any time request CONTRACTOR in writing to permit OWNER to take over operation of any such CONTRACTOR's part of the Work although it is not finally complete. A copy of such request will be sent to the Engineer and within a reasonable time thereafter, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of that part of the Work affected by the request to determine its status of completion and will jointly prepare a list of the items remaining to be completed or corrected before Final Acceptance. If CONTRACTOR does not object in writing to OWNER, Engineer and ENGINEER that such part of the Work is not ready for separate operation by OWNER, or that separate operation by OWNER will significantly interfere with CONTRACTOR's remaining operations, OWNER will finalize the list of items to be completed or corrected and will deliver such list to CONTRACTOR together with a written recommendation as to the division of responsibilities pending Final Acceptance with respect to security, operation, safety, maintenance, warranties, utilities, insurance, and retainage for that part of the Work taken over for operation by OWNER. During such operation, OWNER shall allow CONTRACTOR reasonable access to complete or correct items

on said list and to complete other related Work.

- 9.2 PARTIAL ACCEPTANCE – Partial Acceptance by OWNER for beneficial occupancy of any completed part of the Work, which has specifically been identified in the Contract Documents as being eligible for early OWNER Acceptance, or which OWNER, ENGINEER and CONTRACTOR agree constitutes a separately functioning and usable part of the Work that can be used by OWNER without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Final Acceptance of the total Work subject to the following:
- 9.3 WARRANTY/CORRECTION PERIOD – During a period of twelve (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 or materials, or both, which in the judgment of the OWNER shall become necessary during such period. If within three (3) days after the receipt of a notice in writing to the CONTRACTOR or his agent the 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. In case of an emergency where, in the judgment of the OWNER, delay would cause a serious loss or damage, repairs may be made without notice being sent to the CONTRACTOR, and the CONTRACTOR shall pay the cost thereof.

ARTICLE X. DISPUTES:

- 10.1 GENERAL – Prior to any anticipated litigation between the OWNER and the CONTRACTOR, both hereby agree that disputed matters shall first be submitted to OWNER administrative appellate procedures as described below:
1. Except as otherwise provided in this Contract, any dispute concerning a question of fact arising under this Contract which is not disposed of by mutual agreement shall be initially decided by the ENGINEER who shall reduce his decision to writing and promptly mail or otherwise furnish a copy thereof to the CONTRACTOR. The decision of the ENGINEER shall be final and conclusive unless within thirty (30) calendar days from the date of issuance of such decision by ENGINEER the CONTRACTOR mails or otherwise furnishes to the OWNER a written notice of appeal addressed to the OWNER, whose appellate decision shall be the final and conclusive OWNER decision. In connection with any appeal under this Article, the CONTRACTOR shall be afforded an opportunity to be heard and to offer evidence in support of the appeal to persons to be promptly appointed by the OWNER to review such disputed matters. The OWNER will also be allowed to present information supporting OWNER's position.
 2. Pending final OWNER decision after a dispute hearing, the CONTRACTOR shall proceed diligently with the performance of the Contract and in accordance with the OWNER'S decision. Neither the OWNER nor the CONTRACTOR is precluded from resorting to litigation or other remedy at law nor in equity to perfect a legal filing prior to the expiration of an applicable statute of limitations or after this OWNER administrative review process is completed.
 3. Governing Law; Venue. All parties to the Contract agree that this Contract shall be construed under the laws of the State of Texas, and obligations under the Contract shall be performed in Harris County, Texas. In the event that any legal proceeding is brought to enforce this Contract or any provision hereof, the same shall be brought in the State District Court of Harris County, Texas. The parties agree to submit to the jurisdiction of said court.

ARTICLE XI. SUPPLEMENTAL AND SPECIAL CONDITIONS

- 11.1 GENERAL – When the Work contemplated by the OWNER is of such a character that the foregoing Standard General Conditions of the Contract cannot adequately cover necessary and additional contractual provisions, the Contract Documents may include Supplemental and Special Conditions as described below:
1. SUPPLEMENTAL CONDITIONS shall describe any additional procedures and requirements of Contract administration to be followed by the CONTRACTOR, OWNER, and OWNER representatives. Supplemental Conditions may expand upon matters covered by the Standard General Conditions, where necessary.

2. SPECIAL CONDITIONS shall relate to terms, conditions and procedures related to a particular project and be unique to that project.

11.2 FUNDED PROJECTS – On State or Federally funded projects, the OWNER may waive, suspend or modify any Article in these General Conditions which conflicts with any State or Federal statute, rule, regulation or procedure, where such waiver, suspension or modification is essential to receipt by the OWNER of such State or Federal funds for the Project. In the case of any project financed in whole or in part by State or Federal funds, any Contract standards or provisions required by the enabling State or Federal statute, or any State or Federal rules, regulations or procedures adopted pursuant thereto that conflict with, or preempt these local Standard General Conditions, shall be controlling.

SUPPLEMENTARY CONDITIONS OF AGREEMENT

1. GENERAL

1.1 The provisions of this part of the specifications shall govern in the event of any conflict between this part and the General Conditions.

2. DEFINITIONS

2.1 Owner: Where in the Specifications the term "Owner" is used, it is understood to refer to the City of Deer Park, Texas.

2.2 Engineer: The work "Engineer" in these specifications shall be understood to refer to the City Engineer or his designated representative of the City of Deer Park and authorized to act as an agent for the Owner.

2.3 Contractor: Wherever in these Specifications the term "Contractor" is used, it is understood to mean the person, persons, co-partnership or corporation who has or have agreed to perform the work contained in this Contract, or his, or their authorized representative.

2.4 Extra Work: The term "Extra Work" as defined in the General Conditions of Agreement is hereby clarified with relation to the Extra Work Orders. All orders shall be signed by the "Owner".

3. LOCATION OF WORK

3.1 The site of work is located within the City Limits of Deer Park, Texas. The drawings will show more specific locations.

4. SCOPE OF WORK

4.1 The Contractor is to provide and complete all requirements as defined within the Contract Documents, as set forth in the detailed Specifications and Instructions herein. All work shall be completed and all materials furnished in strict conformity with the Contract Documents.

5. COMPLETION TIME

5.1 The entire project as indicated herein, and provided in the Contract Documents and Plans, shall be completed as indicated in the Proposal and beginning ten (10) days after the date of notice to proceed. Unless otherwise stipulated, the work shall begin no later than ten (10) days after written notice to proceed is issued. Time charges will commence either on the tenth (10th) day after the stipulated notice date or when the contractor moves in on the job site, whichever occurs first.

6. LIQUIDATED DAMAGES FOR DELAYS

6.1 Time is of utmost essence for this Contract; it being important that this public improvement be quickly completed. The Contractor and Owner understand and agree that a breach of this Contract as to completion on time will cause damage to Owner, but further agree that such damages can not be accurately measured, or that ascertainment will be difficult. Therefore, parties agree that for each and every calendar day work, or any portion thereof, shall remain uncompleted after expiration of time limit set in Contract, or as extended, Contractor shall pay as minimum liquidated damages the following amount:

Amount of Contract	Damages Per Calendar Day
Under \$1,000.00	\$ 10.00
\$1,000.00 to 10,000.00	20.00
\$10,001.00 to 50,000.00	50.00
\$50,001.00 to 100,000.00	100.00
\$100,001.00 to 250,000.00	150.00
\$250,001.00 to 500,000.00	250.00
\$500,001.00 to 750,000.00	325.00
\$750,001.00 to 1,000,000.00	400.00
\$1,000,001.00 to 1,500,000.00	525.00
\$1,500,001.00 to 2,000,000.00	650.00
\$2,000,001.00 to 3,000,000.00	900.00
\$Over \$ 3,000,000.00	1,100.00

6.2 However, foregoing agreement as to liquidated damages constitutes only an agreement by Owner and Contractor as to minimum amount of damages which Owner will sustain in any event by reason of Contractor's failure to complete work within specified time. Should Owner suffer damage over and above minimum amount specified by reason of Contractor's failure to begin work when ordered, carry it forward uninterruptedly after beginning, or complete it within specified time in strict accordance with Plans and Specification, Owner may recover such additional amount. Owner has right to deduct and withhold amount of any and all such damages, whether it be the minimum amount agreed upon or otherwise, from any moneys owing by it to said Contractor or Owner may recover such amount from Contractor and sureties on his bond; all of such remedies shall be cumulative and Owner shall not be required to elect any one, nor be deemed to have made an election by proceeding to enforce any one remedy.

7. GUARANTEE AGAINST DEFECTIVE WORK

7.1 The Contractor shall deliver to the Owner upon completion of all work provided herein, his written guarantee, made out to the Owner and in a form satisfactory to the Owner and guaranteeing (and he does hereby guarantee) all the work performed under this Contract is new

and free from faulty materials in every particular, and free from faulty workmanship, and agreeing (and he does hereby agree) to replace or re-execute without additional cost to the Owner such work as may be found to be unsatisfactory, and to make good all damage to his, or work by others, as a result of improper workmanship and materials or due to such required replacement or re-execution.

7.2 This guarantee shall be made to cover (and does cover) a period of one (1) year from the date of acceptance of all work performed under this Contract. Upon completion of the project for final acceptance, the Contractor shall submit a written guarantee as indicated above with his final estimate of payment to the Owner for approval and acceptance. The guarantee and Final Estimate will be approved when the project is completed as indicated and to the Owner's satisfaction. A "final Certificate" will be issued by the Engineer, as evidence. Neither the "Final Certificate" nor payment, nor any provisions in the Contract Documents shall relieve the Contractor of the guarantee provisions, or his responsibility for neglect or the replacement of faulty materials, or workmanship, or any other items of defect during the period of time covered by the guarantee.

8. INSURANCE REQUIREMENTS

8.1 The successful Contractor shall submit to the Owner, prior to start of work, certificates of insurance of separate endorsements obtained to his existing insurance policies in force, and acceptable to the Owner, and shall meet the minimum insurance requirements as follows:

8.1.1 Workmen's Compensation and Employer's Liability Insurance (policy must include coverage for the Texas Workman's Compensation act).

8.1.1.1 New Texas Worker's Compensation Commission Rule 28 TAC 110.110 relating to REPORTING REQUIREMENTS FOR BUILDING OR CONSTRUCTION PROJECTS FOR GOVERNMENTAL ENTITIES.

A. Definitions:

Certificate of coverage ("certificate")-A copy of a certificate of insurance, a certificate of authority to self-insure issued by the commission, or a coverage AGREEMENT (TWCC-81, TWCC-82, TWCC-83, or TWCC-84), showing statutory worker's compensation insurance coverage for the person's or entity's employees providing services on a project, for the duration of the project.

Duration of the project-includes the time from the beginning of the work on the project until the contractor's/person's work on the project has been completed and accepted by the governmental entity.

Persons providing services on the project ("subcontractor" in 406.096)-includes all persons or entities performing all or part of the services the contractor has undertaken to perform on the project, regardless of whether that person contracted directly with the contractor and regardless of whether that person has employees. This includes, without

limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnished persons to provide services on the project. "Services" does not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

B. The contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all employees of the contractor providing services on the project, for the duration of the project.

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

D. If the coverage period shown on the contractor's current certificate of coverage ends during the duration of the project, the contractor must, prior to the end of the coverage period, file a new certificate of coverage with the governmental entity showing that coverage has been extended.

E. The contractor shall obtain from each person providing services on a project, and provide to the governmental entity.

(1) a certificate of coverage, prior to that person beginning work on the project, so the governmental entity will have on file certificates of coverage showing coverage for all persons providing services on the project; and

(2) no later than seven days after receipt by the contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.

F. The contractor shall retain all required certificates of coverage for the duration of the project and for one year thereafter.

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

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

I. The contractor shall contractually require each person with whom it contracts to provide services on a project, to:

(1) provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.00(44) for all of its employees providing services on the project, for the duration of the project;

(2) provide to the contractor, prior to that person beginning work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project, for the duration of the project;

(3) provide the contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

(4) Obtain from each other person with whom it contracts, and provide to the contractor:

(a) a certificate of coverage, prior to the other person beginning work on the project, and

(b) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

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

(6) notify the governmental entity in writing by certified mail of personal delivery, within 10 days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and

(7) Contractually require each person with whom it contracts, to perform as required by paragraphs (1) – (7), with the certificates of coverage to be provided to the person for whom they are providing services.

J. By signing this contract or providing or causing to be provided a certificate of coverage, the contractor is representing to the governmental entity that all employees of the contractor who will provide services on the project will be covered by workers' compensation coverage for the duration of the project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage

agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of self-Insurance Regulations. Providing false or misleading information may subject the contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

K. The contractor's failure to comply with any of these provisions is a breach of contract by the contractor which entitles the governmental entity to declare the contract void if the contractor does not remedy the breach within ten days after receipt of notice of breach from the governmental entity.

(I) A contractor shall:

(1) provide coverage for its employees providing services on a project, for the duration of the project based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements;

(2) Provide a certificate of coverage showing workers' compensation coverage to the governmental entity prior beginning work on the project;

(3) Provide the governmental entity, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the contractor's current certificate of coverage ends during the duration of the project.

(4) Obtain from each person providing services on a project, and provide to the governmental entity:

(A) a certificate of coverage, prior to that person beginning work on the project, so the governmental entity will have on file certificates of coverage showing coverage for all persons providing services on the project; and

(B) no later than seven days after receipt by the contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

(5) Retain all required certificates of coverage on file for the duration of the project and for one year thereafter;

(6) Notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project;

(7) Post a notice on each project site informing all persons providing services on the project that they are required to be covered, and stating how a person may verify current coverage and report failure to provide coverage. This notice does not satisfy other posting requirements imposed by the Act or other commission rules. This notice must be printed with a title in at least 30 point bold type and text in at least 19 point normal type, and shall be in both English and Spanish and any other language common to the worker population. The text for the notices shall be the following text in Figure 2 provided by the commission on the sample notice, without any additional words or changes.

REQUIRED WORKER'S COMPENSATION COVERAGE

“The law requires that each person working on this site or providing services related to this construction project must be covered by workers’ compensation insurance. This includes person providing hauling, or delivering equipment or materials, or providing labor or transportation or other service related to the project, regardless of the identity of their employer or status as an employee.”

“Call the Texas Workers’ Compensation Commission at 512-440-3789 to receive information on the legal requirements for coverage, to verify whether your employer has provided the required coverage, or to report an employer’s failure to provide coverage.”

(8) Contractually require each coverage, or to report an employer’s failure to provide services on a project to:

(A) provide coverage based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements for all of its employees providing services on the project, for the duration of the project;

(B) Provide a certificate of coverage to the contractor prior to that person beginning work on the project;

(C) Include in all contracts to provide services on the project the language in subsection (e) (3) of this rule;

(D) provide the contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

(E) Obtain from each other person with whom it contracts, and provide to the contractor:

(i) a certificate of coverage, prior to the other person beginning work on the project; and

(ii) prior to the end of the coverage period, a new certificate of coverage showing extension of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;

(F) Retain all required certificates of coverage on file for the duration of the project and for one year thereafter;

(G) notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and

(H) Contractually require each other person with whom it contracts, to perform as required by paragraphs (A)-(H), with the certificate of coverage to be provided to the person for whom they are providing services.

(II) A person providing services on a project, other than a contractor, shall:

(1) provide coverage for its employees providing services on a project, for the duration of the project based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements;

(2) Provide a certificate of coverage as required by its contract to provide services on the project, prior to beginning work on the project;

(3) Have the following language in its contract to provide services on the project:

“By signing this contract or providing or causing to be provided a certificate of coverage, the person signing this contract who will provide services on the project will be covered by workers’ compensation coverage for the duration of the project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier of, in the case of a self-insured, with the commission’s Division of Self-Insurance Regulation. Providing false or misleading information may subject the contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.”

- (4) Provide the person for whom it is providing services on the project, prior to the end of the coverage period shown on its current certificate of coverage, a new certificate showing extension of coverage, if the coverage period shown on the certificate ends during the duration of the project:
- (5) Obtain from each person providing services on a project under contract to it, and provide as required by its contract:
 - (A) A certificate of coverage, prior to the other person beginning work on the project; and
 - (B) prior to the end of the coverage period, a new certificate of coverage showing extension of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;
- (6) retain all required certificates of coverage on file for the duration of the project and for one year thereafter;
- (7) notify the governmental entity in writing by certified mail or personal delivery, of any change that materially affects the provision of coverage of any person providing services on the project and send the notice within 10 days after the person knew or should have known of the change;
- (8) Contractually require each other person with whom it contracts to:
 - (A) provide coverage based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements for all of its employees providing services on the project, for the duration of the project;
 - (B) Provide a certificate of coverage to it prior to that person beginning work on the project;
 - (C) Include in all contracts to provide services on the project the language in subsection (e)(3) of this rule;
 - (D) provide, prior to the end of the coverage period, a new certificate of coverage showing extension of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;
 - (E) Obtain from each other person under contract to it to provide services on the project, and provide as required by its contract;

(i) a certificate of coverage, prior to the other person beginning work on the project; and

(ii) prior to the end of the coverage period, a new certificate of coverage showing extension of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the contract;

(F) Retain all required certificates of coverage on file for the duration of the project and for one year thereafter;

(G) notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and

(H) Contractually require each person with whom it contracts, to perform as required by paragraphs (A)-(H), with the certificate of coverage to be provided to the person for whom they are providing services.

(III) If any provision of this rule or its application to any person or circumstance is held invalid, the invalidity does not affect other provisions or applications of this rule that can be given effect without the invalid provisions of this rule are declared to be severable.

(IV) This rule is applicable for building or construction contracts advertised for bid by a governmental entity on or after September 1, 1994.

8.1.2 Comprehensive General Liability with Limits not less than:

Bodily Injury Liability	\$100,000/person \$300,000/accident
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Property Damage Liability	\$50,000/accident \$100,000/aggregate
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8.1.3 Comprehensive Automobile Liability with Limits not less than:

Bodily Injury Liability	\$100,000/person \$300,000/accident
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Property Damage Liability	\$25,000/accident
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8.1.4 The remaining term of all policies shall extend at least to the completion date of the Contract; if the expiration date shall occur prior to final completion of all operations hereunder, Contractor shall, not less than 15 days prior to expiration date, furnish evidence to renewal or of extension of such insurance. All such evidence of insurance shall provide for 15 days prior notice to be given to Owner in the event of cancellation.

8.1.5 The Contractor agrees to indemnify and to hold the Owner and the Engineer harmless from and against any and all damages, claims, demands, suits, judgments, and costs including attorney's fees and expenses for or on account of damage to property of any person or persons (including property and employees of the Owner, the Contractor and employees of the Contractor) directly or indirectly arising out of, or caused by or in connection with the performance of or failure to perform any work provided for hereunder by the Contractor, his sub-contractors, or their or the Contractors agents, servants or employees.

9. SANITARY FACILITIES

9.1 Adequate facilities shall be provided not less than 150 feet from any existing or proposed water well and shall be properly maintained in good sanitary conditions at a location for use by all employees and by the Engineer. The sanitary facilities shall be well ventilated, provided with proper concealment, and shall be kept clean at all times. Upon completion of the work, the facilities shall be removed, and the site restored to its original condition, and to the Owner's complete satisfaction.

10. EXISTING TOPOGRAPHY

10.1 The natural ground contours and topographic features indicated on the drawings are based on latest topographic surveys available, and have been used to estimate quantities; however, the degree of accuracy of this information shall in no way relieve the Contractor or others of any responsibility for the proper performance of the work, or obligations of the Contract Documents.

11 PROPERTY LINES AND MONUMENTS

11.1 The Contractor shall be responsible for protecting reference markers, property line markers, monuments and engineering stakes, and shall reset any such markers, monuments, or stakes damaged or obliterated by the construction crews under this authority, at his own expense, and shall reset same to the satisfaction of the Engineer.

12 OTHER CONTRACTS

12.1 The Owner reserves the right to let other contractors in connection with this work. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and where required, shall properly connect and coordinate his work with theirs.

13. PERMITS AND LICENSES

13.1 All permits and licenses of a temporary nature necessary for the prosecution of the work shall be secured and paid for by the Contractor.

14. CONTRACTOR'S SUPERVISORS AND REPRESENTATIVES

14.1 Provisions shall be made for all personnel and material to perform necessary administration, supervision, coordination, and field engineering required for the performance of the work peculiar to the Contract. Only competent and skilled supervision will be permitted at the job site throughout all phases of the project execution. Their supervisors shall be experienced in and familiar with, the particular type of work under their charge, and shall be fully capable of completely directing the work in accordance with the intent of the Plans and specifications. The Contractor shall also insure that qualified representatives are available at all times to answer questions or to otherwise represent the Contractor for the Engineer and Owner.

15. MATERIALS AND WORKMANSHIP

15.1 All equipment and materials to be provided shall be new and unused. Where materials or equipment are specified by a trade or brand name, it is not the Owner's intention to discriminate against an equal product of another manufacturer, but is intended to set a definite standard of quality or performance, and to establish an equal basis for the evaluation of bids. Where the words, "equivalent", "proper", "approved equal", or "equal to" are used, they shall be understood to mean the item referred to shall be proper, the equivalent of, or equal to the desired type rather than brand in the opinion or judgement of the Engineer. Notwithstanding that the words "or equal to" or other such expressions may be used in the Specifications in connection with a material, manufactured article or process specifically designated shall be used, unless a substitute shall be approved in writing by the Engineer. The Engineer shall have the right to require the use of such specifically designated material, article or process, if in his opinion it is to the Owner's best interest.

16. STORAGE OF MATERIALS

16.1 Suitable water-tight storage facilities, of ample sizes with floors raised above the ground, shall be provided for all types of materials that are liable to damage caused from exposure to the weather. Other materials shall be stored on blocks or platforms above the ground. Materials shall be so placed as to permit easy access for the proper inspection and identification. Any material which is deteriorated, damaged or otherwise unsatisfactory for use, shall be removed from the site of work. Upon completion of all work and when directed, the storage facilities shall be removed from the site.

17. PROTECTION OF FACILITIES

17.1 Pipelines and other existing underground installations and structures in the vicinity of the work are indicated on the drawings according to the best information available to the Engineer. The Owner or the Engineer does not guarantee the accuracy of such information. Every effort shall be made to locate all underground pipelines, conduits, and structures by contracting owners of underground utilities, and by prospecting in advance of all trench excavation. Any existing utilities that are damaged directly or indirectly by the Contractor shall be repaired at the expense of the Contractor.

17.2 Any delay or extra cost to the contractor caused by pipelines, or other underground structures, or obstructions not shown on the drawings, or found in locations different from that indicated, shall not constitute a claim for extra work, additional payment, or damages.

18. CONSTRUCTION SCHEDULE

18.1 All bidders shall include with their proposal a preliminary construction schedule for the Contract. Within fifteen (15) days after award of contract, the successful Contractor shall submit to the Owner a completely detailed construction schedule.

19. PERIODAL AND FINAL CLEAN-UP

19.1 When necessary, and at least once a month, the premises shall be cleaned of all rubbish and waste material, regardless as to whether the accumulation is caused by his employees, sub-contractors, or by the work. Clean-up shall be subject to approval by the Inspector. If the premises are not cleaned up within twenty-four (24) hours after the clean-up is directed by the Inspector, the Owner does hereby reserve the right to clean the premises and withhold the expenditure from payments due the Contractor.

19.2 Upon completion of project construction, and prior to final payment, as directed by the Inspector and at no added cost to the Owner, all tools, equipment, surplus materials, debris and rubbish shall be removed from the site of work and the surrounding premises. All properties (including work areas, and access roads) shall be restored to their original condition.

20. MEASUREMENT AND PAYMENT

20.1 The contractor shall furnish the Engineer and the Owner a breakdown of major classes of work and materials as an aid in determining the amount of monthly pay estimates. This breakdown shall be submitted thirty (30) days after work has commenced and on the first day of each month thereafter, for all work performed and materials supplied, for the Engineer's approval and payment, until the project is completed and final acceptance is made. The Owner shall be responsible for all authorized charges and payments made in connection with the provisions of the Contract Documents of Proposal.

21. PAYMENT – RETAINAGE

21.1 The Owner shall pay the Contractor, on or before the 30th day of the current month, the total amount of the approved statement, less 10% retainage, which shall be retained until final payment, and further less all previous payments and all further sums that may be retained by the Owner under the terms of this Agreement. If the total Contract Price at time of contract execution is Four Hundred Thousand Dollars (\$400,000.00), or more, if approved by the City Engineer, retainage can be reduced to five percent (5%). A Contract that exceeds \$400,000.00 and 10% retainage is with-held, interest earned on the 5% extra retainage will be due to the Prime Contract upon completion of the contract.

22. AVAILABILITY OF UTILITIES

22.1 The Contractor shall pay all expenses for the necessary utilities connected with the construction of this project.

23. EXAMINATION OF SITE

23.1 It shall be the responsibility of the Contractor to make his own survey of the site of the work and to familiarize himself with all characteristics and conditions existing throughout the full extent of the work. No claim for extra compensation will be approved that is based on the fact that the Contractor failed to estimate the amount of labor and materials required to complete the project in accordance with the Plans and Specifications.

24. ASSIGNMENT AND SUBLETTING

24.1 The contractor shall perform with his own organization and with the assistance of workmen under his immediate superintendence, work of a value not less than 50 percent of the value of all work embraced in the contract exclusive of items not commonly found in contracts for similar work, or which require highly specialized knowledge, craftsmanship and/or equipment not ordinarily available in the organizations of Contractors performing work of the character embraced in the contract. Written consent to sublet, assign or otherwise dispose of any portion of the contract shall not be construed to relieve the Contractor of any responsibility for the fulfillment of the contract.

25. LABOR CLASSIFICATION AND MINIMUM WAGE SCALE

25.1 Wage Scale: Article 5159-a of the revised Civil statutes of Texas, passed by the 43rd Legislature Acts of 1993, Page 91, Chapter 45, provides that any government subdivision shall ascertain the general prevailing rate of per diem wages in the locality in which the work is to be performed for each craft or type of workman or mechanic and shall specify in the call for bids and in the contract the prevailing rate of per diem wages which shall be paid for each craft type of workman. This article further provides that the Contract shall forfeit, as penalty, to the City, County, or State, or other political subdivision, Ten Dollars (\$10.00) per day for each laborer, workman, or mechanic who is not paid the stipulated wage for the type of work performed by him as set up in the wage scale. The OWNER is authorized to withhold from the Contractor the amount of this penalty in any payment that might be claimed by the Contractor or subcontractor, The Act makes the Contractor responsible for the acts of the subcontractor in this respect.

The article, likewise, required that the Contractor and subcontractor keep an accurate record of the names and occupations of all persons employed by him and show the actual per diem wages paid to each worker and these records are open to the inspection of the OWNER.

"General Decision Number: TX20200031 01/03/2020

Superseded General Decision Number: TX20190031

State: Texas

Construction Type: Heavy

County: Harris County in Texas.

HEAVY CONSTRUCTION PROJECTS Including Water and Sewer Lines
(Does Not Include Flood Control).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number Publication Date
0 01/03/2020

* SFTX0669-001 04/01/2019

	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers).....	\$ 29.53	21.27

SUTX2005-019 08/16/2005		

	Rates	Fringes
CARPENTER.....	\$ 14.04	0.00
CEMENT MASON/CONCRETE FINISHER...	\$ 12.50	1.17
ELECTRICIAN.....	\$ 17.00	0.04
Formbuilder/Formsetter.....	\$ 13.84	1.17
IRONWORKER, REINFORCING.....	\$ 11.28	0.00

Laborers:

Common.....	\$ 8.94	0.00
Landscape.....	\$ 7.35	0.00
Mason Tender Cement.....	\$ 9.94	0.00
Pipelayer.....	\$ 10.14	0.00

PIPEFITTER.....\$ 17.00 0.04

POWER EQUIPMENT OPERATOR:

Backhoe.....	\$ 13.47	0.00
Bulldozer.....	\$ 12.58	0.00
Crane.....	\$ 15.33	0.57
Excavator.....	\$ 16.37	0.00
Front End Loader.....	\$ 12.16	0.00
Grader.....	\$ 12.20	1.48
Tractor.....	\$ 15.00	0.00

TRUCK DRIVER.....\$ 12.02 1.02

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination

- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
 Wage and Hour Division
 U.S. Department of Labor
 200 Constitution Avenue, N.W.
 Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
 U.S. Department of Labor
 200 Constitution Avenue, N.W.
 Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
 U.S. Department of Labor
 200 Constitution Avenue, N.W.
 Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

"General Decision Number: TX20200038 01/03/2020

Superseded General Decision Number: TX20190038

State: Texas

Construction Type: Highway

Counties: Austin, Brazoria, Chambers, Fort Bend, Galveston, Hardin, Harris, Jefferson, Liberty, Montgomery, Orange, San Jacinto and Waller Counties in Texas.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number Publication Date
0 01/03/2020

* SUTX2011-013 08/10/2011

Rates Fringes

CEMENT MASON/CONCRETE
FINISHER (Paving and
Structures).....\$ 12.98

ELECTRICIAN.....\$ 27.11

FORM BUILDER/FORM SETTER

Paving & Curb.....\$ 12.34
Structures.....\$ 12.23

LABORER

Asphalt Raker.....\$ 12.36
Flagger.....\$ 10.33
Laborer, Common.....\$ 11.02
Laborer, Utility.....\$ 11.73
Pipelayer.....\$ 12.12
Work Zone Barricade
Servicer.....\$ 11.67

PAINTER (Structures).....\$ 18.62

POWER EQUIPMENT OPERATOR:

Asphalt Distributor.....\$ 14.06
Asphalt Paving Machine.....\$ 14.32
Broom or Sweeper.....\$ 12.68
Concrete Pavement
Finishing Machine.....\$ 13.07
Concrete Paving, Curing,
Float, Texturing Machine....\$ 11.71
Concrete Saw.....\$ 13.99
Crane, Hydraulic 80 Tons
or less.....\$ 13.86
Crane, Lattice boom 80
tons or less.....\$ 14.97
Crane, Lattice boom over
80 Tons.....\$ 15.80
Crawler Tractor.....\$ 13.68
Excavator, 50,000 pounds
or less.....\$ 12.71
Excavator, Over 50,000
pounds.....\$ 14.53
Foundation Drill, Crawler
Mounted.....\$ 17.43
Foundation Drill, Truck
Mounted.....\$ 15.89
Front End Loader 3 CY or
Less.....\$ 13.32
Front End Loader, Over 3 CY.\$ 13.17
Loader/Backhoe.....\$ 14.29
Mechanic.....\$ 16.96
Milling Machine.....\$ 13.53
Motor Grader, Fine Grade....\$ 15.69
Motor Grader, Rough.....\$ 14.23
Off Road Hauler.....\$ 14.60
Pavement Marking Machine....\$ 11.18
Piledriver.....\$ 14.95
Roller, Asphalt.....\$ 11.95
Roller, Other.....\$ 11.57
Scraper.....\$ 13.47
Spreader Box.....\$ 13.58

Servicer.....\$ 13.97

Steel Worker

Reinforcing Steel.....\$ 15.15
Structural Steel Welder.....\$ 12.85
Structural Steel.....\$ 14.39

TRUCK DRIVER

Low Boy Float.....\$ 16.03
Single Axle.....\$ 11.46
Single or Tender Axle Dump \$ 11.48

Tandem Axle Tractor w/Semi
Trailer.....\$ 12.27

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

=====
Note: Executive Order (EO) 13706, Establishing Paid Sick Leave
for Federal Contractors applies to all contracts subject to the
Davis-Bacon Act for which the contract is awarded (and any
solicitation was issued) on or after January 1, 2017. If this
contract is covered by the EO, the contractor must provide
employees with 1 hour of paid sick leave for every 30 hours
they work, up to 56 hours of paid sick leave each year.
Employees must be permitted to use paid sick leave for their
own illness, injury or other health-related needs, including
preventive care; to assist a family member (or person who is
like family to the employee) who is ill, injured, or has other
health-related needs, including preventive care; or for reasons
resulting from, or to assist a family member (or person who is
like family to the employee) who is a victim of, domestic
violence, sexual assault, or stalking. Additional information
on contractor requirements and worker protections under the EO
is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within
the scope of the classifications listed may be added after
award only as provided in the labor standards contract clauses
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and wage rates that have been found to be prevailing for the
cited type(s) of construction in the area covered by the wage
determination. The classifications are listed in alphabetical
order of ""identifiers"" that indicate whether the particular
rate is a union rate (current union negotiated rate for local),
a survey rate (weighted average rate) or a union average rate
(weighted union average rate).

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in dotted lines beginning with characters other than ""SU"" or
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classification, which in this example would be Plumbers. 0198
indicates the local union number or district council number
where applicable, i.e., Plumbers Local 0198. The next number,
005 in the example, is an internal number used in processing
the wage determination. 07/01/2014 is the effective date of the
most current negotiated rate, which in this example is July 1,
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Union prevailing wage rates are updated to reflect all rate
changes in the collective bargaining agreement (CBA) governing
this classification and rate.

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WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

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PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, _____, as Principal herein, and [Surety], a corporation organized and existing under the laws of the State of [Surety's state of incorp] and who is authorized and admitted to issue surety bonds in the State of Texas, as surety, are held and firmly bound unto the City of Deer Park, Texas, a municipal corporation with its principal location of 710 E. San Augustine, Deer Park, Texas, Harris County, Obligee herein, in the sum of [printed amount of bond] Dollars (\$[numeric amount of bond]) for the payment of which sum we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents:

WHEREAS, Principal has entered into a certain written contract with the Obligee dated the ____ day of _____, 20____, which contract is hereby referred to herein as "the Contract" and is incorporated herein to the same extent as if copied at length, for the following project: [project name].

NOW, THEREFORE, the condition of this obligation is such, that if the said Principal shall directly or indirectly timely make payment to each and every claimant (as defined in Chapter 2253, Texas Government Code, as amended) supplying labor or materials in the prosecution of the work under the Contract, then this obligation shall be void; otherwise, to remain in full force and effect. *This obligation may be enforced by the Obligee in the event of bankruptcy or default by Principal in payments to suppliers of labor or materials in the prosecution of the work under the Contract, in either of which events the Surety shall make such payments as Principal has failed to pay and as may be required to complete the work under the contract.* The Surety stipulates and agrees that no change, extension of time, alteration, omission, addition or other modification to the terms of the Contract will affect its obligations on this bond, and it hereby waives notice of any such changes, extensions of time, alterations, omissions, additions, or other modifications, to the Contract or to related subcontracts, purchase orders or other obligations, and any notices provided in such regard shall not create as to any party a duty related thereto.

PROVIDED, HOWEVER, that this bond is executed pursuant to Chapter 2253 of the Texas Government Code, as amended, and all rights and liabilities on this bond shall be determined in accordance with the provisions of said statute, to the same extent as if it were

copied at length herein. All notices shall be delivered in writing to the addresses shown below or to addresses provided in the Contract Documents.

IN WITNESS WHEREOF, the duly authorized representatives of the Principal and the Surety have executed this instrument.

SIGNED and SEALED this _____ day of _____, 20__.

The date of bond shall not be prior to date of Contract.

PRINCIPAL

By: _____

Name: _____

Title: _____

Address: _____

Telephone Number: _____

SURETY

By: _____

Name: _____

Attorney in Fact

Address: _____

Telephone Number: _____

ATTEST:

(Principal) Secretary

(S E A L)

Witness as to Principal

ATTEST:

Secretary

(S E A L)

Witness as to Surety

An original copy of Power of Attorney shall be attached to Bond by the Attorney-in-Fact.

Approved as to Form:

City of Deer Park
710 E. San Augustine
Deer Park, Texas 77536

By: _____

Title: _____

Date: _____

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, _____, as Principal herein, and [Surety], a corporation organized and existing under the laws of the State of [Surety's state of incorp] and who is authorized and admitted to issue surety bonds in the State of Texas, as surety, are held and firmly bound unto the City of Deer Park, Texas, a municipal corporation with its principal location of 710 E. San Augustine, Deer Park, Texas, Harris County, Obligee herein, in the sum of [printed amount of bond] Dollars (\$[numeric amount of bond]) for the payment of which sum we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has entered into a certain written contract with the Obligee dated the ___ day of _____, 20___, herein referred to as "the Contract" and incorporated herein and made a part hereof for all purposes, for the construction of the following project: [project name].

NOW, THEREFORE, the condition of this obligation is such, if the said Principal shall faithfully perform the work in accordance with the plans, specifications, and other Contract Documents and shall fully indemnify and hold harmless the Obligee from all costs and damages which Obligee may suffer by reason of Principal's failure to perform the Work in conformity with the Contract Documents, and reimburse and repay Obligee for all outlay and expense that Obligee may incur in making good such default, then this obligation shall be void; otherwise, to remain in full force and effect. Whenever Contractor shall be declared by Obligee to be in default under the Contract, the Surety shall, upon request of Obligee and within seven (7) calendar days from receipt of Obligee's notice of Contractor's default, commence and thereafter complete performance of Contractor's obligations under the Contract. This Bond covers all contractual obligations of Contractor under the Contract, including, without limitation, the indemnity, warranty and guaranty obligations. The Surety stipulates and agrees that no change, extension of time, alteration, omission, addition or other modification to the terms of any of the Contract will affect its obligations on this bond, and it hereby waives notice of any such changes, extensions of time, alterations, omissions, additions, or other modifications, to the Contract or to related subcontracts, purchase orders or other obligations, and any notices provided in such regard shall not create as to any party a duty related thereto. The penal limit of this bond shall

automatically be increased by the amount of any change order, supplemental agreement or amendment which increases the price of the Contract.

PROVIDED, HOWEVER, that this bond is executed pursuant to Chapter 2253 of the Texas Government Code, as amended, and all rights and liabilities on this bond shall be determined in accordance with the provisions of such statute, to the same extent as if it were copied at length herein. All notices shall be delivered in writing to the addresses shown below or to addresses provided in the Contract Documents.

IN WITNESS WHEREOF, the duly authorized representatives of the Principal and the Surety have executed this instrument.

SIGNED and SEALED this _____ day of _____, 20__.

The date of bond shall not be prior to date of Contract.

ATTEST:

(Principal) Secretary

(S E A L)

Witness as to Principal

ATTEST:

Secretary

(S E A L)

Witness as to Surety

PRINCIPAL

By: _____

Name: _____

Title: _____

Address: _____

Telephone Number: _____

SURETY

By: _____

Name: _____
Attorney in Fact

Address: _____

Telephone Number: _____

An original copy of Power of Attorney shall be attached to Bond by the Attorney-in-Fact.

Approved as to Form:

City of Deer Park
710 E. San Augustine
Deer Park, Texas 77536

By: _____

Title: _____

Date: _____

CONFLICT OF INTEREST QUESTIONNAIRE

In accordance with H.B. 914 the City of Deer Park is required to file the enclosed form (CIQ), Conflict of Interest Questionnaire with the City Secretary's office with any vendor that the City will contract with for purchases and services of any kind.

In order to comply with this State Requirement the City is requesting that your company as a potential contracted vendor with the City of Deer Park complete this form and submit it with your bid documents. This form will be considered part of the bid package. Failure to complete and submit this form with your bid could delay the award of your bid should you meet all other requirements.

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

FORM CIQ

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. See Section 176.006(a-1), Local Government Code.

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

OFFICE USE ONLY

Date Received

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

2 Check this box if you are filing an update to a previously filed questionnaire. (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

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

Name of Officer

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

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

Yes No

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

Yes No

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

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

7

Signature of vendor doing business with the governmental entity

Date

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

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

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

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

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

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

(2) the vendor:

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

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor;

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

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

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

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

(1) has an employment or other business relationship with a local government officer of that local governmental entity, or a family member of the officer, described by Section 176.003(a)(2)(A);

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

(3) has a family relationship with a local government officer of that local governmental entity.

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

(1) the date that the vendor:

(A) begins discussions or negotiations to enter into a contract with the local governmental entity; or

(B) submits to the local governmental entity an application, response to a request for proposals or bids, correspondence, or another writing related to a potential contract with the local governmental entity; or

(2) the date the vendor becomes aware:

(A) of an employment or other business relationship with a local government officer, or a family member of the officer, described by Subsection (a);

(B) that the vendor has given one or more gifts described by Subsection (a); or

(C) of a family relationship with a local government officer.

H.B. 1295

Certificate of Interested Parties Procedure

The Texas Ethics Commission states:

"In 2015, the Texas Legislature adopted House Bill 1295, which added section 2252.908 of the Government Code. The law states that a governmental entity or state agency may not enter into certain contracts with a business entity unless the business entity submits a disclosure of interested parties to the governmental entity or state agency at the time the business entity submits the signed contract to the governmental entity or state agency. The law applies only to a contract of a governmental entity or state agency that either (1) requires an action or vote by the governing body of the entity or agency before the contract may be signed or (2) has a value of at least \$1 million. The disclosure requirement applies to a contract entered into on or after January 1, 2016."

The key issue is that the disclosure form must be submitted by the business entity before the signed contract is submitted in order for the contract to be valid. The Texas Ethics Commission requires each contract covered by law to have an ID # generated by the City in order to track the contract. Once the City generates an ID # this will be given to the business entity to file with the Ethics Commission.

WHO IS REQUIRED TO FILE FORM 1295?

Any vendor or business entity that falls into one of these categories must file FORM 1295 with the Texas Ethics Commission.

- A) On projects over \$50,000: Once the lowest bidder has been determined the City will provide them with a project identification number to be submitted on Form 1295. The procedure, listed below, must be completed before Council approves the contract/agreement.
- B) All purchases requiring Council approval: Vendor will be required to submit Form 1295 following the procedure below.

FORM 1295 PROCEDURE

1. Business entities must log on to the Texas Ethics Commission web page at <https://www.ethics.state.tx.us> on the left hand side of the screen choose "File Reports Electronically", then choose "Form 1295 Certificates of Interested Parties Filing".
2. Once the business entity generates the Disclosure Form on the Texas Ethics Commission website, the business entity will print the Form and Certification of Filing. The authorized agent of the vendor must sign the printed copy of the form and have the signature notarized.
3. The signed and notarized Form 1295 must be submitted to the City prior to the City Council meeting, at which time the contract or agreement will be considered for approval. The City must acknowledge the receipt of the filed Form 1295 no later than the 30th day after the date the contract binds all parties to the contract. Once a Form 1295 is acknowledged, it will be posted to the Texas Ethics Commission website within 7 days.

CERTIFICATE OF INTERESTED PARTIES

FORM 1295

Complete Nos. 1 - 4 and 6 if there are interested parties.
 Complete Nos. 1, 2, 3, 5, and 6 if there are no interested parties.

OFFICE USE ONLY

1 Name of business entity filing form, and the city, state and country of the business entity's place of business.

2 Name of governmental entity or state agency that is a party to the contract for which the form is being filed.

3 Provide the identification number used by the governmental entity or state agency to track or identify the contract, and provide a description of the goods or services to be provided under the contract.

4 Name of Interested Party	City, State, Country (place of business)	Nature of Interest (check applicable)	
		Controlling	Intermediary

5 Check only if there is NO Interested Party.

6 AFFIDAVIT I swear, or affirm, under penalty of perjury, that the above disclosure is true and correct.

 Signature of authorized agent of contracting business entity

AFFIX NOTARY STAMP / SEAL ABOVE

Sworn to and subscribed before me, by the said _____, this the _____ day of _____, 20____, to certify which, witness my hand and seal of office.

 Signature of officer administering oath

 Printed name of officer administering oath

 Title of officer administering oath

ADD ADDITIONAL PAGES AS NECESSARY

PART II
TECHNICAL SPECIFICATIONS

PROJECT SPECIFICATIONS
for the
Deer Park Hike and Bike Trail
Phase 1

Located at
Tributary "B" to Willow Spring, Deer Park, TX
Harris County
Prepared for
City of Deer Park

PROJECT NO.

Burditt Project No.:1039.003
Issued: 02-20-2021

Burditt Consultants, LLC.
310 Longmire Road, Conroe, TX 77304
P: (936) 756-3041 F: (936) 539-3240

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**SECTION 00 01 02
PROJECT INFORMATION**

PART 1 GENERAL

1.01 PROJECT IDENTIFICATION

- A. Project Name: Deer Park Hike & Bike Trail Phase 1,

Deer Park, Texas 77801.
- B. The Owner, hereinafter referred to as Owner: City of Deer park
- C. Architect: Burditt Consultants LLC,
 - 1. Address: 310 Longmire Rd.
 - 2. City, State, Zip: Conroe, TX 77304
 - 3. Phone/Fax: P:936-756-3041 F: 936-539-3240
 - 4. Email: cwalker@burditt.com

1.02 NOTICE TO PROSPECTIVE BIDDERS

- A. These documents constitute an Invitation to Bid to General Contractors for the construction of the project described below.
- B. Notice Date: 2/10/2021.

1.03 PROJECT DESCRIPTION

- A. Summary Project Description: 8' wide decomposed granite trail, block wall, concrete ramps, grading, drainage and site furnishings..

1.04 PROJECT CONSULTANTS

- A. The Architect, hereinafter referred to as Architect: [_____].

1.05 PROCUREMENT TIMETABLE

- A. RFQ Documents Available: 2/10/2021.
- B. Last Request for Information Due: 7 days prior to due date of qualifications statements.
- C. Mandatory Pre-Bid Briefing: 3/10/2021 at 11:00 am.
- D. Last Request for Substitution Due: 7 days prior to due date of bids.
- E. Last Request for Information Due: 7 days prior to due date of bids.
- F. Anticipated Bid Due Date: 3/18/2021, before 2 PM local time.
- G. Bid Opening: Same day, 2 PM local time.
- H. Contract Time: 180 calendar days.
- I. Contract Time: To be stated in bid documents.
- J. The Owner reserves the right to change the schedule or terminate the entire procurement process at any time.

1.06 PROCUREMENT DOCUMENTS

- A. Availability of Documents: Complete sets of procurement documents may be obtained:
 - 1. From Owner at the Project Manager's address listed above.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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- B. 00 01 02 - Project Information
- C. 00 01 10 - Table of Contents
- D. 00 01 15 - List of Drawing Sheets
- E. 00 31 00 - Available Project Information

SPECIFICATIONS

2.01 DIVISION 01 -- GENERAL REQUIREMENTS

- A. 01 10 00 - Summary
- B. 01 20 00 - Price and Payment Procedures
- C. 01 22 00 - Unit Prices
- D. 01 23 00 - Alternates
- E. 01 25 00 - Substitution Procedures
- F. 01 30 00 - Administrative Requirements
- G. 01 32 16 - Construction Progress Schedule
- H. 01 40 00 - Quality Requirements
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- K. 01 42 19 - Reference Standards
- L. 01 45 33 - Code-Required Special Inspections
- M. 01 57 13 - Temporary Erosion and Sediment Control
- N. 01 60 00 - Product Requirements
- O. 01 70 00 - Execution and Closeout Requirements
- P. 01 71 23 - Field Engineering
- Q. 01 78 00 - Closeout Submittals

2.02 DIVISION 02 -- EXISTING CONDITIONS

- A. 02 41 00 - Demolition

2.03 DIVISION 03 -- CONCRETE

- A. 03 10 00 - Concrete Forming and Accessories
- B. 03 20 00 - Concrete Reinforcing

2.04 DIVISION 04 -- MASONRY

2.05 DIVISION 05 -- METALS

2.06 DIVISION 06 -- WOOD, PLASTICS, AND COMPOSITES

- 2.07 DIVISION 07 -- THERMAL AND MOISTURE PROTECTION**
 - 2.08 DIVISION 08 -- OPENINGS**
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 - 2.12 DIVISION 12 -- FURNISHINGS**
 - 2.13 DIVISION 13 -- SPECIAL CONSTRUCTION**
 - 2.14 DIVISION 14 -- CONVEYING EQUIPMENT**
 - 2.15 DIVISION 21 -- FIRE SUPPRESSION**
 - 2.16 DIVISION 22 -- PLUMBING**
 - 2.17 DIVISION 23 -- HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)**
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 - 2.19 DIVISION 26 -- ELECTRICAL**
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 - 2.22 DIVISION 31 -- EARTHWORK**
 - A. 31 10 00 - Site Clearing
 - B. 31 22 00 - Grading
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 - 2.26 DIVISION 46 -- WATER AND WASTEWATER EQUIPMENT**
- END OF SECTION**

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

SHEET NO	SHEET NAME
CVR	COVER SHEET
LS1.00	OVERALL SITE
LS1.01	ENLARGED SITE PLAN
LS1.02	ENLARGED SITE PLAN
LS1.03	ENLARGED SITE PLAN
LS1.04	ENLARGED SITE PLAN
LS1.05	SITE DETAILS

END OF SECTION

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SECTION 00 31 00
AVAILABLE PROJECT INFORMATION

PART 1 GENERAL

1.01 EXISTING CONDITIONS

- A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders but will not be part of Contract Documents, as follows:
- B. Geotechnical Report: Entitled Geotechnical Exploration - Phase One- Hike & Bike Trails Master Plan, dated February 14, 2020.
 - 1. This report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of Architect.
 - 2. The recommendations described shall not be construed as a requirement of this Contract, unless specifically referenced in Contract Documents.
 - 3. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Price accruing to Owner.

1.02 PERMITS

- A. Owner has obtained the following permits and/or approvals, that are required to be secured prior to commencement of construction work on this project:
 - 1. Master License Agreement for Hike & Bike Trails.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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GEOTECHNICAL EXPLORATION

PHASE ONE - HIKE & BIKE TRAILS MASTER PLAN

Off East P Street
City of Deer Park, Texas
ALPHA Report No. H193257
February 14, 2020

Prepared for:

BURDITT CONSULTANTS, LLC.
310 Longmire Road
Conroe, TX 77304
Attention: Ms. Claudia Walker

Prepared By:

ALPHA  TESTING
WHERE IT ALL BEGINS

February 14, 2020

Burditt Consultants, LLC.
310 Longmire Road
Conroe, TX 77304

Attention: Ms. Claudia Walker

Re: Geotechnical Exploration
Phase One - Hike & Bike Trails Master Plan
Off East P Street
City of Deer Park, Texas
ALPHA Report No. H193257

Attached is the report of the geotechnical exploration performed for the project referenced above. This study was authorized through Agreement between Architect and Consultant on December 12, 2019 and performed in accordance with ALPHA Proposal No. 73219, dated September 10, 2019.

This report contains results of field explorations and laboratory testing and an engineering interpretation of these with respect to available project characteristics. The results and analyses were used to develop information to aid design of the hike and bike trail and retaining walls.

ALPHA TESTING, INC. appreciates the opportunity to be of service on this project. If we can be of further assistance, such as providing construction materials testing services, please contact our office.

Sincerely,

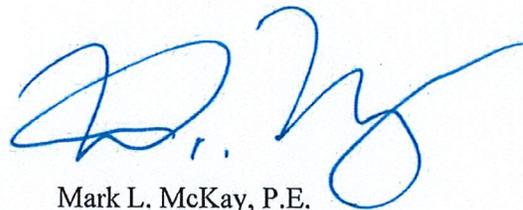
ALPHA TESTING, INC



Duraisamy S. (Roy) Saravanathiiban, Ph.D., P.E.
Senior Geotechnical Engineer



02/14/2020



Mark L. McKay, P.E.
Director of Geotechnical Engineering

RS/MLM/rs
Copies: (1) Client



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1.0 PURPOSE AND SCOPE

The purpose of this geotechnical exploration is for ALPHA TESTING, INC. (ALPHA) to evaluate for Burditt Consultants, LLC (“Client”) some of the physical and engineering properties of subsurface materials at selected locations on the subject site with respect to formulation of appropriate geotechnical design parameters for the proposed hike and bike trail and retaining walls. The field exploration was accomplished by securing subsurface samples from widely spaced test borings performed across the expanse of the site. Engineering analyses were performed from results of the field exploration and results of laboratory tests performed on representative samples.

Also included are general comments pertaining to reasonably anticipated construction problems and recommendations concerning earthwork and quality control testing during construction. This information can be used to evaluate subsurface conditions and to aid in ascertaining construction meets project specifications.

Recommendations provided in this report were developed from information obtained in test borings depicting subsurface conditions only at the specific boring locations and at the particular time designated on the logs. Subsurface conditions at other locations may differ from those observed at the boring locations, and subsurface conditions at boring locations may vary at different times of the year. The scope of work may not fully define the variability of subsurface materials and conditions that are present on the site.

The nature and extent of variations between borings may not become evident until construction. If significant variations then appear evident, our office should be contacted to re-evaluate our recommendations after performing on-site observations and possibly other tests.

2.0 PROJECT CHARACTERISTICS

We understand the project consists of a hike and bike trail that is to be located along existing drainage easements within the City of Deer Park. The trail is about 2,500 ft long, from Station 0+00 to about Station 25+00. The trail will consist of a decomposed granite path. Short retaining walls (less than 3 ft in height) will be constructed along the trail. A vicinity map showing the project’s general location is provided on Figure A-1 in Appendix A of this report.

3.0 FIELD EXPLORATION

Subsurface conditions on the site were explored by drilling a total of four (4) test borings to a depth of 6 ft. Portable drilling equipment was utilized due to the limitation in site access. The approximate location of each test boring is shown on the Boring Location Plan, Figure A-2, enclosed in the Appendix of this report. Details of drilling and sampling operations are briefly summarized in Methods of Field Exploration, Section A-3 of the Appendix.

Subsurface soil types encountered during the field exploration are presented on Log of Boring sheets included in Appendix A of this report. The boring logs contain our Field Technician's and Engineer's interpretation of conditions believed to exist between actual samples retrieved. Therefore, these boring logs contain both factual and interpretive information. Lines delineating subsurface strata on the boring logs are approximate and the actual transition between strata may be gradual.



4.0 LABORATORY TESTS

Selected samples of the subsurface materials were tested in the laboratory to evaluate their engineering properties as a basis in providing recommendations for foundation design and earthwork construction. A brief description of testing procedures used in the laboratory can be found in Methods of Laboratory Testing, Section B-1 of the Appendix. Individual test results are presented on Log of Boring sheets or on summary data sheets also enclosed in the Appendix.

5.0 GENERAL SUBSURFACE CONDITIONS

5.1 Local Geology

Based on a review of literature and public maps in our library, as well as our experience, the project site lies within the Coastal Prairies Province of the Gulf Coastal Plains Physiographic Region of Texas and is underlain by soils common to the Beaumont Formation.

The Beaumont Formation is late Pleistocene in age. The Beaumont Formation outcrop covers a large part of the lower coastal plain except where cut by modern river valleys or covered by Holocene wind-blown sand in south Texas. The Beaumont Formation is composed of clay-rich sediments transected by sandy fluvial and deltaic-distributary channels. The Beaumont Formation also includes isolated segments of coast-parallel, sandy beach ridges known as the Ingleside barrier/strandplain system. The Beaumont depositional episode records a continuation of patterns that developed during deposition of the Lissie Formation including high-frequency, glacio-eustatic, sea-level fluctuations, and dominant fluvial sediment input. At sea-level highstand, the position of the Beaumont Formation shoreline approximately coincided with that of the modern shoreline.

The Beaumont Formation ranges in thickness from a thin veneer in updip areas to about 500 ft near the modern coast, and thickens to the northeast. The Beaumont Formation dips coastward from 1 to 10 ft per mile. Individual sands range from 20 to 50 ft thick, stacking locally to reach 150 ft in thickness. Interbedded muddy intervals are generally of similar thickness to the sands. Thicknesses of individual sands increase updip, whereas thicknesses of individual shales increase downdip.

5.2 Subsurface Stratigraphy

In general, sandy clay (CL) was encountered from the ground surface extending to the boring termination depth of 6 ft. The letters in parenthesis represent the soils' classification according to the Unified Soil Classification System (ASTM D 2488). More detailed stratigraphic information is presented on the Logs of Boring sheets attached to this report.

5.3 Depth-to-Water

Borings were drilled using dry-auger techniques in an attempt to measure depth-to-water in the open boreholes. Free water was not encountered during drilling or immediately upon completion of drilling operations.

Most of the subsurface materials encountered in the borings are relatively impermeable and are anticipated to have a relatively slow response to water movement. Therefore, several days of



observation would be required to evaluate actual groundwater levels within the depths explored. Also, the groundwater level at the project site is anticipated to fluctuate seasonally depending on the amount of rainfall, prevailing weather conditions, and subsurface drainage characteristics. If more detailed groundwater information is required, monitoring wells or piezometers can be installed.

6.0 RETAINING WALL RECOMMENDATIONS

The following design recommendations were developed on the basis of the previously described Project Characteristics (Section 2.0) and General Subsurface Conditions (Section 5.0). If project criteria should change, including the structure location on the site, our office should conduct a review to determine if modifications to the recommendations are required. Further, it is recommended our office be provided with a copy of the final plans and specifications for review prior to construction.

The following design criteria given in this report were developed assuming the ground surface at the bottom of the proposed retaining wall is constructed within 2 ft of existing grade. Substantial cutting and filling on the site (more than 2 ft) can alter the recommended foundation design parameters. Therefore, it is recommended our office be contacted before performing other cutting and filling on site to verify the appropriate design parameters are utilized for final foundation design.

6.1 Lateral Earth Pressures

The retaining wall should be designed to resist the expected lateral earth pressures. The magnitude of lateral earth pressure against below-grade walls is dependent on the method of backfill placement, type of backfill soil, drainage provisions, and type of wall (rigid or yielding) after placement of the backfill. Experience demonstrates when a wall is held rigidly against horizontal movement (restrained at the top), the lateral pressure (at-rest lateral earth pressure) against the wall is greater than the normally assumed active pressure. Yielding walls (rotation at the top of the wall on the order of 0.1 to 0.4 percent of the wall height) can be designed for active earth pressures (k_a) but rigid walls should be designed for higher at-rest lateral earth pressures (k_o). Walls should be designed using the equivalent fluid pressures provided in Table A below, considering a triangular stress distribution and assuming a horizontal ground surface extending backward from the top of the wall. The equivalent fluid pressures provided do not include a factor of safety.

TABLE A			
LATERAL EARTH PRESSURES			
Horizontal Ground Surface Extending Backward from the Top of the Wall			
Material	Condition	Equivalent Fluid Pressure, pcf	
		Drained	Undrained Including Hydrostatic Pressure
Free Draining Granular Soil $\Phi=35^\circ$, $\gamma_T=125$ pcf	At-Rest, $k_o=0.42$	53	89
	Active, $k_a=0.27$	34	79
On-Site Clay Soil, $\Phi=15^\circ$, $\gamma_T=120$ pcf	At-Rest, $k_o=0.74$	---	105
	Active, $k_a=0.59$	---	96



The above values tabulated under “Active Conditions” pertain to flexible retention systems free to tilt inward as a result of lateral earth pressures. For rigid, non-yielding walls the values under “At-Rest Conditions” should be used.

Free Draining Granular backfill material should be a clean, non-plastic, relatively well-graded granular backfill consisting of either a sand or a sand and gravel mixture (less than 5 percent finer than the No. 200 sieve size). A material meeting the gradation requirements of ASTM C33 No. 57 or 67 are examples of commercially available materials that could be used for this purpose. To reduce surface water seepage into the free draining granular backfill, the top 1-ft of the backfill should consist of on-site clay soil with a plasticity index of at least 25. The free draining granular backfill should extend outward at least 2 ft from the base of the wall and then extend upward on a 1 (horizontal) to 2 (vertical) slope. The free draining granular backfill should be separated from the adjacent native soils using a non-woven filter fabric (Mirafi 140N, or equivalent) to prevent intrusion of native soils into the free draining granular backfill.

Complete drainage of the free draining granular material should be provided to prevent the development of hydrostatic pressures behind the wall. A typical drainage system should consist of perforated plastic drain pipes placed in filter trenches excavated parallel to the base of the walls for their entire length. The drain pipes should be positioned at a depth lower than the bottom elevation of the wall and should also be wrapped with filter fabric (Mirafi 140N, or equivalent). Septic field drain pipe is not suitable for this purpose. A perimeter drain system is beneficial regardless of the type of backfill used behind the wall. As a minimum, a system of weep-holes should be provided for free standing site walls. However, weep holes by themselves will not be sufficient to prevent occasional build-up of hydrostatic pressure behind the wall.

Lightweight, hand-controlled vibrating plate compactors are recommended for compaction of backfill adjacent to walls to reduce the possibility of increases in lateral pressures due to over-compaction. Heavy compaction equipment should not be operated within a distance equal to the height of the wall or at least 10 ft from the wall of whichever is greater. Also, compaction of backfill soils behind walls should not exceed 100 percent standard Proctor maximum dry density (ASTM D 698) to further limit lateral earth pressures against walls.

The values presented in Table A above do not include the effect of surcharge loads such as construction equipment, vehicular loads, or future storage near the structures. Nor do the values account for possible hydrostatic pressures resulting from groundwater seepage entering and ponding within the cut soils. However, these surcharge loads and groundwater pressures should be considered, if applicable, in designing any structures subjected to lateral earth pressures.

6.2 Retaining Wall Foundations

The retaining wall can be supported using a strip footing type foundation system. A net allowable bearing pressure of 2.0 kips per square foot can be used for foundations bearing on native clay soils or fill soils placed and compacted as recommended in Section 7.3, considering a minimum foundation depth of 2 ft below final grade. This includes a factor of safety of about 3 against a bearing capacity failure. Greater bearing depths could be required based on the overall wall design requirements. For bearing capacity considerations, the width of the wall footing or the width of the base of the wall should be at least 16 inches. The structural engineer should review the recommended bearing depths and minimum footing width to verify the walls are sufficiently designed for global stability and to resist sliding, overturning, etc.



A soil supported wall with foundations bearing on native clayey soils (within 2 ft from the existing grade) at this site could experience potential seasonal movements of up to 2 inches. *This potential seasonal movement was estimated based on an assumption that soil conditions remain constant for the full active depth (10 ft). Deeper borings would be required to verify the potential movement.* This potential seasonal movement was estimated in general accordance with methods outlined by Texas Department of Transportation (TxDOT) Test Method Tex-124-E, engineering judgment, and experience. Estimated movements were calculated assuming the moisture content of the in-situ soil within the normal zone of seasonal moisture content change varies between a “dry” condition and a “wet” condition as defined by Tex-124-E. Also, it was assumed a 1 psi surcharge load from the floor slab acts on the subgrade soils. Movements exceeding those predicted above could occur if the soils are exposed to an extended dry period, positive drainage of surface water is not maintained or if soils are subject to an outside water source, such as leakage from a utility line or subsurface moisture migration from off-site locations.

Resistance to sliding will be developed by friction along the base of the footings and passive earth pressure acting on the vertical face of the footing and a key installed in the base of the footings, if required. We recommend a coefficient of base friction of 0.3 be used along the bottom of the footing. An allowable uniform passive earth resistance of 500 psf can be utilized on the vertical face of the footing and a key constructed in the base of the footing below a depth of 1 ft from adjacent grade, for vertical cuts in native clay and for properly placed and compacted clay fill. Fill soils should be compacted per Section 7.3 of this report.

6.3 Wall Drainage

Positive drainage away from the retaining wall should be maintained throughout the life of the structure. It is important that surface water not be allowed to collect behind or near retaining wall. Such collection of water can cause unanticipated saturation of soils behind the wall, thereby increasing the applied forces on the wall, as well as reducing the shear strength of the resisting soils. Increasing the applied forces on the wall and/or decreasing the strength of the soils resisting wall movement could cause global failure of the affected sections of the wall.

7.0 GENERAL CONSTRUCTION PROCEDURES AND GUIDELINES

Variations in subsurface conditions could be encountered during construction. To permit correlation between test boring data and actual subsurface conditions encountered during construction, it is recommended a registered Professional Engineering firm be retained to observe construction procedures and materials.

Some construction problems, particularly degree or magnitude, cannot be anticipated until the course of construction. The recommendations offered in the following paragraphs are intended not to limit or preclude other conceivable solutions, but rather to provide our observations based on our experience and understanding of the project characteristics and subsurface conditions encountered in the borings.

7.1 Site Preparation and Grading

All areas supporting foundations the new trail or areas to receive new fill should be properly prepared.



- After completion of the necessary stripping, clearing, and excavating and prior to placing any required fill, the exposed soil subgrade should be carefully evaluated by probing and testing. Any undesirable material (organic material, wet, soft, or loose soil) still in place should be removed.
- The exposed soil subgrade should be further evaluated by proof-rolling with a heavy pneumatic tired roller, loaded dump truck or similar equipment weighing approximately 20 tons to check for pockets of soft or loose material hidden beneath a thin crust of possibly better soil.
- Proof-rolling procedures should be observed routinely by a Professional Engineer, or his designated representative. Any undesirable material (organic material, wet, soft, or loose soil) exposed during the proofroll should be removed and replaced with well-compacted material as outlined in Section 6.3.
- Prior to placement of any fill, the exposed soil subgrade should then be scarified to a minimum depth of 6 inches and recompacted as outlined in Section 6.3.

If fill is to be placed on existing slopes (natural or constructed) steeper than six horizontal to one vertical (6:1), the fill materials should be benched into the existing slopes in such a manner as to provide a minimum bench-key width of five (5) ft. This should provide a good contact between the existing soils and new fill materials, reduce potential sliding planes, and allow relatively horizontal lift placements.

Slope stability analysis of embankments (natural or constructed) was not within the scope of this study. Global stability analysis of the retaining wall was not within the scope of this study.

The contractor is responsible for designing any excavation slopes, temporary sheeting or shoring. Design of these structures should include any imposed surface surcharges. Construction site safety is the sole responsibility of the contractor, who shall also be solely responsible for the means, methods and sequencing of construction operations. The contractor 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. Stockpiles should be placed well away from the edge of the excavation and their heights should be controlled so they do not surcharge the sides of the excavation. Surface drainage should be carefully controlled to prevent flow of water over the slopes and/or into the excavations. Construction slopes should be closely observed for signs of mass movement, including tension cracks near the crest or bulging at the toe. If potential stability problems are observed, a geotechnical engineer should be contacted immediately. Shoring, bracing or underpinning required for the project (if any) should be designed by a professional engineer registered in the State of Texas.

Due to the nature of the clayey soils found near the surface at the borings, traffic of heavy equipment (including heavy compaction equipment) may create pumping and general deterioration of shallow soils. Therefore, some construction difficulties should be anticipated during periods when these soils are saturated.



7.2 Foundation Excavations

All foundation excavations should be properly monitored to verify loose, soft, or otherwise undesirable materials are removed and new fill/foundations will bear on satisfactory material. Soil exposed in the base of all foundation excavations should be protected against detrimental change in condition, such as surface sloughing, side disturbance, rain, or excessive drying.

Surface runoff should be drained away from excavations and not allowed to pond in the bottom of the excavation. Concrete for foundations should be placed as soon as practical after the excavation is made. That is, the exposed foundation soils should not be allowed to become excessively dry or wet before placement of concrete. All concrete for foundations should be placed as soon as practical after the excavation is made. Prolonged exposure of the bearing surface to air or water will result in changes in strength and compressibility of the bearing stratum. Therefore, if delays occur, spread footing foundations should be slightly deepened to provide a fresh bearing surface.

7.3 Fill Compaction

Clay soils to be used as fill at the site should be compacted to a dry density of 95 to 100 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of 1 percentage point below to 3 percentage points above the material's optimum moisture content. Clayey soil materials used as fill should be processed and the largest particle or clod should be less than 6 inches prior to compaction.

Compaction should be accomplished by placing fill in about 8-inch thick loose lifts and compacting each lift to at least the specified minimum dry density. Field density and moisture content tests should be performed on each lift.

7.4 Utilities

In cases where utility lines are more than 10 ft deep, the fill/backfill below 10 ft should be compacted to at least 100 percent of standard Proctor maximum dry density (ASTM D 698) and within -2 to $+2$ percentage points of the material's optimum moisture content. The portion of the fill/backfill shallower than 10 ft should be compacted as previously outlined. Density tests should be performed on each lift (maximum 12-inch thick) and should be performed as the trench is being backfilled.

Even if fill is properly compacted, fills in excess of about 10 ft are still subject to settlements over time of up to about 1 to 2 percent of the total fill thickness. This should be considered when designing pavements over utility lines and/or other areas with deep fill.

If utility trenches or other excavations extend to or beyond a depth of 5 ft below construction grade, the contractor or others shall be required to develop an excavation safety plan to protect personnel entering the excavation or excavation vicinity. The collection of specific geotechnical data and the development of such a plan, which could include designs for sloping and benching or various types of temporary shoring, is beyond the scope of this study. Any such designs and safety plans shall be developed in accordance with current OSHA guidelines and other applicable industry standards.



7.5 Wet Weather Conditions

Due to the nature of the surficial soils, construction operations may encounter difficulties due to wet or soft surface soils becoming a general hindrance to equipment, especially following periods of wet weather. If the subgrade cannot be adequately compacted to the minimum densities as described previously, one of the following measures will be required: 1) removal and replacement with select fill, 2) chemical treatment of the soil to dry and improve the condition of the subgrade, or 3) drying by natural means if the schedule allows. Based on our experience with similar soils in this area, chemical treatment is generally the most efficient and effective method to increase the supporting value of wet and weak subgrade. ALPHA TESTING should be contacted for additional recommendations if chemical treatment is needed due to soft and wet subgrade.

7.6 Groundwater

Free water was not observed during drilling operations. However, from our experience with similar soils, groundwater seepage could be encountered at shallow depths in excavations for foundations, utility conduits, and other general excavations. The risk of seepage increases with depth of excavation and during or after periods of precipitation. Standard sump pits and pumping may be adequate to control seepage on a local basis for relatively shallow excavations.

8.0 LIMITATIONS

Professional services provided in this geotechnical exploration were performed, findings obtained, and recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. The scope of services provided herein does not include an environmental assessment of the site or investigation for the presence or absence of hazardous materials in the soil, surface water or groundwater. ALPHA, upon written request, can be retained to provide these services.

ALPHA is not responsible for conclusions, opinions or recommendations made by others based on this data. Information contained in this report is intended for the exclusive use of the Client (and their designated design representatives), and is related solely to design of the specific structures outlined in Section 2.0. No party other than the Client (and their designated design representatives) shall use or rely upon this report in any manner whatsoever unless such party shall have obtained ALPHA's written acceptance of such intended use. Any such third party using this report after obtaining ALPHA's written acceptance shall be bound by the limitations and limitations of liability contained herein, including ALPHA's liability being limited to the fee paid to it for this report. Recommendations presented in this report should not be used for design of any other structures except those specifically described in this report. In all areas of this report in which ALPHA may provide additional services if requested to do so in writing, it is presumed that such requests have not been made if not evidenced by a written document accepted by ALPHA. Further, subsurface conditions can change with passage of time. Recommendations contained herein are not considered applicable for an extended period of time after the completion date of this report. It is recommended our office be contacted for a review of the contents of this report for construction commencing more than one (1) year after completion of this report. Non-compliance with any of these requirements by the Client or anyone else shall release ALPHA from any liability resulting from the use of, or reliance upon, this report.



Recommendations provided in this report are based on our understanding of information provided by the Client about characteristics of the project. If the Client notes any deviation from the facts about project characteristics, our office should be contacted immediately since this may materially alter the recommendations. Further, ALPHA is not responsible for damages resulting from workmanship of designers or contractors. It is recommended the Owner retain qualified personnel, such as a Geotechnical Engineering firm, to verify construction is performed in accordance with plans and specifications.



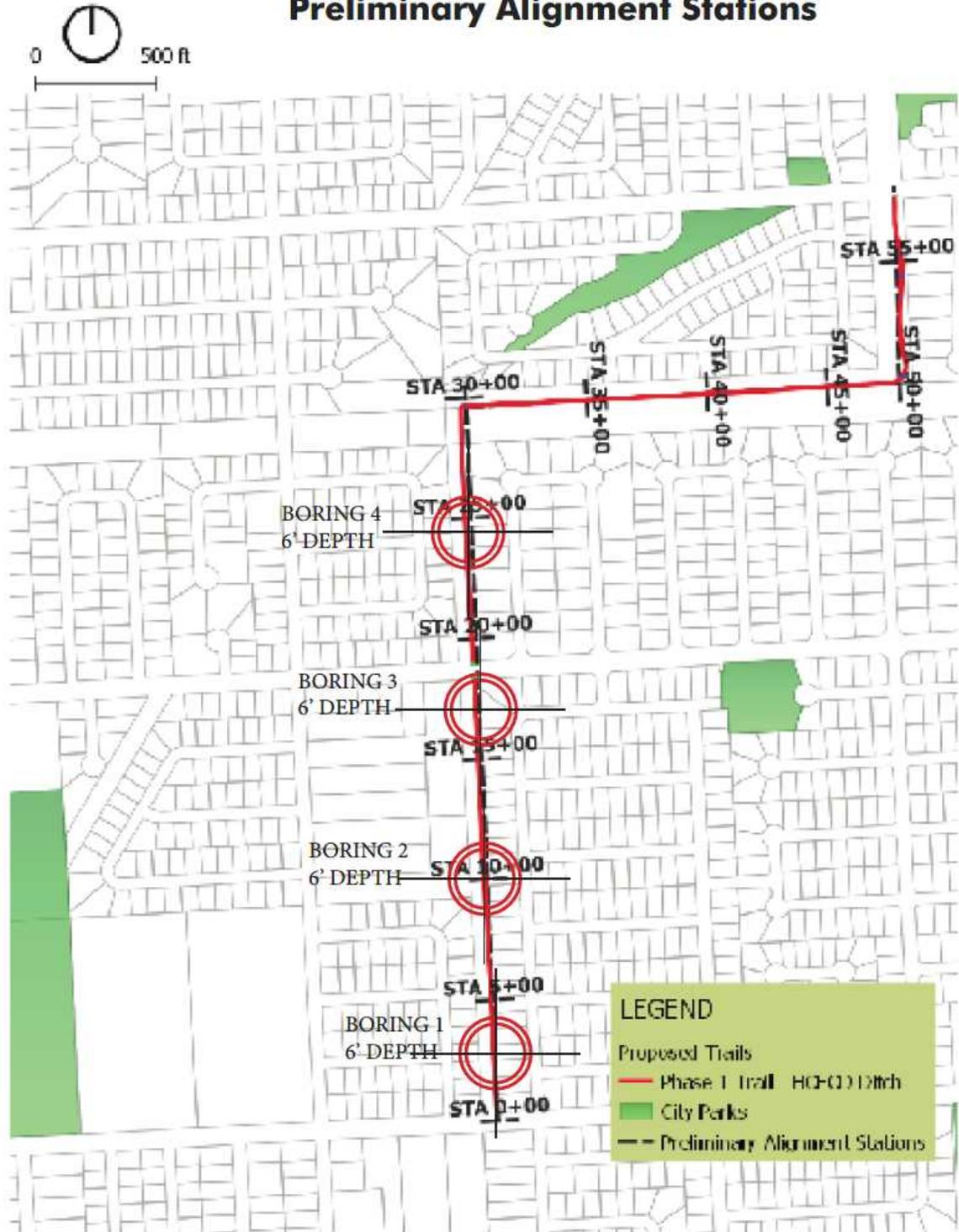
APPENDIX



CLIENT City of Deer Park, Texas
 PROJECT NUMBER H193257

PROJECT NAME Phase One - Hike & Bike Trails Master Plan
 PROJECT LOCATION City of Deer Park, Texas

**Phase 1 Trail
 Preliminary Alignment Stations**



Site plan provided by the Client.

FIGURE A-2



A-3 METHODS OF FIELD EXPLORATION

Using portable drilling equipment, a total of four (4) test borings were performed for this geotechnical exploration at the approximate locations shown on the Boring Location Plan, Figure A-2. The boring locations were staked by using a handheld GPS device or by pacing or taping and estimating right angles from landmarks which could be identified in the field and as shown on the site plan provided during this study. The locations of the test borings shown on the Boring Location Plan are considered accurate only to the degree implied by the methods used to define them.

Relatively undisturbed samples of the cohesive subsurface materials were obtained by hydraulically pressing 3-inch O.D. thin-wall sampling tubes into the underlying soils at selected depths (ASTM D 1587). These samples were removed from the sampling tubes in the field and examined visually. One representative portion of each sample was sealed in a plastic bag for use in future visual examinations and possible testing in the laboratory.

Logs of all borings are included in the Appendix of this report. The logs show visual descriptions of subsurface strata encountered using the Unified Soil Classification System. Sampling information, pertinent field data, and field observations are also included. Samples not consumed by testing will be retained in our laboratory for at least 14 days and then discarded unless the Client requests otherwise.

Client: Burditt Consultants, LLC
Project: Phase One - Hike & Bike Trails Master Plan
Start Date: 1/7/2019 End Date: 1/7/2019
Drilling Method: Straight Flight Auger

Location: City of Deer Park, Texas
Surface Elevation: _____
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in): 140 / 30

Depth, feet	Graphic Log	GROUND WATER OBSERVATIONS ▽ On Rods (ft): <u>None</u> ▼ After Drilling (ft): <u>Dry</u> ▽ After _____ Hours (ft): _____	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf)				% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
						Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr						
		MATERIAL DESCRIPTION													
		Dark gray, gray SANDY CLAY - with traces of roots from 0' to 2'				2.0						13			
		- light gray with sand seams and calcareous nodules from 2' to 6'				2.0						13			
5		- with ferrous nodules from 4' to 6'				1.8		0.9			116	15	39	16	23
			6.0												
		BORING TERMINATED AT 6 feet													
		Notes:													
10															

FIGURE A-5

Client: Burditt Consultants, LLC
Project: Phase One - Hike & Bike Trails Master Plan
Start Date: 1/7/2019 End Date: 1/7/2019
Drilling Method: Straight Flight Auger

Location: City of Deer Park, Texas
Surface Elevation: _____
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in): 140 / 30

Depth, feet	Graphic Log	GROUND WATER OBSERVATIONS <input type="checkbox"/> On Rods (ft): <u>None</u> <input checked="" type="checkbox"/> After Drilling (ft): <u>Dry</u> <input type="checkbox"/> After <u> </u> Hours (ft): <u> </u>	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf)				% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
						Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr						
		MATERIAL DESCRIPTION													
		Gray SANDY CLAY - with calcareous nodules from 0' to 4'				2.0					12				
		- light gray with sand seams, calcareous and ferrous nodules from 4' to 6'				1.8			71	112	12	36	15	21	
5						1.8					15				
			6.0												
		BORING TERMINATED AT 6 feet													
		Notes:													
10															

FIGURE A-6

Client: Burditt Consultants, LLC
Project: Phase One - Hike & Bike Trails Master Plan
Start Date: 1/7/2019 End Date: 1/7/2019
Drilling Method: Straight Flight Auger

Location: City of Deer Park, Texas
Surface Elevation: _____
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in): 140 / 30

Depth, feet	Graphic Log	GROUND WATER OBSERVATIONS <input type="checkbox"/> On Rods (ft): <u>None</u> <input checked="" type="checkbox"/> After Drilling (ft): <u>Dry</u> <input type="checkbox"/> After _____ Hours (ft): _____	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf)				% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
						Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr						
		MATERIAL DESCRIPTION													
		Dark gray, gray SANDY CLAY				1.3					17	47	14	33	
		- light gray with calcareous and ferrous nodules from 4' to 6'				0.8					20				
5						0.5	0.7			102	20				
			6.0												
		BORING TERMINATED AT 6 feet													
		Notes:													
10															

FIGURE A-7

CLIENT Burditt Consultants, LLC

PROJECT NAME Phase One - Hike & Bike Trails Master Plan

PROJECT NUMBER H193257

PROJECT LOCATION City of Deer Park, Texas

SOIL & ROCK SYMBOLS

	(CH), High Plasticity CLAY
	(CL), Low Plasticity CLAY
	(SC), CLAYEY SAND
	(SP), Poorly Graded SAND
	(SW), Well Graded SAND
	(SM), SILTY SAND
	(ML), SILT
	(MH), Elastic SILT
	LIMESTONE
	SHALE / MARL
	SANDSTONE
	(GP), Poorly Graded GRAVEL
	(GW), Well Graded GRAVEL
	(GC), CLAYEY GRAVEL
	(GM), SILTY GRAVEL
	(OL), ORGANIC SILT
	(OH), ORGANIC CLAY
	FILL

RELATIVE DENSITY OF COHESIONLESS SOILS (blows/ft)

VERY LOOSE	0 TO 4
LOOSE	5 TO 10
MEDIUM	11 TO 30
DENSE	31 TO 50
VERY DENSE	OVER 50

SHEAR STRENGTH OF COHESIVE SOILS (tsf)

VERY SOFT	LESS THAN 0.25
SOFT	0.25 TO 0.50
FIRM	0.50 TO 1.00
STIFF	1.00 TO 2.00
VERY STIFF	2.00 TO 4.00
HARD	OVER 4.00

RELATIVE DEGREE OF PLASTICITY (PI)

LOW	4 TO 15
MEDIUM	16 TO 25
HIGH	26 TO 35
VERY HIGH	OVER 35

RELATIVE PROPORTIONS (%)

TRACE	1 TO 10
LITTLE	11 TO 20
SOME	21 TO 35
AND	36 TO 50

SAMPLING SYMBOLS

	SHELBY TUBE (3" OD except where noted otherwise)
	SPLIT SPOON (2" OD except where noted otherwise)
	AUGER SAMPLE
	TEXAS CONE PENETRATION
	ROCK CORE (2" ID except where noted otherwise)

PARTICLE SIZE IDENTIFICATION (DIAMETER)

BOULDERS	8.0" OR LARGER
COBBLES	3.0" TO 8.0"
COARSE GRAVEL	0.75" TO 3.0"
FINE GRAVEL	5.0 mm TO 3.0"
COURSE SAND	2.0 mm TO 5.0 mm
MEDIUM SAND	0.4 mm TO 5.0 mm
FINE SAND	0.07 mm TO 0.4 mm
SILT	0.002 mm TO 0.07 mm
CLAY	LESS THAN 0.002 mm



B-1 METHODS OF LABORATORY TESTING

Selected samples were examined and classified by a qualified member of the Geotechnical Division and the boring logs were edited as necessary. To aid in classifying the subsurface materials and to determine the general engineering characteristics, natural moisture content tests (ASTM D 2216), Atterberg-limit tests (ASTM D 4318), and gradation tests (percent of material passing a No. 200 sieve, ASTM D 1140) were performed on select samples. A calibrated pocket penetrometer was used to approximate the unconfined compressive strength as an indicator of soil consistency for all in-tact cohesive samples. Unconfined compression strength tests (ASTM D 2166) were also performed on representative samples. Results of all laboratory tests described above are provided on either the accompanying Log of Boring sheets or on summary data sheets as noted.

In addition to the Atterberg-limit tests, the expansive properties of the clay soils were further analyzed by absorption swell tests (ASTM D 4546). The swell test is performed by placing a selected sample in a consolidation machine and applying either the approximate current or expected overburden pressure and then allowing the sample to absorb water. When the sample exhibits very little tendency for further expansion, the height increase is recorded and the percent free swell and total moisture gain calculated. Results of the absorption swell tests are provided on the Swell Test Data sheet, Figure B-3 included in this appendix.

CLIENT Burditt Consultants, LLC

PROJECT NAME Phase One - Hike & Bike Trails Master Plan

PROJECT NUMBER H193257

PROJECT LOCATION City of Deer Park, Texas

Boring No.	Sample No.	Sample Top Depth, ft	Sample Bottom Depth, ft	Sample Type	SPT N-Value bpf	Moisture Content %	Dry Density pcf	Liquid Limit	Plastic Limit	Plasticity Index	Passing -200 %	Shear Strength, tsf				USCS
												UC	UU	TV	PP	
1	1	0	2	ST		18.1		39	16	23	82.5				1.3	CL
1	2	2	4	ST		20.5	104.4					0.9			1.3	
1	3	4	6	ST		21.7									1.3	
2	1	0	2	ST		13.3									2.0	
2	2	2	4	ST		13.1									2.0	
2	3	4	6	ST		15.2	116.4	39	16	23		0.9			1.8	
3	1	0	2	ST		12.5									2.0	
3	2	2	4	ST		12.0	112.5	36	15	21	70.8				1.8	CL
3	3	4	6	ST		15.5									1.8	
4	1	0	2	ST		17.2		47	14	33					1.3	
4	2	2	4	ST		20.4									0.8	
4	3	4	6	ST		19.6	101.9					0.7			0.5	

SS = Split Spoon Sampler	CH = Fat Clay	GW = Well Graded Gravel	SP = Poorly Graded Sand
ST = Shelby Tube (Undisturbed Sample Extruded on-Site)	CL = Lean Clay	GW-GC = Well Graded Gravel w/ Clay	SP-SC = Poorly Graded Sand w/ Clay
SPT = Standard Penetration Test	CL-ML = Silty Clay	GW-GM = Well Graded Gravel w/ Silt	SP-SM = Poorly Graded Sand w/ Silt
UC = Unconfined Compression	GC = Clayey Gravel	MH = Elastic Silt	SW = Well Graded Sand
UU = Triaxial Compr. (Conf Pressure, psi)	GM = Silty Gravel	ML = Silt	SW-SC = Well Graded Sand w/ Clay
TV = Hand-held Torvane	GP = Poorly Graded Gravel	SC = Clayey Sand	SW-SM = Well Graded Sand w/ Silt
PP = Pocket Penetrometer	GP-GC = Poorly Graded Gravel w/ Clay	SC-SM = Clayey, Silty Sand	
	GP-GM = Poorly Graded Gravel w/ Silt	SM = Silty Sand	NP = Non Plastic

FIGURE B-2

Phase 1: Mid-Block Crossing Treatments for Deer Park Northeast Trail at East X Street and East San Augustine Street

CITY OF DEER PARK, TEXAS



AUGUST 2020



5225 Katy Freeway, Suite 400 * Houston, Texas 77007



Suzanna I. Set
August 28, 2020



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LIST OF APPENDICES

Appendix A: Exhibit 1 through Exhibit 3

Appendix B: Crossings Photographs

Appendix C: Traffic Volumes

Appendix D: City of Houston – Infrastructure Design Manual (excerpt of Chapter 17)

Appendix E: FHWA Safety Effects Of Marked Versus Unmarked Crosswalks at Uncontrolled Locations Final Report and Recommended Guidelines

LIST OF TABLES

Table 1: 24-hour Traffic Counts

Table 2: Peak Traffic Volumes

Table 3: City of Houston Mid-Block Crossing Guidance

Table 4: FHWA Recommendations for installing marked crosswalks and other needed pedestrian improvements at uncontrolled locations.*



I. INTRODUCTION AND SUMMARY

Midtown Engineers, LLC was retained to study (Phase 1) and design (Phase 2) two mid-block crossings, at East X Street and East San Augustine Street, located in the City of Deer Park, Harris County, Texas (Key Map 538R). The two crossings are shown in **Exhibit 1**.

This study phase is comprised of the following tasks:

- 1) Analysis of existing conditions based on collected traffic counts and lane geometry
- 2) Develop mid-blocking crossing treatments

II. EXISTING CONDITIONS

This section outlines the characteristics of the roadways and the current land use surrounding the two crossings.

A. East X Street

East X Street runs in the east-west direction through the City of Deer Park. It begins at Georgia Ave on the west and terminates at Old Underwood Road on the east. It comprises a four-lane section with curbs. The land use along it is residential. Streetlights and sidewalks are present along East X Street with the posted speed limit of 40 MPH within the study area.

B. East San Augustine Street

East San Augustine Street runs in the east-west direction through the City of Deer Park. It begins at East Sam Houston Tollway Frontage Road on the west and terminates at Old Underwood Road on the east. It comprises a four-lane section with curbs. The land use along it is residential. Streetlights and sidewalks are present along East San Augustine Street with the posted speed limit of 40 MPH within the study area.

C. Land Use

According to Houston-Galveston Area Council (H-GAC), the properties surrounding the two streets are composed of residential. **Appendix B** contains photographs of each approach of the two crossings.

III. TRAFFIC DATA

A. Traffic Volumes

Twenty-four (24) hour traffic counts were recorded at the two crossings on Thursday, August 6, 2020. The bi-directional 24-hour traffic counts for East X Street and East San Augustine Street, are shown in **Table 1** below. The AM, Mid-Day and PM peak hours are summarized in **Table 2**. See **Appendix C** for the raw data.

Table 1: 24-hour Traffic Counts

Crossing Location	24-hour Traffic Counts
East X St	3,750
East San Augustine St	4,407

Table 2: Peak Traffic Volumes

Crossing Location	Peak Hours	Traffic Volumes (vph)	
		Westbound	Eastbound
East X St	AM (8:45 – 9:45)	94	96
	MID-DAY (12:00 – 13:00)	143	141
	PM (17:00 – 18:00)	218	149
East San Augustine St	AM (10:00 – 11:00)	135	153
	MID-DAY (11:45 – 12:45)	171	186
	PM (15:45 – 16:30)	208	205

IV. RESEARCH

Research utilizes three criteria; average daily traffic (ADT), speed of the roadway and number of lanes (with or without median), to determine the type of mid-block crossing treatments at uncontrolled crossings.

City of Houston’s guidance on mid-block crossing is shown in **Table 3**, where the A, B, C, and D refers to the level of treatments.

Table 3: City of Houston Mid-Block Crossing Guidance

ADT	Speed Limit	4-Lanes with median	2-Lanes without median	4-Lanes without median
≤ 5,000	≤ 30MPH	A	A	A
	> 30MPH	A	B	C
5,000 - 15,000	≤ 30MPH	B	B	B
	> 30MPH	C	C	D
> 15,000	≤ 30MPH	C	D	D
	> 30MPH	D	D	D

Source: City of Houston, IDM 2019 Chapter 17, page 21.

Level A: Midblock crossing pavement markings

Level B: Level A + advance warning signage

Level C: Level B + additional pavement markings

Level D: Level C + crossing enhancements

See **Appendix D** for the details of each type of treatment.

The Federal Highway Administration (FHWA) has a similar guidance, shown in **Table 4**, which has been condensed to show values (Vehicle ADT \leq 9,000) which are applicable to this study.

Table 4: FHWA Recommendations for installing marked crosswalks and other needed pedestrian improvements at uncontrolled locations.*

Roadway Type (Number of Travel Lanes and Median Type)	Vehicle ADT \leq 9,000		
	Speed Limit**		
	30MPH	35MPH	40MPH
Two lanes	C	C	P
Three lanes	C	C	P
Multilane (four or more lanes) without raised median	C	P	N

Source: FHWA, Chapter 4 - Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations Final Report and Recommended Guidelines.

* These guidelines include intersection and midblock locations with no traffic signals or stop signs on the approach to the crossing. They do not apply to school crossings. A two-way center turn lane is not considered a median. Crosswalks should not be installed at locations that could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex or confusing designs, a substantial volume of heavy trucks, or other dangers, without first providing adequate design features and/or traffic control devices. Adding crosswalks alone will not make crossings safer, nor will they necessarily result in more vehicles stopping for pedestrians. Whether or not marked crosswalks are installed, it is important to consider other pedestrian facility enhancements (e.g., raised median, traffic signal, roadway narrowing, enhanced overhead lighting, traffic-calming measures, curb extensions), as needed, to improve the safety of the crossing. These are general recommendations; good engineering judgment should be used in individual cases for deciding where to install crosswalks.

** Where the speed limit exceeds 64.4 km/h (40 mi/h), marked crosswalks alone should not be used at unsignalized locations.

Level C: Candidate sites for marked crosswalks

Level P: Possible increase in pedestrian crash risk may occur if crosswalks are added without other pedestrian facility enhancement

Level N: Marked crosswalks alone are insufficient, since pedestrian crash risk may be increased by providing marked crosswalks alone.

See **Appendix E** for the details of each type of treatment.

V. ANALYSIS

The two crossings have ADT less than 5,000 with posted speed of 40 MPH and typical section of 4-lanes without median. The City of Houston and the Federal Highway Administration guidance would be recommended Level C and N treatment, respectively. The details for each are outlined below.

City of Houston Level C:

Per the *City of Houston Mid-Block Crossing guidance*, Level C recommends installing the following:

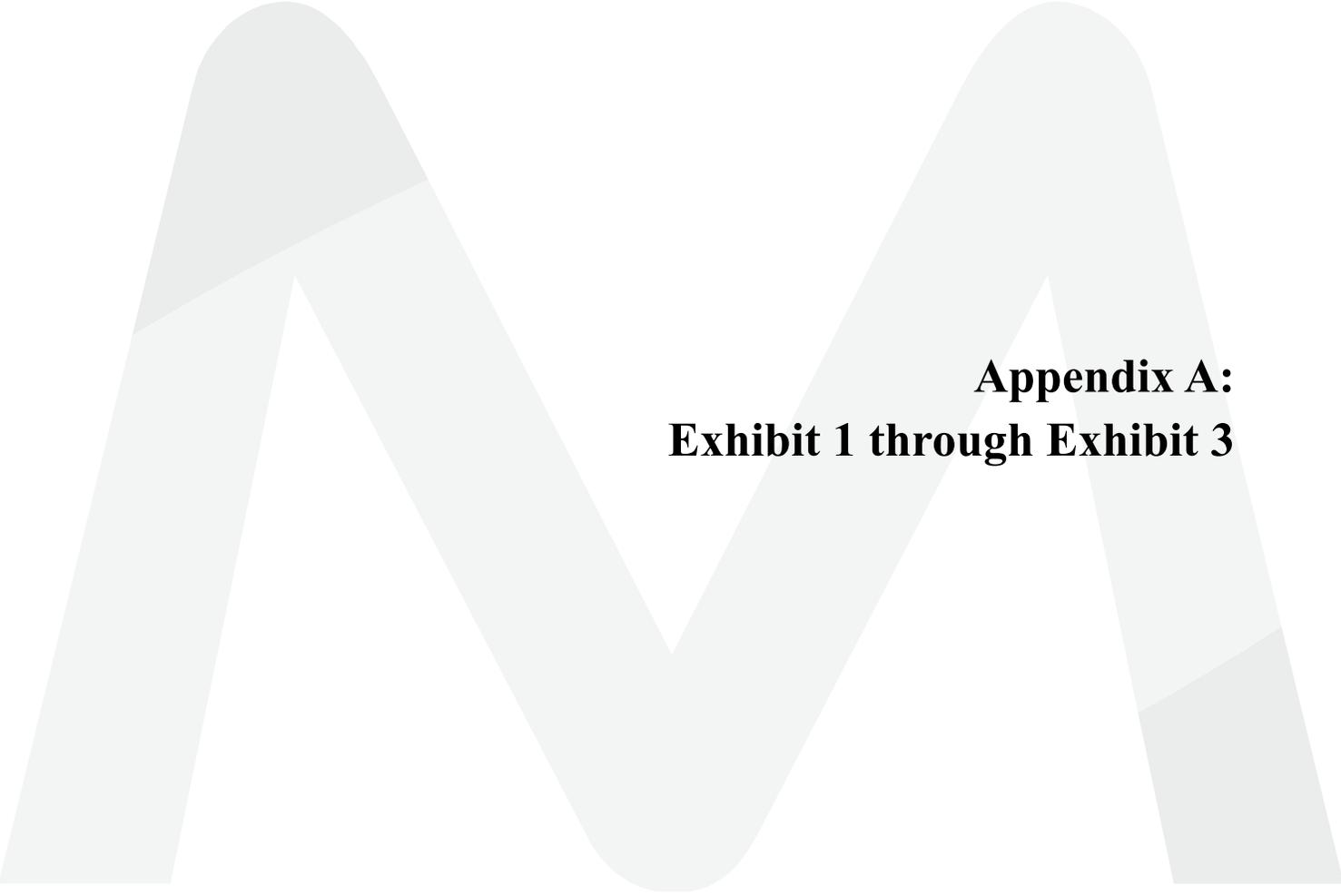
- White high visibility crosswalk markings.
- W11-2 pedestrian warning sign (pedestrian only crossing) with a W16-9P AHEAD (plaque) mounted on the side of the roadway in advance of the crossing.
- W11-2 pedestrian warning sign (pedestrian only crossing) with W16-7PL diagonal downward arrow (plaque) mounted on the side of the roadway at the crossing.
- Install "PED XING" (pedestrian-only crossing) advanced pavement marking.
- On four-lane roadways, install R1-5 "Yield Here to Pedestrians"(pedestrian-only crossing) signage and yield lines consisting of isosceles triangles pointing toward oncoming vehicles.

Federal Highway Administration Level N:

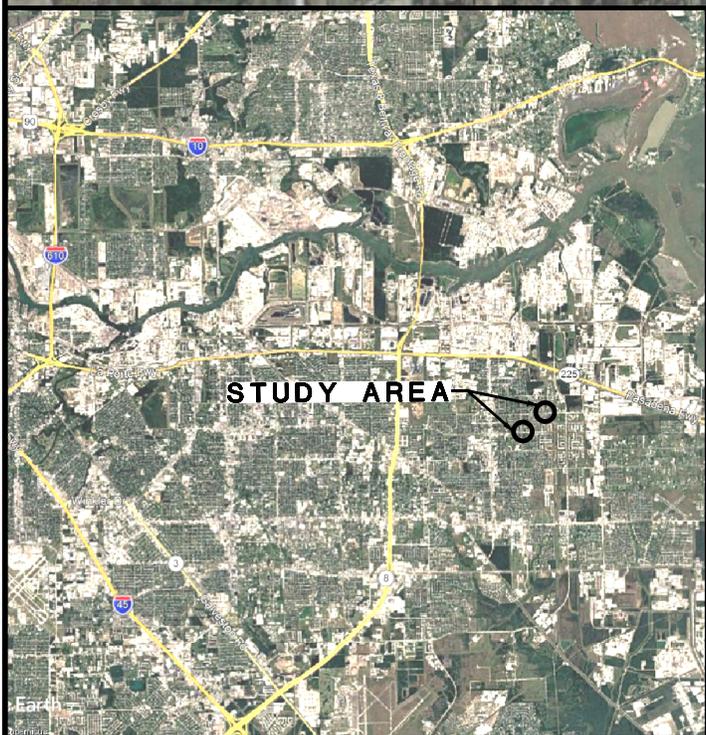
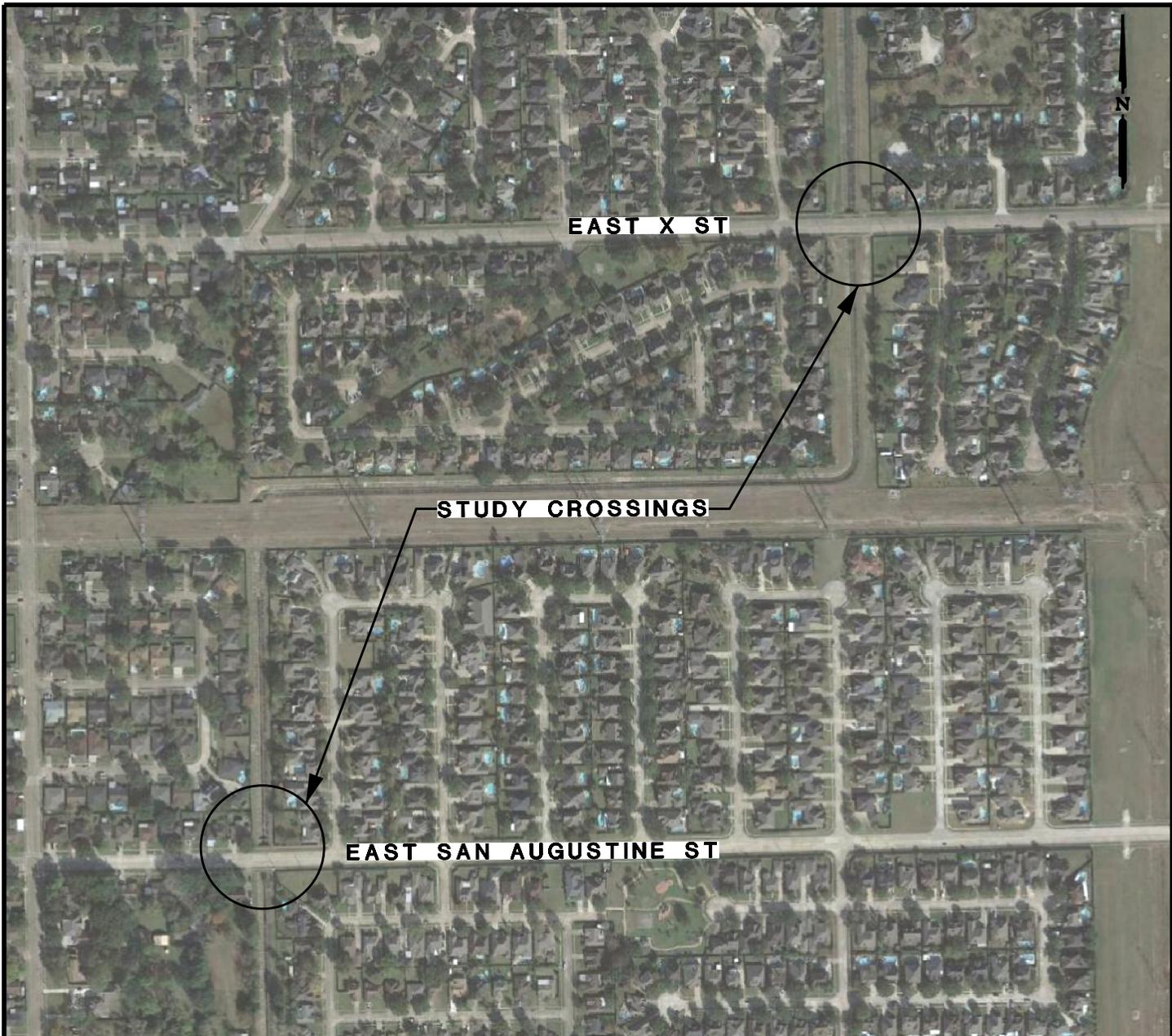
Per the *FHWA Recommendations for installing marked crosswalks* the recommended treatment is Level N, which indicates that a marked crosswalk alone is not enough and other treatments such as pedestrian crossing warning signs and traffic calming treatments should be used. The additional treatments could be the ones recommended by the City of Houston.

VI. CONCLUSION AND RECOMMENDATIONS

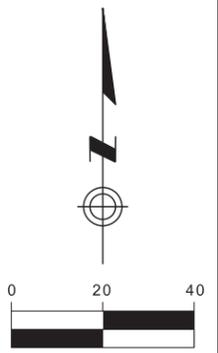
It is recommended to use the *City of Houston Mid-Block Crossing Criteria*, as shown in **Exhibit 2 and 3**, install a high visibility crosswalk pattern for both crossings. In addition, install W11-2 pedestrian warning sign with W16-7P mounted on the side of the roadway at the crossings and R1-5 "Yield Here to Pedestrians" signage and yield lines consisting of isosceles triangles pointing toward oncoming vehicles.

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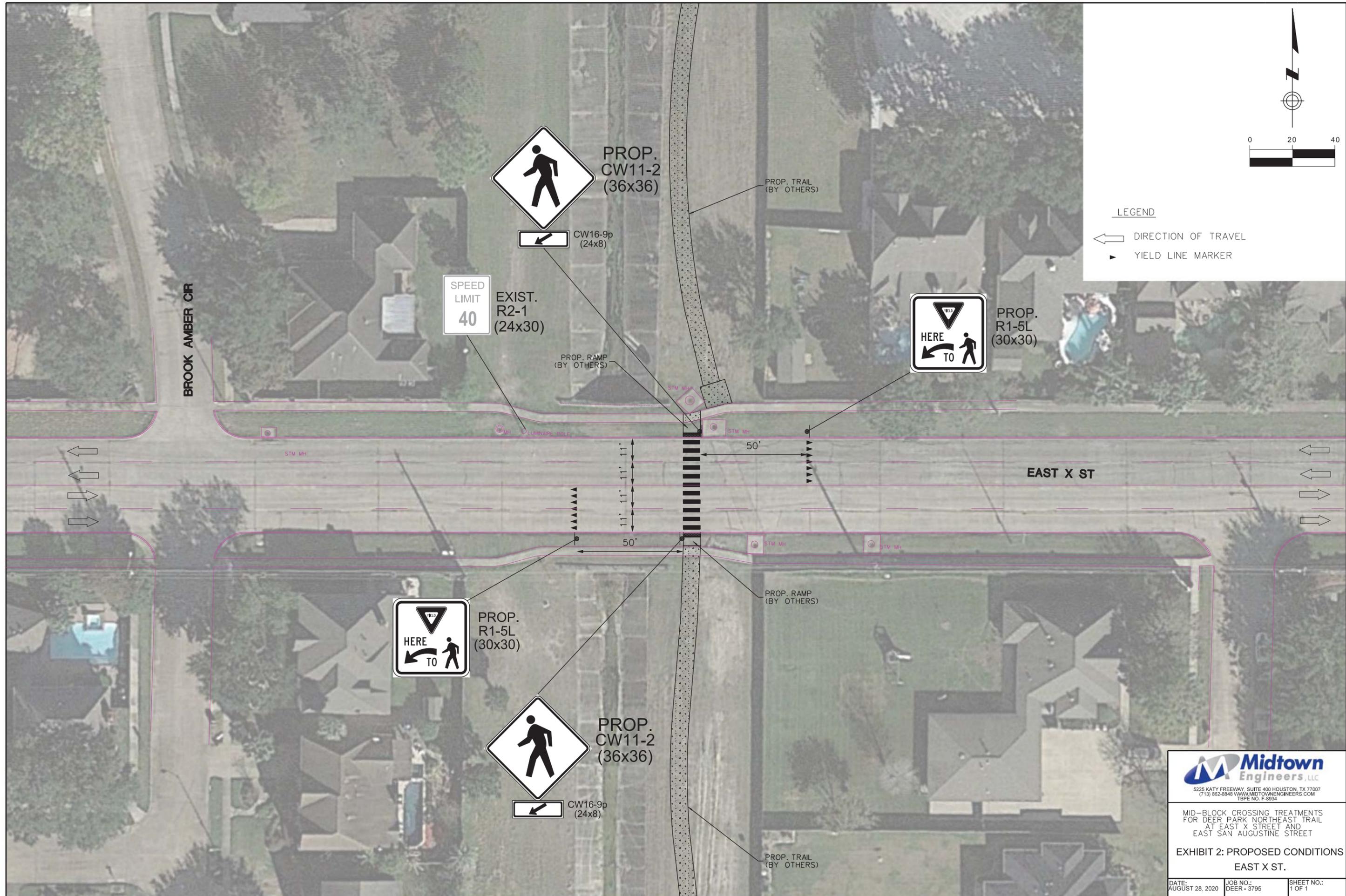
**Appendix A:
Exhibit 1 through Exhibit 3**



	
<small>5225 KATY FREEWAY, SUITE 400 HOUSTON, TX 77007 (713) 862-8848 WWW.MIDTOWNGENGINEERS.COM TBPE NO. F-8934</small>	
<small>MID-BLOCK CROSSING TREATMENTS FOR DEER PARK NORTHEAST TRAIL AT EAST X STREET AND EAST SAN AUGUSTINE STREET</small>	
EXHIBIT 1: STUDY LOCATIONS MAP	
<small>DATE:</small> AUGUST 28, 2020	<small>SCALE:</small> N.T.S.



LEGEND
 ← DIRECTION OF TRAVEL
 ▶ YIELD LINE MARKER



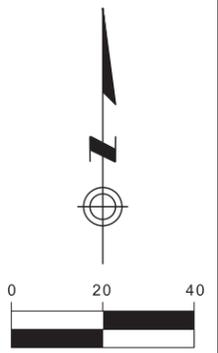
\$FILES \$DATES \$TIMES

Midtown Engineers, LLC
 5225 KATY FREEWAY, SUITE 400 HOUSTON, TX 77007
 (713) 862-8848 WWW.MIDTOWNEENGINEERS.COM
 TSP# NO. F-8524

MID-BLOCK CROSSING TREATMENTS
 FOR DEER PARK NORTHEAST TRAIL
 AT EAST X STREET AND
 EAST SAN AUGUSTINE STREET

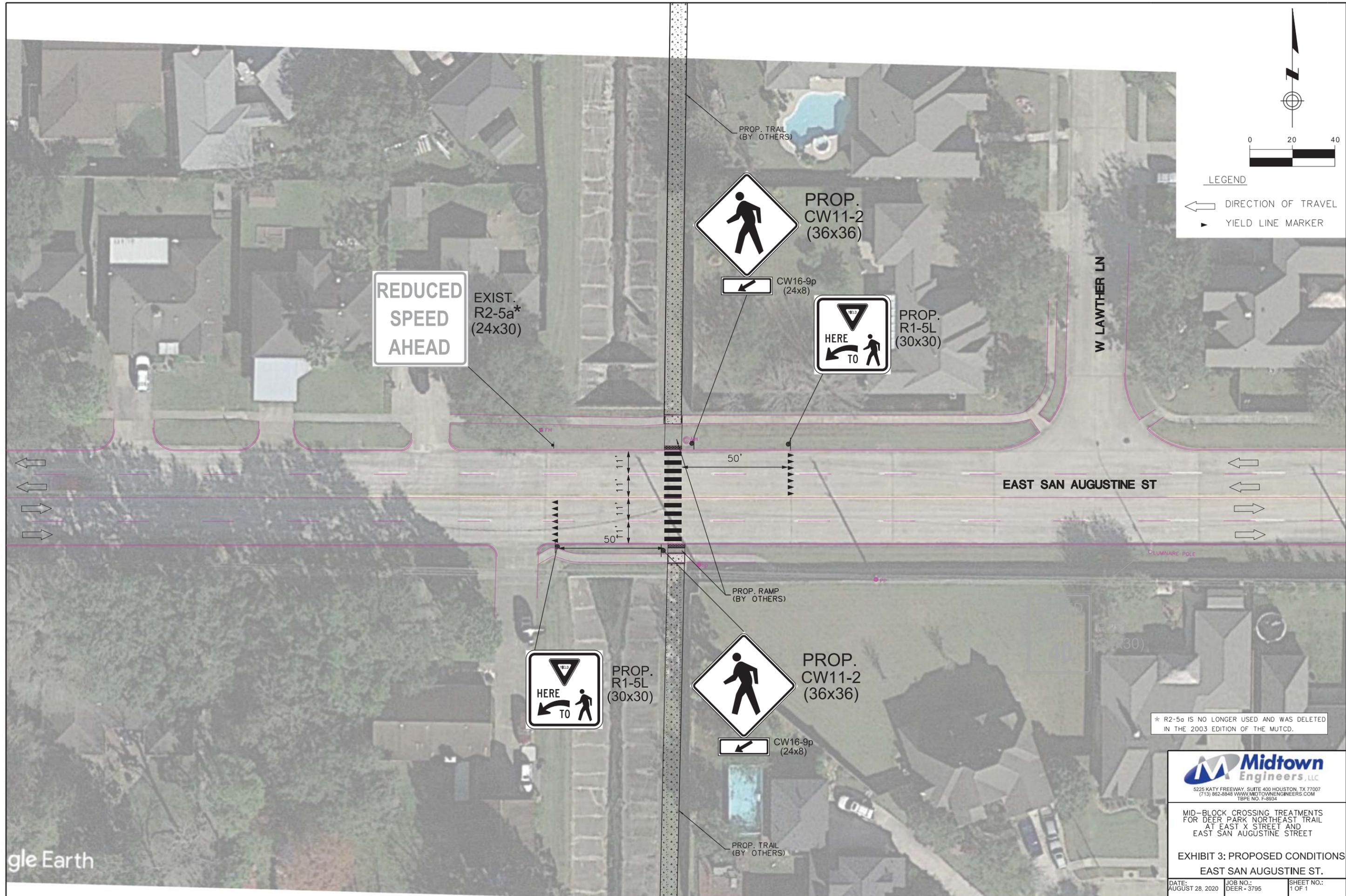
**EXHIBIT 2: PROPOSED CONDITIONS
 EAST X ST.**

DATE: AUGUST 28, 2020	JOB NO.: DEER - 3795	SHEET NO.: 1 OF 1
--------------------------	-------------------------	----------------------



LEGEND

- ← DIRECTION OF TRAVEL
- ▶ YIELD LINE MARKER



**REDUCED
SPEED
AHEAD**
EXIST.
R2-5a*
(24x30)

PROP. TRAIL
(BY OTHERS)

PROP.
CW11-2
(36x36)

CW16-9p
(24x8)

PROP.
R1-5L
(30x30)

HERE
TO

W LAWATHER LN

EAST SAN AUGUSTINE ST

PROP.
R1-5L
(30x30)

HERE
TO

PROP. TRAIL
(BY OTHERS)

PROP.
CW11-2
(36x36)

CW16-9p
(24x8)

PROP. TRAIL
(BY OTHERS)

* R2-5a IS NO LONGER USED AND WAS DELETED
IN THE 2003 EDITION OF THE MUTCD.

**Midtown
Engineers, LLC**
5225 KATY FREEWAY, SUITE 400 HOUSTON, TX 77007
(713) 862-8848 WWW.MIDTOWNEENGINEERS.COM
TSPE NO. F-8524

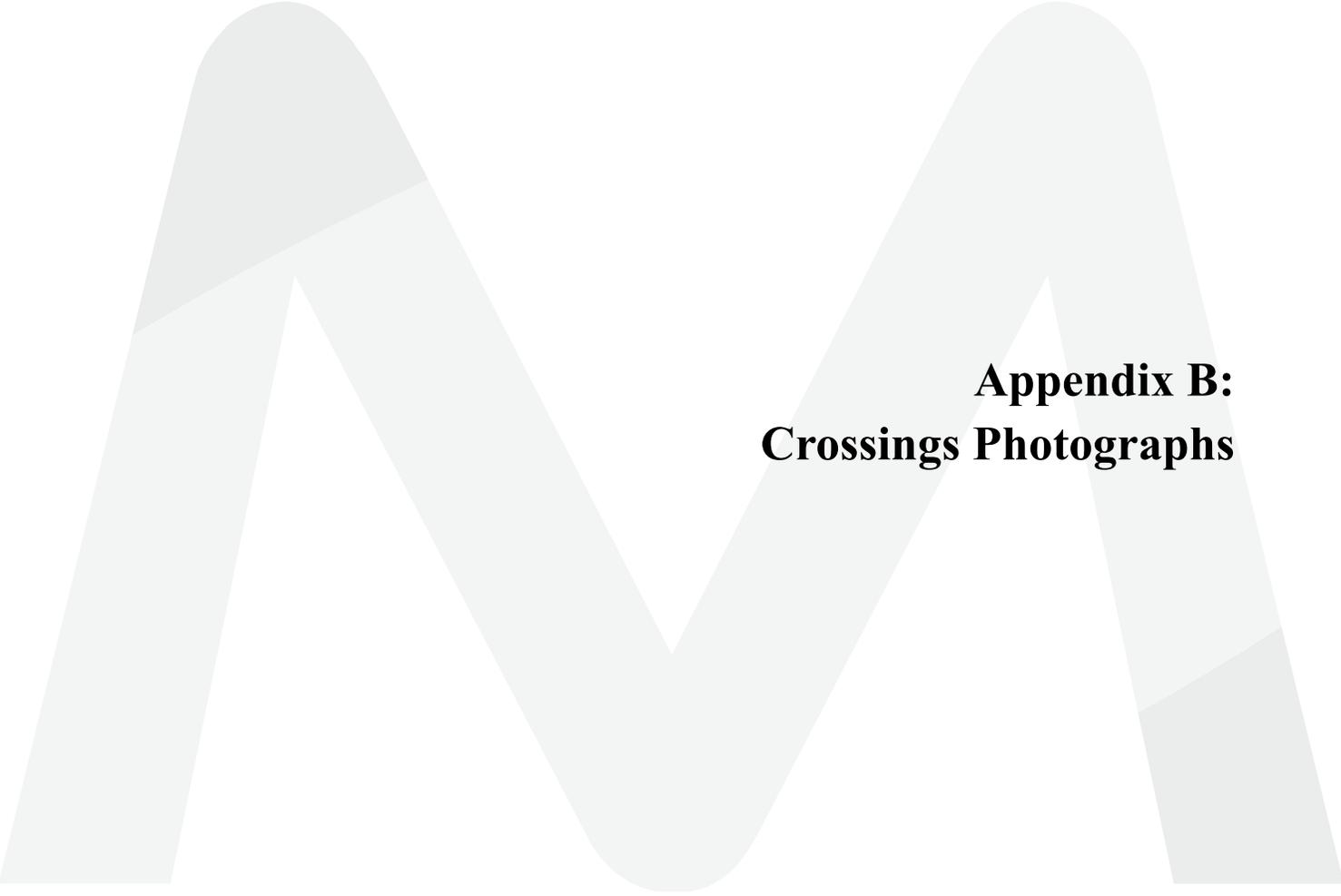
MID-BLOCK CROSSING TREATMENTS
FOR DEER PARK NORTHEAST TRAIL
AT EAST X STREET AND
EAST SAN AUGUSTINE STREET

EXHIBIT 3: PROPOSED CONDITIONS
EAST SAN AUGUSTINE ST.

DATE: AUGUST 28, 2020	JOB NO.: DEER - 3795	SHEET NO.: 1 OF 1
--------------------------	-------------------------	----------------------

\$FILES \$DATES \$TIMES

gle Earth

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**Appendix B:
Crossings Photographs**



Figure 1: East San Augustine looking west



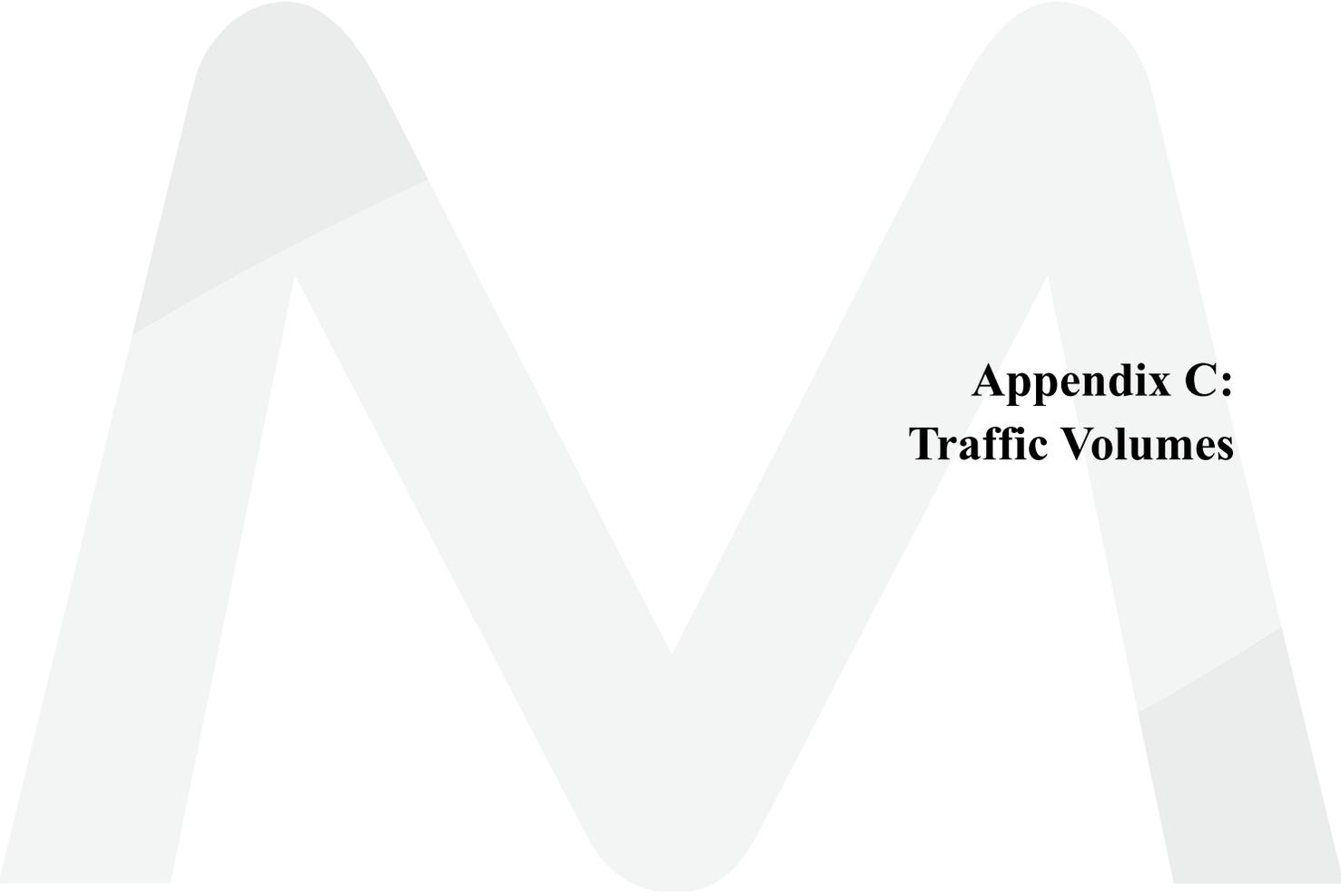
Figure 2: East San Augustine looking east



Figure 3: East X Street looking west



Figure 4: East X Street looking east

A large, light gray watermark of the letter 'M' is centered on the page, spanning most of the width and height.

Appendix C: Traffic Volumes

Canal at EX St - TMC

Thu Aug 6, 2020

Full Length (12 AM-12 AM(+1))

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 773977, Location: 29.695028, -95.105472



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Canal Southbound						E X St Westbound						Canal Northbound						E X St Eastbound						Int						
	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*							
2020-08-06 12:00AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15AM	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:30AM	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	0	6
12:45AM	0	0	0	0	0	2	0	2	0	0	2	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	4
Hourly Total	0	0	0	0	0	2	0	7	0	0	7	0	0	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	0	13
1:00AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	2
1:15AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1
1:30AM	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
1:45AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hourly Total	0	0	0	0	0	2	0	2	0	0	2	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	5
2:00AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	2
2:15AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1
2:45AM	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	3
Hourly Total	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	0	6
3:00AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	0	4
3:15AM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:30AM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	0	6
3:45AM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Hourly Total	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	0	0	12
4:00AM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	0	5
4:15AM	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	5
4:30AM	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	0	0	12
4:45AM	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	0	8
Hourly Total	0	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	0	0	30
5:00AM	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	11	0	0	11	0	0	0	0	0	0	0	14
5:15AM	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	0	0	16
5:30AM	0	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	0	1	0	18	0	0	18	0	0	0	0	0	0	0	26
5:45AM	0	0	0	0	0	1	0	15	0	0	15	0	0	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	0	0	28
Hourly Total	0	0	0	0	0	1	0	29	0	0	29	0	0	0	0	0	0	1	0	55	0	0	55	0	0	0	0	0	0	0	84
6:00AM	0	0	0	0	0	0	0	11	0	0	11	0	0	0	0	0	0	0	0	23	0	0	23	0	0	0	0	0	0	0	34
6:15AM	0	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	0	0	23
6:30AM	0	0	0	0	0	2	0	12	0	0	12	0	0	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	0	0	32
6:45AM	0	0	0	0	0	1	0	22	0	0	22	0	0	0	0	0	0	3	0	31	0	0	31	0	0	0	0	0	0	0	53
Hourly Total	0	0	0	0	0	3	0	55	0	0	55	0	0	0	0	0	0	3	0	87	0	0	87	0	0	0	0	0	0	0	142
7:00AM	0	0	0	0	0	4	0	7	0	0	7	0	0	0	0	0	0	1	0	24	0	0	24	0	0	0	0	0	0	0	31
7:15AM	0	0	0	0	0	0	0	24	0	0	24	0	0	0	0	0	0	0	0	30	0	0	30	0	0	0	0	0	0	0	54
7:30AM	0	0	0	0	0	1	0	15	0	0	15	0	0	0	0	0	0	0	0	21	0	0	21	0	0	0	0	0	0	0	36
7:45AM	0	0	0	0	0	3	0	30	0	0	30	0	0	0	0	0	0	0	0	25	0	0	25	0	0	0	0	0	0	0	55
Hourly Total	0	0	0	0	0	8	0	76	0	0	76	0	0	0	0	0	0	1	0	100	0	0	100	0	0	0	0	0	0	0	176
8:00AM	0	0	0	0	0	3	0	20	0	0	20	0	0	0	0	0	0	1	0	19	0	0	19	0	0	0	0	0	0	0	39
8:15AM	0	0	0	0	0	3	0	21	0	0	21	0	0	0	0	0	0	1	0	34	0	0	34	0	0	0	0	0	0	0	55
8:30AM	0	0	0	0	0	2	0	14	0	0	14	0	0	0	0	0	0	0	0	28	0	0	28	0	0	0	0	0	0	0	42
8:45AM	0	0	0	0	0	0	0	22	0	0	22	0	0	0	0	0	0	6	0	25	0	0	25	0	0	0	0	0	0	0	47
Hourly Total	0	0	0	0	0	8	0	77	0	0	77	0	0	0	0	0	0	8	0	106	0	0	106	0	0	0	0	0	0	0	183
9:00AM	0	0	0	0	0	2	0	24	0	0	24	0	0	0	0	0	0	1	0	21	0	0	21	0	0	0	0	0	0	0	45
9:15AM	0	0	0	0	0	7	0	25	0	0	25	0	0	0	0	0	0	2	0	13	0	0	13	0	0	0	0	0	0	0	38
9:30AM	0	0	0	0	0	0	0	23	0	0	23	0	0	0	0	0	0	0	0	37	0	0	37	0	0	0	0	0	0	0	60
9:45AM	0	0	0	0	0	2	0	25	0	0	25	0	0	0	0	0	0	0	0	12	0	0	12	0	0	0	0	0	0	0	37
Hourly Total	0	0	0	0	0	11	0	97	0	0	97	0	0	0	0	0	0	3	0	83	0	0	83	0	0	0	0	0	0	0	180
10:00AM	0	0	0	0	0	0	0	22	0	0	22	0	0	0	0	0	0	0	0	24	0	0	24	0	0	0	0	0	0	0	46
10:15AM	0	0	0	0	0	1	0	19	0	0	19	0	0	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	0	0	39
10:30AM	0	0	0	0	0	1	0	30	0	0	30	0	0	0	0	0	0	0	0	15	0	0	15	0	0	0	0	0	0	0	45
10:45AM	0	0	0	0	0	0	0	36	0	0	36	0	0	0	0	0	0	0	0	23	0	0	23	0	0	0	0	0	0	0	59
Hourly Total	0	0	0	0	0	2	0	107	0	0	107	0	0	0	0	0	0	0	0	82	0	0	82	0	0	0	0	0	0	0	189
11:00AM	0																														

Leg Direction	Canal Southbound						E X St Westbound						Canal Northbound						E X St Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
11:15AM	0	0	0	0	0	0	0	41	0	0	41	0	0	0	0	0	0	0	0	24	0	0	24	0	65
11:30AM	0	0	0	0	0	1	0	32	0	0	32	0	0	0	0	0	0	1	0	33	0	0	33	0	65
11:45AM	0	0	0	0	0	0	0	31	0	0	31	0	0	0	0	0	0	0	0	28	0	0	28	0	59
Hourly Total	0	0	0	0	0	1	0	131	0	0	131	0	0	0	0	0	1	0	113	0	0	113	0	244	
12:00PM	0	0	0	0	0	0	0	42	0	0	42	0	0	0	0	0	0	0	0	34	0	0	34	0	76
12:15PM	0	0	0	0	0	0	0	37	0	0	37	0	0	0	0	0	0	0	0	29	0	0	29	0	66
12:30PM	0	0	0	0	0	0	0	28	0	0	28	0	0	0	0	0	0	0	0	42	0	0	42	0	70
12:45PM	0	0	0	0	0	0	0	36	0	0	36	0	0	0	0	0	0	0	0	36	0	0	36	0	72
Hourly Total	0	0	0	0	0	0	0	143	0	0	143	0	0	0	0	0	0	0	0	141	0	0	141	0	284
1:00PM	0	0	0	0	0	0	0	29	0	0	29	0	0	0	0	0	0	0	0	23	0	0	23	0	52
1:15PM	0	0	0	0	0	1	0	41	0	0	41	0	0	0	0	0	0	0	0	23	0	0	23	0	64
1:30PM	0	0	0	0	0	0	0	34	0	0	34	0	0	0	0	0	4	0	26	0	0	26	0	60	
1:45PM	0	0	0	0	0	0	0	37	0	0	37	0	0	0	0	0	0	0	0	38	0	0	38	0	75
Hourly Total	0	0	0	0	0	1	0	141	0	0	141	0	0	0	0	0	4	0	110	0	0	110	0	251	
2:00PM	0	0	0	0	0	4	0	38	0	0	38	0	0	0	0	0	0	0	0	29	0	0	29	0	67
2:15PM	0	0	0	0	0	1	0	31	0	0	31	0	0	0	0	0	0	0	0	27	0	0	27	0	58
2:30PM	0	0	0	0	0	0	0	32	0	0	32	0	0	0	0	0	0	0	0	43	0	0	43	0	75
2:45PM	0	0	0	0	0	0	0	39	0	0	39	0	0	0	0	0	0	0	0	25	0	0	25	0	64
Hourly Total	0	0	0	0	0	5	0	140	0	0	140	0	0	0	0	0	0	0	0	124	0	0	124	0	264
3:00PM	0	0	1	0	1	0	0	24	0	0	24	0	0	0	0	0	0	0	0	28	0	0	28	0	53
3:15PM	0	0	0	0	0	0	1	35	0	0	36	0	0	0	0	0	0	0	0	29	0	0	29	0	65
3:30PM	0	0	0	0	0	0	0	47	0	0	47	0	0	0	0	0	0	0	0	34	0	0	34	0	81
3:45PM	0	0	0	0	0	0	0	45	0	0	45	0	0	0	0	0	0	0	0	23	0	0	23	0	68
Hourly Total	0	0	1	0	1	0	1	151	0	0	152	0	0	0	0	0	0	0	0	114	0	0	114	0	267
4:00PM	0	0	0	0	0	0	0	35	0	0	35	0	0	0	0	0	2	0	28	0	0	28	0	63	
4:15PM	0	0	0	0	0	0	0	35	0	0	35	0	0	0	0	0	2	0	36	0	0	36	0	71	
4:30PM	0	0	0	0	0	1	0	57	0	0	57	0	0	0	0	0	0	0	0	40	0	0	40	0	97
4:45PM	0	0	0	0	0	0	0	40	0	0	40	0	0	0	0	0	0	0	0	33	0	0	33	0	73
Hourly Total	0	0	0	0	0	1	0	167	0	0	167	0	0	0	0	0	4	0	137	0	0	137	0	304	
5:00PM	0	0	0	0	0	0	0	65	0	0	65	0	0	0	0	0	2	0	39	0	0	39	0	104	
5:15PM	0	0	0	0	0	2	0	50	0	0	50	0	0	0	0	0	1	0	36	0	0	36	0	86	
5:30PM	0	0	0	0	0	0	0	50	0	0	50	0	0	0	0	0	1	0	40	0	0	40	0	90	
5:45PM	0	0	0	0	0	0	0	53	0	0	53	0	0	0	0	0	0	0	34	0	0	34	0	87	
Hourly Total	0	0	0	0	0	2	0	218	0	0	218	0	0	0	0	0	4	0	149	0	0	149	0	367	
6:00PM	0	0	0	0	0	0	0	34	0	0	34	0	0	0	0	0	0	0	41	0	0	41	0	75	
6:15PM	0	0	0	0	0	0	0	25	0	0	25	0	0	0	0	0	0	0	22	0	0	22	0	47	
6:30PM	0	0	0	0	0	2	0	32	0	0	32	0	0	0	0	0	0	0	18	0	0	18	0	50	
6:45PM	0	0	0	0	0	1	0	25	0	0	25	0	0	0	0	0	2	0	22	0	0	22	0	47	
Hourly Total	0	0	0	0	0	3	0	116	0	0	116	0	0	0	0	0	2	0	103	0	0	103	0	219	
7:00PM	0	0	0	0	0	2	0	28	0	0	28	0	0	0	0	0	0	0	25	0	0	25	0	53	
7:15PM	0	0	0	0	0	0	0	17	0	0	17	0	0	0	0	0	4	0	28	0	0	28	0	45	
7:30PM	0	0	0	0	0	3	0	24	0	0	24	0	0	0	0	0	4	0	17	0	0	17	0	41	
7:45PM	0	0	0	0	0	1	0	24	0	0	24	0	0	0	0	0	0	0	22	0	0	22	0	46	
Hourly Total	0	0	0	0	0	6	0	93	0	0	93	0	0	0	0	0	8	0	92	0	0	92	0	185	
8:00PM	0	0	0	0	0	2	0	30	0	0	30	0	0	0	0	0	4	0	19	0	0	19	0	49	
8:15PM	0	0	0	0	0	1	0	22	0	0	22	0	0	0	0	0	2	0	21	0	0	21	0	43	
8:30PM	0	0	0	0	0	4	0	23	0	0	23	0	0	0	0	0	0	0	12	0	0	12	0	35	
8:45PM	0	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	0	0	10	0	0	10	0	23	
Hourly Total	0	0	0	0	0	7	0	88	0	0	88	0	0	0	0	0	6	0	62	0	0	62	0	150	
9:00PM	0	0	0	0	0	1	0	21	0	0	21	0	0	0	0	0	1	0	15	0	0	15	0	36	
9:15PM	0	0	0	0	0	5	0	14	0	0	14	0	0	0	0	0	0	0	11	0	0	11	0	25	
9:30PM	0	0	0	0	0	1	0	12	0	0	12	0	0	0	0	0	0	0	9	0	0	9	0	21	
9:45PM	0	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	1	0	9	0	0	9	0	22	
Hourly Total	0	0	0	0	0	7	0	60	0	0	60	0	0	0	0	0	2	0	44	0	0	44	0	104	
10:00PM	0	0	0	0	0	2	0	9	0	0	9	0	0	0	0	0	0	0	6	0	0	6	0	15	
10:15PM	0	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	0	0	3	0	0	3	0	10	
10:30PM	0	0	0	0	0	0	0	12	0	0	12	0	0	0	0	0	0	0	9	0	0	9	0	21	
10:45PM	0	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	0	0	3	0	0	3	0	10	
Hourly Total	0	0	0	0	0	2	0	35	0	0	35	0	0	0	0	0	0	0	21	0	0	21	0	56	
11:00PM	0	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	0	0	4	0	0	4	0	12	
11:15PM	0	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	0	7	0	0	7	0	13	
11:30PM	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	1	0	1	0	0	1	0	4	
11:45PM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	5	0	0	5	0	6	
Hourly Total	0	0	0	0	0	0	0	18	0	0	18	0	0	0	0	0	1	0	17	0	0	17	0	35	

Leg Direction	Canal Southbound						E X St Westbound						Canal Northbound						E X St Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
Total	0	0	1	0	1	72	1	1966	0	0	1967	0	0	0	0	0	0	48	0	1782	0	0	1782	0	3750
% Approach	0%	0%	100%	0%	-	-	0.1%	99.9%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	100%	0%	0%	-	-	-
% Total	0%	0%	0%	0%	0%	-	0%	52.4%	0%	0%	52.5%	-	0%	0%	0%	0%	0%	-	0%	47.5%	0%	0%	47.5%	-	-
Lights	0	0	0	0	0	-	1	1943	0	0	1944	-	0	0	0	0	0	-	0	1746	0	0	1746	-	3690
% Lights	0%	0%	0%	0%	0%	-	100%	98.8%	0%	0%	98.8%	-	0%	0%	0%	0%	-	-	0%	98.0%	0%	0%	98.0%	-	98.4%
Articulated Trucks	0	0	0	0	0	-	0	1	0	0	1	-	0	0	0	0	0	-	0	2	0	0	2	-	3
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0.1%	0%	0%	0.1%	-	0%	0%	0%	0%	-	-	0%	0.1%	0%	0%	0.1%	-	0.1%
Buses and Single-Unit Trucks	0	0	1	0	1	-	0	17	0	0	17	-	0	0	0	0	0	-	0	15	0	0	15	-	33
% Buses and Single-Unit Trucks	0%	0%	100%	0%	100%	-	0%	0.9%	0%	0%	0.9%	-	0%	0%	0%	0%	-	-	0%	0.8%	0%	0%	0.8%	-	0.9%
Bicycles on Road	0	0	0	0	0	-	0	5	0	0	5	-	0	0	0	0	0	-	0	19	0	0	19	-	24
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0.3%	0%	0%	0.3%	-	0%	0%	0%	0%	-	-	0%	1.1%	0%	0%	1.1%	-	0.6%
Pedestrians	-	-	-	-	-	66	-	-	-	-	-	0	-	-	-	-	-	33	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-91.7%	-	-	-	-	-	-	-	-	-	-	-	-68.8%	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	6	-	-	-	-	-	0	-	-	-	-	-	15	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	8.3%	-	-	-	-	-	-	-	-	-	-	-	31.3%	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Canal at EX St - TMC

Thu Aug 6, 2020

Full Length (12 AM-12 AM (+1))

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 773977, Location: 29.695028, -95.105472



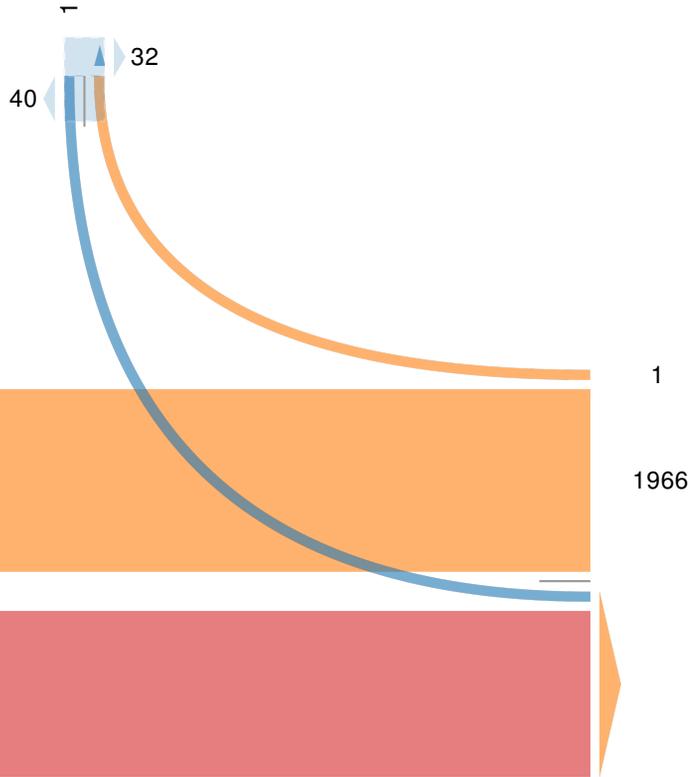
Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Canal

Total: 2

In: 1 Out: 1



[S] Canal

Canal at EX St - TMC

Thu Aug 6, 2020

AM Peak (Aug 06 2020 8:45AM - 9:45 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 773977, Location: 29.695028, -95.105472



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Canal Southbound						E X St Westbound						Canal Northbound						E X St Eastbound						Int
	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	
2020-08-06 8:45AM	0	0	0	0	0	0	0	22	0	0	22	0	0	0	0	0	0	6	0	25	0	0	25	0	47
9:00AM	0	0	0	0	0	2	0	24	0	0	24	0	0	0	0	0	0	1	0	21	0	0	21	0	45
9:15AM	0	0	0	0	0	7	0	25	0	0	25	0	0	0	0	0	0	2	0	13	0	0	13	0	38
9:30AM	0	0	0	0	0	0	0	23	0	0	23	0	0	0	0	0	0	0	0	37	0	0	37	0	60
Total	0	0	0	0	0	9	0	94	0	0	94	0	0	0	0	0	0	9	0	96	0	0	96	0	190
% Approach	0%	0%	0%	0%	0%	-	0%	100%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	100%	0%	0%	-	-	-
% Total	0%	0%	0%	0%	0%	0%	0%	49.5%	0%	0%	49.5%	-	0%	0%	0%	0%	0%	0%	0%	50.5%	0%	0%	50.5%	-	-
PHF	-	-	-	-	-	-	-	0.940	-	-	0.940	-	-	-	-	-	-	-	-	0.649	-	-	0.649	-	0.792
Lights	0	0	0	0	0	0	0	92	0	0	92	0	0	0	0	0	0	0	0	96	0	0	96	0	188
% Lights	0%	0%	0%	0%	0%	-	0%	97.9%	0%	0%	97.9%	-	0%	0%	0%	0%	-	-	0%	100%	0%	0%	100%	-	98.9%
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	-	0%	2.1%	0%	0%	2.1%	-	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	-	1.1%
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	-	6	-	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	66.7%	-	-	-	-	-	-	-	-	-	-	-	44.4%	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	5	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	33.3%	-	-	-	-	-	-	-	-	-	-	-	55.6%	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Canal at EX St - TMC

Thu Aug 6, 2020

AM Peak (Aug 06 2020 8:45AM - 9:45 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 773977, Location: 29.695028, -95.105472



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Canal



[S] Canal

Canal at EX St - TMC

Thu Aug 6, 2020

Midday Peak (Aug 06 2020 12PM - 1 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 773977, Location: 29.695028, -95.105472



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Canal Southbound						E X St Westbound						Canal Northbound						E X St Eastbound						Int
	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	
2020-08-06 12:00PM	0	0	0	0	0	0	0	42	0	0	42	0	0	0	0	0	0	0	0	34	0	0	34	0	76
12:15PM	0	0	0	0	0	0	0	37	0	0	37	0	0	0	0	0	0	0	0	29	0	0	29	0	66
12:30PM	0	0	0	0	0	0	0	28	0	0	28	0	0	0	0	0	0	0	0	42	0	0	42	0	70
12:45PM	0	0	0	0	0	0	0	36	0	0	36	0	0	0	0	0	0	0	0	36	0	0	36	0	72
Total	0	0	0	0	0	0	0	143	0	0	143	0	0	0	0	0	0	0	0	141	0	0	141	0	284
% Approach	0%	0%	0%	0%	-	-	0%	100%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	100%	0%	0%	-	-	-
% Total	0%	0%	0%	0%	0%	-	0%	50.4%	0%	0%	50.4%	-	0%	0%	0%	0%	0%	-	0%	49.6%	0%	0%	49.6%	-	-
PHF	-	-	-	-	-	-	-	0.851	-	-	0.851	-	-	-	-	-	-	-	-	0.833	-	-	0.833	-	0.931
Lights	0	0	0	0	0	0	0	143	0	0	143	0	0	0	0	0	0	0	0	139	0	0	139	0	282
% Lights	0%	0%	0%	0%	-	-	0%	100%	0%	0%	100%	-	0%	0%	0%	0%	-	-	0%	98.6%	0%	0%	98.6%	-	99.3%
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1
% Buses and Single-Unit Trucks	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	-	-	0%	0.7%	0%	0%	0.7%	-	0.4%
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1
% Bicycles on Road	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	-	-	0%	0.7%	0%	0%	0.7%	-	0.4%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Canal at EX St - TMC

Thu Aug 6, 2020

Midday Peak (Aug 06 2020 12PM - 1 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 773977, Location: 29.695028, -95.105472



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US



Canal at EX St - TMC

Thu Aug 6, 2020

PM Peak (Aug 06 2020 5PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 773977, Location: 29.695028, -95.105472



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Canal Southbound						E X St Westbound						Canal Northbound						E X St Eastbound						Int
	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	
2020-08-06 5:00PM	0	0	0	0	0	0	0	65	0	0	65	0	0	0	0	0	0	2	0	39	0	0	39	0	104
5:15PM	0	0	0	0	0	2	0	50	0	0	50	0	0	0	0	0	0	1	0	36	0	0	36	0	86
5:30PM	0	0	0	0	0	0	0	50	0	0	50	0	0	0	0	0	0	1	0	40	0	0	40	0	90
5:45PM	0	0	0	0	0	0	0	53	0	0	53	0	0	0	0	0	0	0	0	34	0	0	34	0	87
Total	0	0	0	0	0	2	0	218	0	0	218	0	0	0	0	0	0	4	0	149	0	0	149	0	367
% Approach	0%	0%	0%	0%	-	-	0%	100%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	100%	0%	0%	-	-	-
% Total	0%	0%	0%	0%	0%	-	0%	59.4%	0%	0%	59.4%	-	0%	0%	0%	0%	0%	-	0%	40.6%	0%	0%	40.6%	-	-
PHF	-	-	-	-	-	-	-	0.838	-	-	0.838	-	-	-	-	-	-	-	-	0.928	-	-	0.928	-	0.871
Lights	0	0	0	0	0	-	0	218	0	0	218	-	0	0	0	0	0	-	0	140	0	0	140	-	358
% Lights	0%	0%	0%	0%	0%	-	0%	100%	0%	0%	100%	-	0%	0%	0%	0%	0%	-	0%	94.0%	0%	0%	94.0%	-	97.5%
Articulated Trucks	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	1	-	1
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0.7%	0%	0%	0.7%	-	0.3%
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	8	0	0	8	-	8
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	5.4%	0%	0%	5.4%	-	2.2%
Pedestrians	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	75.0%	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	25.0%	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Canal at EX St - TMC

Thu Aug 6, 2020

PM Peak (Aug 06 2020 5PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 773977, Location: 29.695028, -95.105472



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Canal



[W] EX St
Total: 367
In: 149 Out: 218



Out: 149 In: 218
Total: 367
[E] EX St



[S] Canal

Canal at E San Augustine St - TMC

Thu Aug 6, 2020

Full Length (12 AM-12 AM (+1))

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 773978, Location: 29.689716, -95.111168



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Canal Southbound						E San Augustine St Westbound						Canal Northbound						E San Augustine St Eastbound						Int
	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	
2020-08-06 12:00AM	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	-	0	2	0	0	2	0	4
12:15AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	1	0	0	1	0	1
12:30AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	1	0	0	1	0	1
12:45AM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	-	0	1	0	0	1	0	2
Hourly Total	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	-	0	5	0	0	5	0	8
1:00AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
1:15AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
1:30AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
1:45AM	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	-	0	1	0	0	1	0	5
Hourly Total	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	-	0	1	0	0	1	0	5
2:00AM	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	-	0	0	0	0	0	0	2
2:15AM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	-	0	0	0	0	0	0	1
2:30AM	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	-	0	0	0	0	0	0	2
2:45AM	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	-	0	2	0	0	2	0	4
Hourly Total	0	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	0	-	0	2	0	0	2	0	9
3:00AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	1	0	0	1	0	1
3:15AM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	-	0	2	0	0	2	0	3
3:30AM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	-	0	9	0	0	9	0	10
3:45AM	0	0	0	0	0	1	0	9	0	0	9	0	0	0	0	0	0	-	0	7	0	0	7	0	16
Hourly Total	0	0	0	0	0	1	0	11	0	0	11	0	0	0	0	0	0	-	0	19	0	0	19	0	30
4:00AM	0	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	-	0	8	0	0	8	0	14
4:15AM	0	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	-	0	7	0	0	7	0	13
4:30AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	14	0	0	14	0	14
4:45AM	0	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	0	-	0	10	0	0	10	0	23
Hourly Total	0	0	0	0	0	0	0	25	0	0	25	0	0	0	0	0	0	-	0	39	0	0	39	0	64
5:00AM	0	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	-	0	10	0	0	10	0	15
5:15AM	0	0	0	0	0	1	0	16	0	0	16	0	0	0	0	0	0	-	0	10	0	0	10	0	26
5:30AM	0	0	0	0	0	0	0	11	0	0	11	0	0	0	0	0	0	-	0	12	0	0	12	0	23
5:45AM	0	0	0	0	0	1	0	15	0	0	15	0	0	0	0	0	0	-	0	21	0	0	21	0	36
Hourly Total	0	0	0	0	0	2	0	47	0	0	47	0	0	0	0	0	0	-	0	53	0	0	53	0	100
6:00AM	0	0	0	0	0	1	0	11	0	0	11	0	0	0	0	0	0	-	0	32	0	0	32	0	43
6:15AM	0	0	0	0	0	1	0	20	0	0	20	0	0	0	0	0	0	-	0	20	0	0	20	0	40
6:30AM	0	0	0	0	0	1	0	26	0	0	26	0	0	0	0	0	0	-	0	37	0	0	37	0	63
6:45AM	0	0	0	0	0	0	0	24	0	0	24	0	0	0	0	0	0	-	0	40	0	0	40	0	64
Hourly Total	0	0	0	0	0	3	0	81	0	0	81	0	0	0	0	0	0	-	0	129	0	0	129	0	210
7:00AM	0	0	0	0	0	2	0	20	1	0	21	0	0	0	0	0	0	-	0	37	0	0	37	0	58
7:15AM	0	0	0	0	0	1	0	18	0	0	18	0	0	0	0	0	0	-	0	27	0	0	27	0	45
7:30AM	0	0	0	0	0	0	0	22	0	0	22	0	0	0	0	0	0	-	0	42	0	0	42	0	64
7:45AM	0	0	0	0	0	0	0	21	0	0	21	0	0	0	0	0	0	-	0	30	0	0	30	0	51
Hourly Total	0	0	0	0	0	3	0	81	1	0	82	0	0	0	0	0	0	-	0	136	0	0	136	0	218
8:00AM	0	0	0	0	0	1	0	26	0	0	26	0	0	0	0	0	0	-	0	28	0	0	28	0	54
8:15AM	0	0	0	0	0	1	0	22	0	0	22	0	0	0	0	0	0	-	0	28	0	0	28	0	50
8:30AM	0	0	0	0	0	3	0	16	0	0	16	0	0	0	0	0	0	-	0	26	0	0	26	0	42
8:45AM	0	0	0	0	0	2	0	28	0	0	28	0	0	0	0	0	0	-	0	26	0	0	26	0	54
Hourly Total	0	0	0	0	0	7	0	92	0	0	92	0	0	0	0	0	0	-	0	108	0	0	108	0	200
9:00AM	0	0	0	0	0	0	0	29	0	0	29	0	0	0	0	0	0	-	0	32	0	0	32	0	61
9:15AM	0	0	0	0	0	1	0	35	0	0	35	0	0	0	0	0	0	-	0	25	0	0	25	0	60
9:30AM	0	0	0	0	0	0	0	29	0	0	29	0	0	0	0	0	0	-	0	23	0	0	23	0	52
9:45AM	0	0	0	0	0	1	0	33	0	0	33	0	0	0	0	0	0	-	0	30	0	0	30	0	63
Hourly Total	0	0	0	0	0	2	0	126	0	0	126	0	0	0	0	0	0	-	0	110	0	0	110	0	236
10:00AM	0	0	0	0	0	1	0	30	0	0	30	0	0	0	0	0	0	-	0	40	0	0	40	0	70
10:15AM	0	0	0	0	0	0	0	43	0	0	43	0	0	0	0	0	0	-	0	45	0	0	45	0	88
10:30AM	0	0	0	0	0	1	0	24	0	0	24	0	0	0	0	0	0	-	0	29	0	0	29	0	53
10:45AM	0	0	0	0	0	0	0	38	0	0	38	0	0	0	0	0	0	-	1	38	0	0	39	0	77
Hourly Total	0	0	0	0	0	2	0	135	0	0	135	0	0	0	0	0	0	-	1	152	0	0	153	0	288
11:00AM	0	0	0	0	0	0	0	47	0	0	47	0	0	0	0	0	0	-	0	38	0	0	38	0	85
11:15AM	0	0	0	0	0	0	0	44	0	0	44	0	0	0	0	0	0	-	0	35	0	0	35	0	79

Leg Direction	Canal Southbound						E San Augustine St Westbound						Canal Northbound						E San Augustine St Eastbound							
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int	
11:30AM	0	0	0	0	0	0	0	41	0	0	41	0	0	0	0	0	0	0	0	34	0	0	34	0	75	
11:45AM	0	0	0	0	0	0	0	42	0	0	42	0	0	0	0	0	0	0	0	62	0	0	62	0	104	
Hourly Total	0	0	0	0	0	0	0	174	0	0	174	0	0	0	0	0	0	0	0	169	0	0	169	0	343	
12:00PM	0	0	0	0	0	0	0	40	0	0	40	0	0	0	0	0	0	0	0	46	0	0	46	0	86	
12:15PM	0	0	0	0	0	0	0	52	0	0	52	0	0	0	0	0	0	0	0	37	0	0	37	0	89	
12:30PM	0	0	0	0	0	0	0	37	0	0	37	0	0	0	0	0	0	0	0	41	0	0	41	0	78	
12:45PM	0	0	0	0	0	0	0	38	0	0	38	0	0	0	0	0	0	0	0	44	0	0	44	0	82	
Hourly Total	0	0	0	0	0	0	0	167	0	0	167	0	0	0	0	0	0	0	0	168	0	0	168	0	335	
1:00PM	0	0	0	0	0	3	0	36	0	0	36	0	0	0	0	0	0	0	0	24	0	0	24	0	60	
1:15PM	0	0	0	0	0	0	0	40	0	0	40	0	0	0	0	0	0	0	0	33	0	0	33	0	73	
1:30PM	0	0	0	0	0	0	0	43	0	0	43	0	0	0	0	0	0	0	0	28	0	0	28	0	71	
1:45PM	0	0	0	0	0	0	0	36	0	0	36	0	0	0	0	0	0	0	0	33	0	0	33	0	69	
Hourly Total	0	0	0	0	0	3	0	155	0	0	155	0	0	0	0	0	0	0	0	118	0	0	118	0	273	
2:00PM	0	0	0	0	0	1	0	25	0	0	25	0	0	0	0	0	0	0	0	39	0	0	39	0	64	
2:15PM	0	0	0	0	0	0	0	31	0	0	31	0	0	0	0	0	0	0	0	41	0	0	41	0	72	
2:30PM	0	0	0	0	0	2	0	36	0	0	36	0	0	0	0	0	0	0	0	42	0	0	42	0	78	
2:45PM	0	0	0	0	0	1	0	39	0	0	39	0	0	0	0	0	0	0	0	45	0	0	45	0	84	
Hourly Total	0	0	0	0	0	4	0	131	0	0	131	0	0	0	0	0	0	0	0	167	0	0	167	0	298	
3:00PM	0	0	0	0	0	0	0	47	0	0	47	0	0	0	0	0	0	0	0	41	0	0	41	0	88	
3:15PM	0	0	0	0	0	0	0	48	0	0	48	0	0	0	0	0	0	0	0	38	0	0	38	0	86	
3:30PM	0	0	0	0	0	0	0	40	0	0	40	0	0	0	0	0	0	0	0	37	0	0	37	0	77	
3:45PM	0	0	0	0	0	0	0	54	0	0	54	0	0	0	0	0	0	0	0	56	0	0	56	0	110	
Hourly Total	0	0	0	0	0	0	0	189	0	0	189	0	0	0	0	0	0	0	0	172	0	0	172	0	361	
4:00PM	0	0	0	0	0	0	0	51	0	0	51	0	0	0	0	0	0	0	0	46	0	0	46	0	97	
4:15PM	0	0	0	0	0	0	0	57	0	0	57	0	0	0	0	0	0	0	0	40	0	0	40	0	97	
4:30PM	0	0	0	0	0	0	0	46	0	0	46	0	0	0	0	0	0	0	0	63	0	0	63	0	109	
4:45PM	0	0	0	0	0	7	0	60	0	0	60	0	0	0	0	0	0	0	0	48	0	0	48	0	108	
Hourly Total	0	0	0	0	0	7	0	214	0	0	214	0	0	0	0	0	0	0	0	197	0	0	197	0	411	
5:00PM	0	0	0	0	0	1	0	35	0	0	35	0	0	0	0	0	0	0	0	42	0	0	42	0	77	
5:15PM	0	0	0	0	0	0	0	39	0	0	39	0	0	0	0	0	0	0	0	39	0	0	39	0	78	
5:30PM	0	0	0	0	0	1	0	33	0	0	33	0	0	0	0	0	0	0	0	33	0	0	33	0	66	
5:45PM	0	0	0	0	0	0	0	35	0	0	35	0	0	0	0	0	0	0	0	22	0	0	22	0	57	
Hourly Total	0	0	0	0	0	2	0	142	0	0	142	0	0	0	0	0	0	0	0	136	0	0	136	0	278	
6:00PM	0	0	0	0	0	5	0	35	0	0	35	0	0	0	0	0	0	0	0	46	0	0	46	0	81	
6:15PM	0	0	0	1	1	1	0	30	0	0	30	0	0	0	0	0	0	0	0	27	0	0	27	0	58	
6:30PM	0	0	0	0	0	2	0	22	0	0	22	0	0	0	0	0	0	0	0	23	0	0	23	0	45	
6:45PM	0	0	0	0	0	3	0	34	0	0	34	0	0	0	0	0	0	0	0	27	0	0	27	0	61	
Hourly Total	0	0	0	1	1	11	0	121	0	0	121	0	0	0	0	0	0	0	0	123	0	0	123	0	245	
7:00PM	0	0	0	0	0	1	0	34	0	0	34	0	0	0	0	0	0	0	0	22	0	0	22	0	56	
7:15PM	0	0	0	0	0	1	0	34	0	0	34	0	0	0	0	0	0	0	0	29	0	0	29	0	63	
7:30PM	0	0	0	0	0	0	0	33	0	0	33	0	0	0	0	0	0	0	0	15	0	0	15	0	48	
7:45PM	0	0	0	0	0	2	0	16	0	0	16	0	0	0	0	0	0	0	0	10	0	0	10	0	26	
Hourly Total	0	0	0	0	0	4	0	117	0	0	117	0	0	0	0	0	0	0	0	76	0	0	76	0	193	
8:00PM	0	0	0	0	0	0	0	21	0	0	21	0	0	0	0	0	0	0	0	17	0	0	17	0	38	
8:15PM	0	0	0	0	0	0	0	22	0	0	22	0	0	0	0	0	0	0	0	12	0	0	12	0	34	
8:30PM	0	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	0	0	0	14	0	0	14	0	22	
8:45PM	0	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	0	0	0	8	0	0	8	0	18	
Hourly Total	0	0	0	0	0	0	0	61	0	0	61	0	0	0	0	0	0	0	0	51	0	0	51	0	112	
9:00PM	0	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	0	0	0	9	0	0	9	0	18	
9:15PM	0	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	0	0	0	10	0	0	10	0	17	
9:30PM	0	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	4	0	0	4	0	9	
9:45PM	0	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	5	0	0	5	0	10	
Hourly Total	0	0	0	0	0	0	0	26	0	0	26	0	0	0	0	0	0	0	0	28	0	0	28	0	54	
10:00PM	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	0	0	4	0	0	4	0	8	
10:15PM	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	5	0	0	5	0	8	
10:30PM	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	5	0	0	5	0	7	
10:45PM	0	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0	6	0	0	6	0	11	
Hourly Total	0	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	0	0	0	20	0	0	20	0	34	
11:00PM	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	4	0	0	4	0	6	
11:15PM	0	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	0	0	0	1	0	0	1	0	8	
11:30PM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
11:45PM	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	1	0	0	1	0	4	
Hourly Total	0	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	0	0	0	6	0	0	6	0	19	
Total	0	0	0	1	1	51	0	2136	1	0	2137	0	0	0	0	0	0	0	0	1	2185	0	0	2186	0	4324
% Approach	0%	0%	0%	100%	-	-	0%	100.0%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	100.0%	0%	0%	-	-	-	

Leg Direction	Canal Southbound						E San Augustine St Westbound						Canal Northbound						E San Augustine St Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
% Total	0%	0%	0%	0%	0%	-	0%	49.4%	0%	0%	49.4%	-	0%	0%	0%	0%	0%	-	0%	50.5%	0%	0%	50.6%	-	-
Lights	0	0	0	1	1	-	0	2106	1	0	2107	-	0	0	0	0	0	-	1	2163	0	0	2164	-	4272
% Lights	0%	0%	0%	100%	100%	-	0%	98.6%	100%	0%	98.6%	-	0%	0%	0%	0%	-	-	100%	99.0%	0%	0%	99.0%	-	98.8%
Articulated Trucks	0	0	0	0	0	-	0	2	0	0	2	-	0	0	0	0	0	-	0	1	0	0	1	-	3
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0.1%	0%	0%	0.1%	-	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	-	0.1%
Buses and Single-Unit Trucks	0	0	0	0	0	-	0	17	0	0	17	-	0	0	0	0	0	-	0	16	0	0	16	-	33
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	-	0%	0.8%	0%	0%	0.8%	-	0%	0%	0%	0%	-	-	0%	0.7%	0%	0%	0.7%	-	0.8%
Bicycles on Road	0	0	0	0	0	-	0	11	0	0	11	-	0	0	0	0	0	-	0	5	0	0	5	-	16
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0.5%	0%	0%	0.5%	-	0%	0%	0%	0%	-	-	0%	0.2%	0%	0%	0.2%	-	0.4%
Pedestrians	-	-	-	-	-	35	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	68.6%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	16	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	31.4%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Canal at E San Augustine St - TMC

Thu Aug 6, 2020

Full Length (12 AM-12 AM (+1))

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 773978, Location: 29.689716, -95.111168

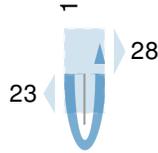


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[N] Canal

Total: 2

In: 1 Out: 1



[W] E San Augustine St

Total: 4322

In: 2186

Out: 2136

2185

1

2136

1

In: 2137

Total: 4322

Out: 2185

[E] E San Augustine St

Out: 2 In: 0

Total: 2

[S] Canal

Canal at E San Augustine St - TMC

Thu Aug 6, 2020

AM Peak (Aug 06 2020 10AM - 11 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 773978, Location: 29.689716, -95.111168



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Canal Southbound							E San Augustine St Westbound							Canal Northbound							E San Augustine St Eastbound							Int
	R	T	L	U	App	Ped*		R	T	L	U	App	Ped*		R	T	L	U	App	Ped*		R	T	L	U	App	Ped*		
2020-08-06 10:00AM	0	0	0	0	0	1	0	30	0	0	0	30	0	0	0	0	0	0	0	0	-	0	40	0	0	40	0	0	70
10:15AM	0	0	0	0	0	0	0	43	0	0	0	43	0	0	0	0	0	0	0	0	-	0	45	0	0	45	0	0	88
10:30AM	0	0	0	0	0	1	0	24	0	0	0	24	0	0	0	0	0	0	0	0	-	0	29	0	0	29	0	0	53
10:45AM	0	0	0	0	0	0	0	38	0	0	0	38	0	0	0	0	0	0	0	0	-	1	38	0	0	39	0	0	77
Total	0	0	0	0	0	2	0	135	0	0	0	135	0	0	0	0	0	0	0	0	-	1	152	0	0	153	0	0	288
% Approach	0%	0%	0%	0%	0%	-	0%	100%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	-	0.7%	99.3%	0%	0%	-	-	-	-	
% Total	0%	0%	0%	0%	0%	0%	0%	46.9%	0%	0%	0%	46.9%	0%	0%	0%	0%	0%	0%	0%	0%	-	0.3%	52.8%	0%	0%	53.1%	-	-	-
PHF	-	-	-	-	-	-	-	0.779	-	-	-	0.779	-	-	-	-	-	-	-	-	-	0.250	0.844	-	-	0.850	-	-	0.815
Lights	0	0	0	0	0	0	0	132	0	0	0	132	0	0	0	0	0	0	0	0	-	1	152	0	0	153	0	0	285
% Lights	0%	0%	0%	0%	0%	-	0%	97.8%	0%	0%	0%	97.8%	0%	0%	0%	0%	0%	0%	0%	0%	-	100%	100%	0%	0%	100%	-	-	99.0%
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%
Buses and Single-Unit Trucks	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	2
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	-	0%	1.5%	0%	0%	0%	1.5%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0.7%
Bicycles on Road	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	1
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0.7%	0%	0%	0%	0.7%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0.3%
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	
% Pedestrians	-	-	-	-	-	50.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bicycles on Crosswalk	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	
% Bicycles on Crosswalk	-	-	-	-	-	50.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Canal at E San Augustine St - TMC

Thu Aug 6, 2020

AM Peak (Aug 06 2020 10AM - 11 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

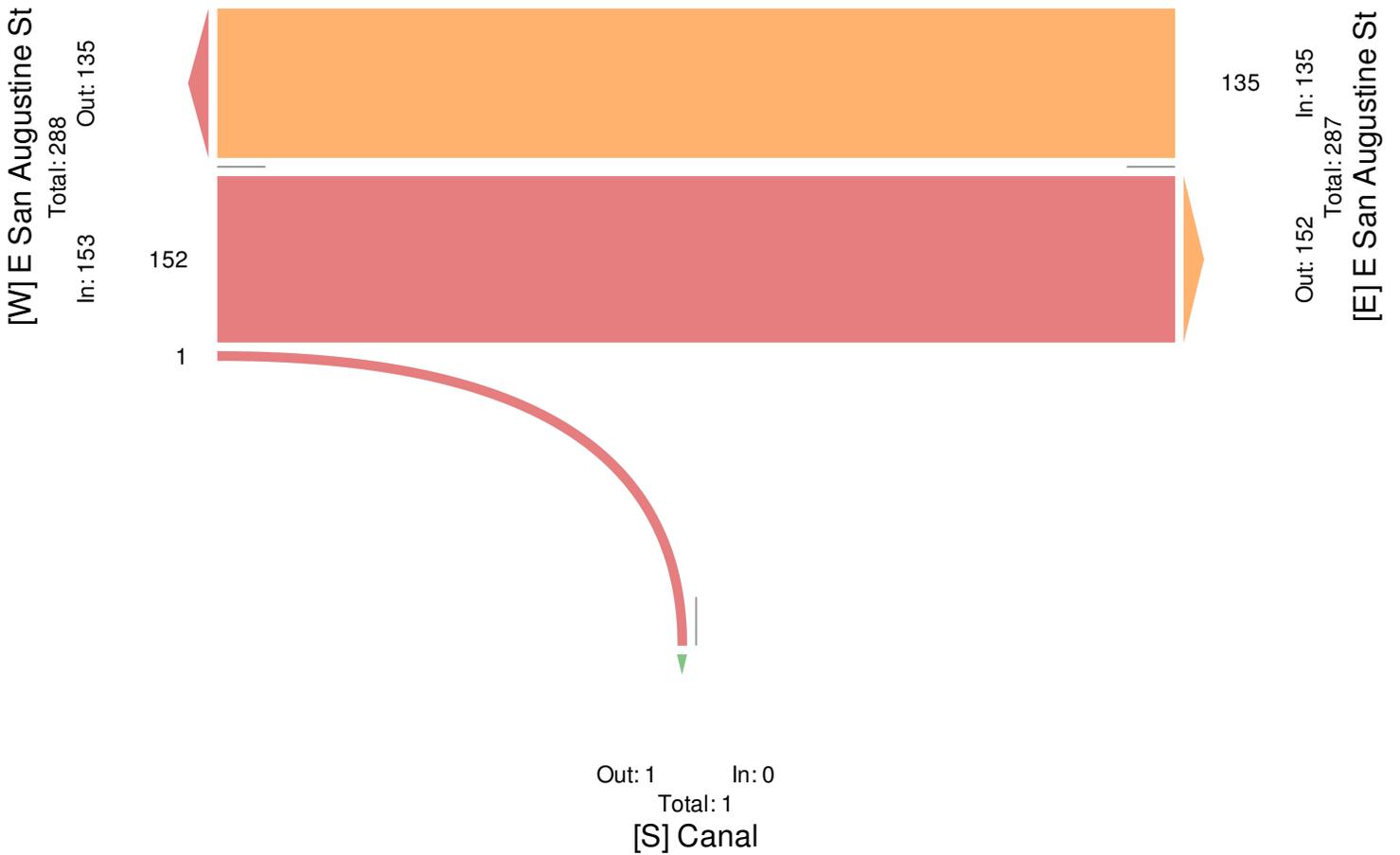
ID: 773978, Location: 29.689716, -95.111168



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5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Canal



Canal at E San Augustine St - TMC

Thu Aug 6, 2020

Midday Peak (Aug 06 2020 11:45AM - 12:45 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 773978, Location: 29.689716, -95.111168



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Canal Southbound						E San Augustine St Westbound						Canal Northbound						E San Augustine St Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
2020-08-06 11:45AM	0	0	0	0	0	0	0	42	0	0	42	0	0	0	0	0	0	0	0	62	0	0	62	0	104
12:00PM	0	0	0	0	0	0	0	40	0	0	40	0	0	0	0	0	0	0	0	46	0	0	46	0	86
12:15PM	0	0	0	0	0	0	0	52	0	0	52	0	0	0	0	0	0	0	0	37	0	0	37	0	89
12:30PM	0	0	0	0	0	0	0	37	0	0	37	0	0	0	0	0	0	0	0	41	0	0	41	0	78
Total	0	0	0	0	0	0	0	171	0	0	171	0	0	0	0	0	0	0	0	186	0	0	186	0	357
% Approach	0%	0%	0%	0%	-	-	0%	100%	0%	0%	-	-	0%	0%	0%	0%	-	-	0%	100%	0%	0%	-	-	-
% Total	0%	0%	0%	0%	0%	-	0%	47.9%	0%	0%	47.9%	-	0%	0%	0%	0%	0%	-	0%	52.1%	0%	0%	52.1%	-	-
PHF	-	-	-	-	-	-	-	0.822	-	-	0.822	-	-	-	-	-	-	-	-	0.746	-	-	0.746	-	0.856
Lights	0	0	0	0	0	0	0	171	0	0	171	0	0	0	0	0	0	0	0	185	0	0	185	0	356
% Lights	0%	0%	0%	0%	-	-	0%	100%	0%	0%	100%	-	0%	0%	0%	0%	-	-	0%	99.5%	0%	0%	99.5%	-	99.7%
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Buses and Single-Unit Trucks	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	-	0%
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1
% Bicycles on Road	0%	0%	0%	0%	-	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	-	-	0%	0.5%	0%	0%	0.5%	-	0.3%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Canal at E San Augustine St - TMC

Thu Aug 6, 2020

Midday Peak (Aug 06 2020 11:45AM - 12:45 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 773978, Location: 29.689716, -95.111168



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US



Canal at E San Augustine St - TMC

Thu Aug 6, 2020

PM Peak (Aug 06 2020 3:45PM - 4:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 773978, Location: 29.689716, -95.111168



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5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Canal Southbound						E San Augustine St Westbound						Canal Northbound						E San Augustine St Eastbound						Int
	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	
2020-08-06 3:45PM	0	0	0	0	0	0	0	54	0	0	54	0	0	0	0	0	0	0	0	56	0	0	56	0	110
4:00PM	0	0	0	0	0	0	0	51	0	0	51	0	0	0	0	0	0	0	0	46	0	0	46	0	97
4:15PM	0	0	0	0	0	0	0	57	0	0	57	0	0	0	0	0	0	0	0	40	0	0	40	0	97
4:30PM	0	0	0	0	0	0	0	46	0	0	46	0	0	0	0	0	0	0	0	63	0	0	63	0	109
Total	0	0	0	0	0	0	0	208	0	0	208	0	0	0	0	0	0	0	0	205	0	0	205	0	413
% Approach	0%	0%	0%	0%	0%	-	0%	100%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	100%	0%	0%	0%	-	-
% Total	0%	0%	0%	0%	0%	0%	0%	50.4%	0%	0%	50.4%	0%	0%	0%	0%	0%	0%	0%	0%	49.6%	0%	0%	49.6%	0%	-
PHF	-	-	-	-	-	-	-	0.912	-	-	0.912	-	-	-	-	-	-	-	-	0.813	-	-	0.813	-	0.939
Lights	0	0	0	0	0	0	0	207	0	0	207	0	0	0	0	0	0	0	0	204	0	0	204	0	411
% Lights	0%	0%	0%	0%	0%	-	0%	99.5%	0%	0%	99.5%	-	0%	0%	0%	0%	0%	-	0%	99.5%	0%	0%	99.5%	-	99.5%
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%
Buses and Single-Unit Trucks	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	2
% Buses and Single-Unit Trucks	0%	0%	0%	0%	0%	-	0%	0.5%	0%	0%	0.5%	-	0%	0%	0%	0%	0%	-	0%	0.5%	0%	0%	0.5%	-	0.5%
Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Canal at E San Augustine St - TMC

Thu Aug 6, 2020

PM Peak (Aug 06 2020 3:45PM - 4:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

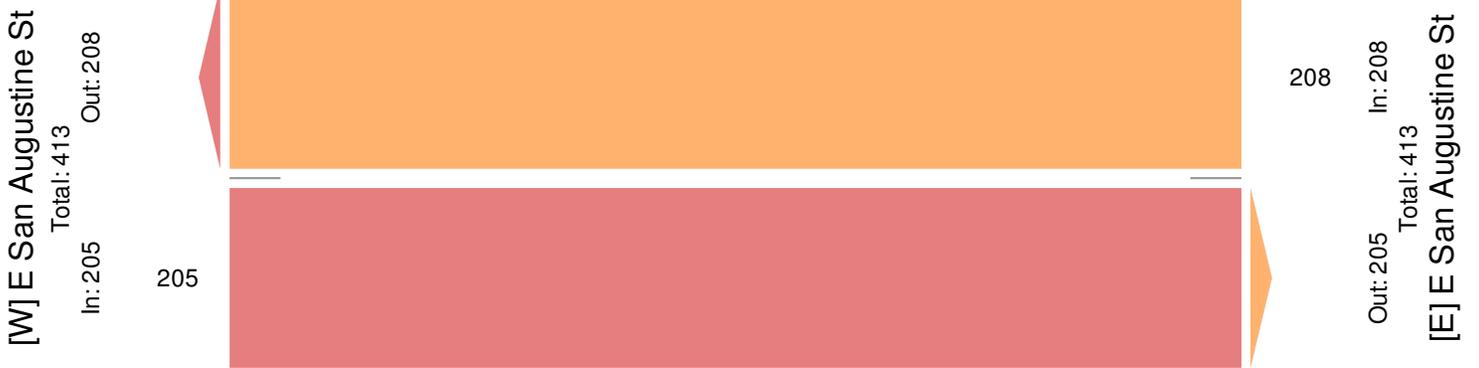
All Movements

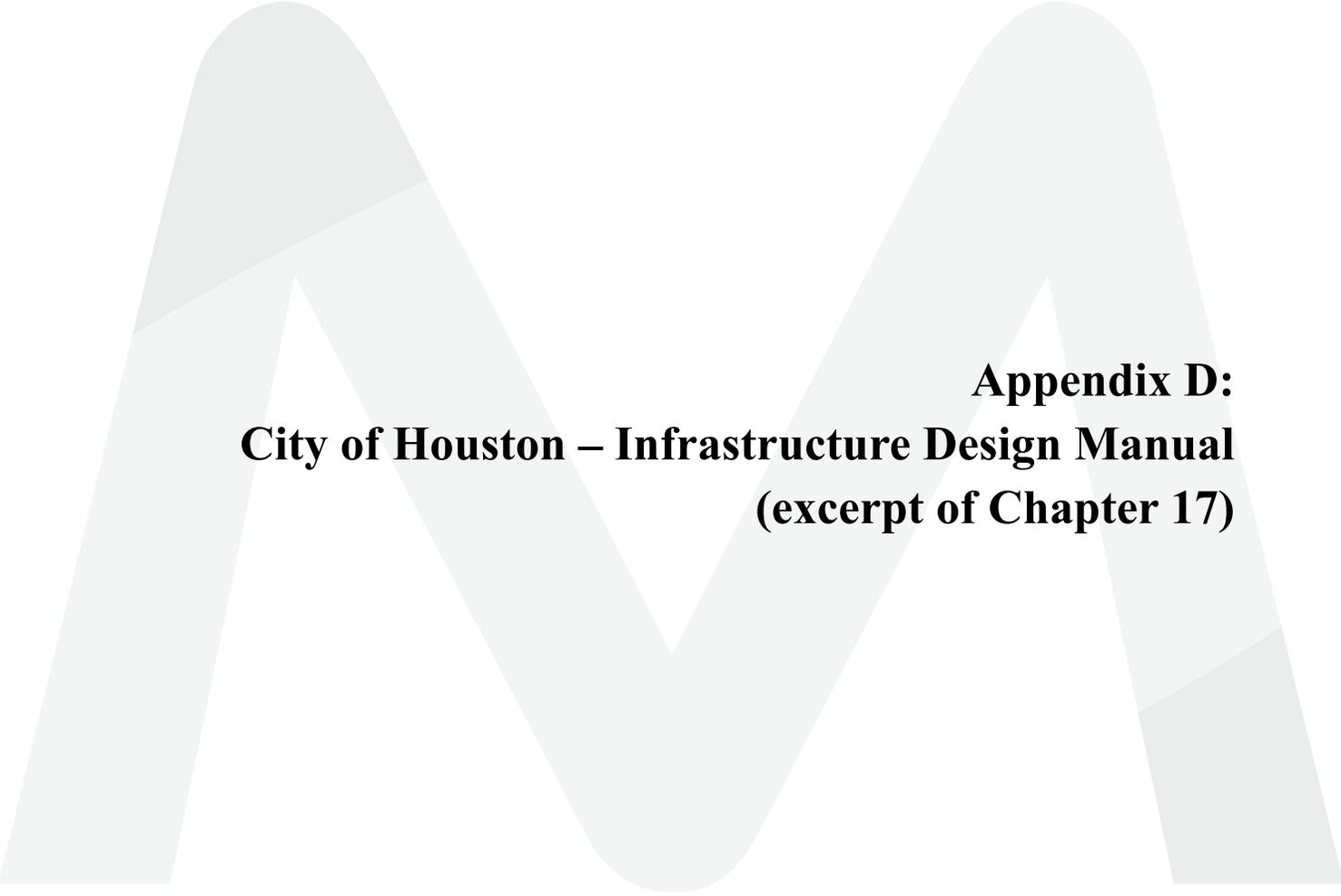
ID: 773978, Location: 29.689716, -95.111168



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US



A large, light gray, stylized 'M' watermark is centered on the page, serving as a background for the title text.

**Appendix D:
City of Houston – Infrastructure Design Manual
(excerpt of Chapter 17)**

- e. Railing/Delineator:
 - i. Exterior bridge railings adjacent to a pedestrian/bicycle facility:
 - 1. Minimum height: 42 inches.
 - 2. Height of 48 inches should be considered in the following cases:
 - Speed of adjacent traffic exceeds 35 mph
 - Width of pedestrian/bicycle facility is less than 10-ft
 - 3. The railing design should minimize opportunities for bicycle handle bars to get caught in the railing.
 - ii. A railing may be used to separate bicycle traffic from pedestrian traffic to improve bicycle/pedestrian safety and comfort where appropriate.
6. Loading/Commercial Zones:
- a. Dedicated loading/commercial zones shall not impede bicycle traffic or encroach on a bicycle facility. Where possible, dedicated bicycle facilities should be placed behind loading zones and adjacent to the pedestrian zone whether on or off-street.
 - b. To avoid conflicts with loading/commercial zones bicycle facility may be transitioned to the adjacent sidewalk where a minimum 10-ft separate pedestrian realm is maintained.
 - c. A painted crosswalk may be provided across the bikeway facility to accommodate loading and unloading of commercial vehicles.
7. **Midblock Crossings**
- a. General: Midblock crossings are legal pedestrian and bicycle street crossing locations that are not located at roadway intersections. Intersection crossings are generally preferred, but occasionally midblock crossing locations are acceptable. Examples of potentially acceptable midblock crossing locations include a trail in a utility easement that crosses a street at a distance that is farther from the nearest signalized intersection than a trail user would be expected to traverse.
 - b. Midblock crossings shall require Houston Public Works approval.
 - c. Midblock crossings shall be designed at minimum with the following considerations:
 - i. Midblock crossings shall be located at least 100-ft from adjacent intersections.
 - ii. Street name signs should be placed at Major Thoroughfare crossings and should be considered on Collector and Local Street crossings.

- iii. The width of curb ramps serving a midblock crossing shall be equal to the width of the approaching pedestrian or bicycle facility. Detectable warning surfaces shall extend the full width of the ramp.
- iv. Pavement markings shall be used to define all midblock crossing locations.
 - 1. For pedestrian-only midblock crossing, white high visibility crosswalk markings shall be used.
 - 2. For shared-use midblock crossings, Dual Use Markings shall be used, consisting of a series of white stripes flanked by square bicycle-green pavement markings (see Standard Detail 01510-09A).
- d. Midblock Enhancements: Additional treatments should be considered for increased visibility and refuge at midblock crossings. Enhancements shall require justification per engineering judgment and approval by Houston Public Works. Potential enhancements may include:
 - i. Raised crossing (a.k.a. raised crosswalk). Raised crossings elevate people in the crossing above the road level, thereby increasing their visibility. Raised crossings are not permitted on corridors with design speeds greater than 35 miles per hour.
 - ii. Curb extensions. Curb extension reduce crossing distance and increase visibility of people in the crossing. This treatment can be used when on-street parking exists or where excess pavement exists such that a curb extension can be constructed without decreasing roadway capacity.
 - iii. Median refuge islands. Median refuge islands are located in the center of the roadway to permit a two-stage crossing of the roadway. Median refuges should be considered where center turn lanes are present and are encouraged on corridor with 4 or more lanes, or where roadway configuration is reconfigured from a 4-lane corridor to a 3-lane corridor.
 - iv. Street lighting at midblock trail crossings where feasible and approved by Houston Public Works.
- e. Selection of Midblock Treatments:

Midblock treatments shall be selected to maximize safety of people crossing the street at the midblock location. Selection of treatments should consider the corridor speed, number of lanes and average daily traffic in addition to area context. Several levels of treatment based on these factors are presented below. Standard treatments are required for each level. Optional treatments may be used based on engineering judgment and with Houston Public Works approval. **Table 1-B** provides guidance for the selection of treatment level.

Table 1-B Criteria for Midblock Crosswalk
(Levels A, B, C, D are defined below)

ADT	Speed Limit	4 lanes with median	2 lanes without median	4 lanes without median
≤ 5,000	≤ 30 mph	A	A	A
	> 30 mph	A	B	C
5,000 - 15,000	≤ 30 mph	B	B	B
	> 30 mph	C	C	D
>15,000	≤ 30 mph	C	D	D
	> 30 mph	D	D	D

Level A: Midblock crossing pavement markings

1. Standard: Install, as appropriate, white high-visibility crosswalk markings (pedestrian-only crossing) or Dual Use Markings (shared-use crossing).
2. Optional:
 - a. Install W11-2 pedestrian warning sign (pedestrian-only crossing) or W11-15 pedestrian/bicycle warning sign (shared-use crossing) with W16-9P AHEAD (plaque) mounted on the side of the roadway in advance of the crossing.
 - b. Install W11-2 pedestrian warning sign (pedestrian-only crossing) or W11-15 pedestrian/bicycle warning sign (shared-use crossing) with W16-7PL diagonal downward arrow plaque mounted on the side of the roadway at the crossing.

Level B: Level A + advance warning signage

1. Standard:
 - a. Install, as appropriate, white high-visibility crosswalk markings (pedestrian-only crossing) or Dual Use Markings (shared-use crossing).
 - b. Install W11-2 pedestrian warning sign (pedestrian-only crossing) or W11-15 pedestrian/bicycle warning sign (shared-use crossing) with W16-9P AHEAD (plaque) mounted on the side of the roadway in advance of the crossing.

- c. Install W11-2 pedestrian warning sign (pedestrian-only crossing) or W11-15 pedestrian/bicycle warning sign (shared-use crossing) with W16-7PL diagonal downward arrow plaque mounted on the side of the roadway at the crossing.

2. Optional:

- a. Install "PED XING" (pedestrian-only crossing) or "BIKE XING" (shared-use crossing) advanced pavement marking.

Level C: Level B + additional pavement markings

1. Standard:

- a. Install, as appropriate, white high-visibility crosswalk markings (pedestrian-only crossing) or Dual Use Markings (shared-use crossing).
- b. Install W11-2 pedestrian warning sign (pedestrian-only crossing) or W11-15 pedestrian/bicycle warning sign (shared-use crossing) with W16-9P AHEAD (plaque) mounted on the side of the roadway in advance of the crossing.
- c. Install W11-2 pedestrian warning sign (pedestrian-only crossing) or W11-15 pedestrian/bicycle warning sign (shared-use crossing) with W16-7PL diagonal downward arrow (plaque) mounted on the side of the roadway at the crossing.
- d. Install "PED XING" (pedestrian-only crossing) or "BIKE XING" (shared-use crossing) advanced pavement marking.
- e. On four-lane roadways, install R1-5 "Yield Here to Pedestrians" (pedestrian-only crossing) or R1-5PB "Yield Here to Pedestrians and Bicyclists" (shared-use crossing) signage and yield lines consisting of isosceles triangles pointing toward oncoming vehicles (see Standard Detail 01510-09A).

2. Optional:

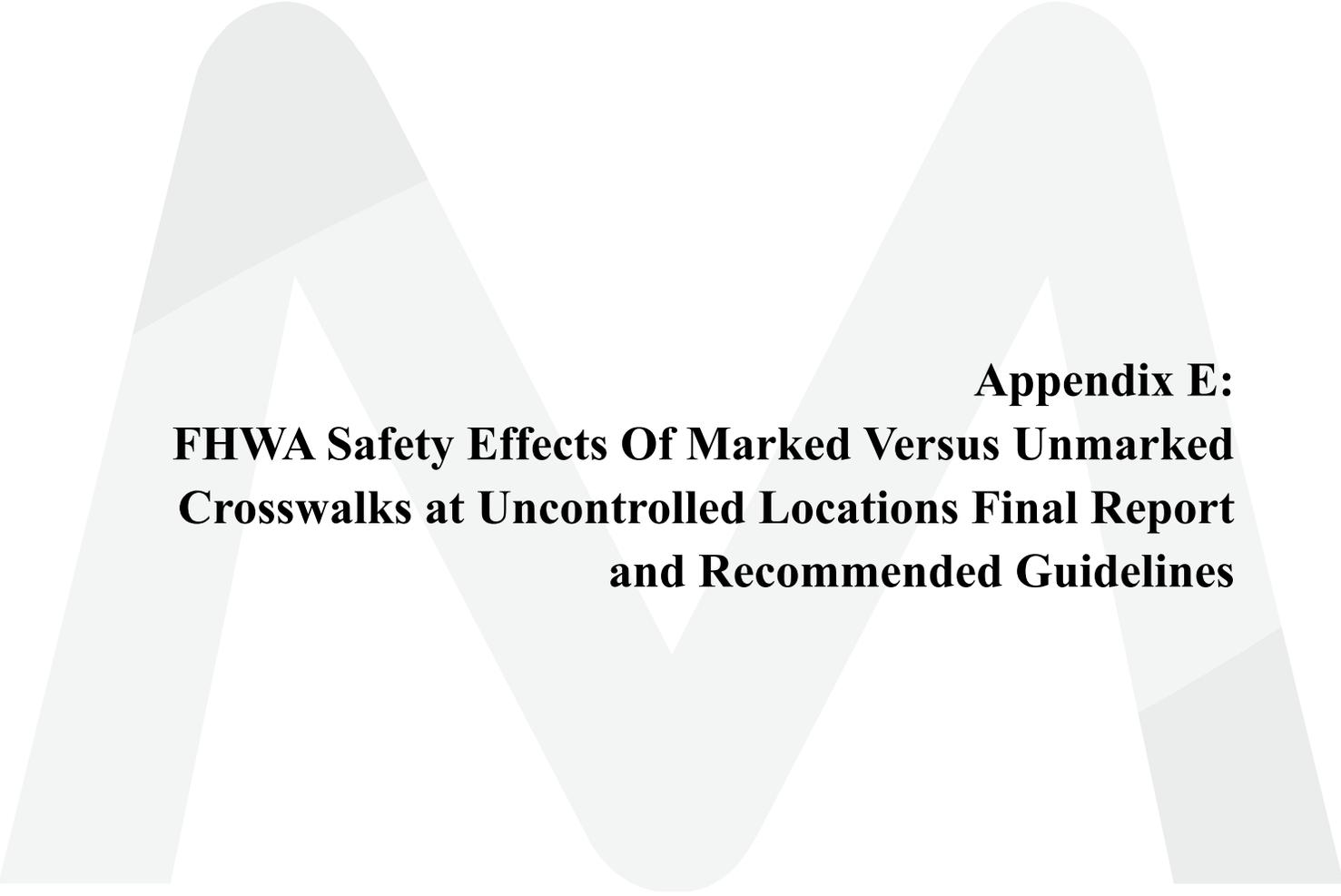
- a. Raised crossing
- b. Curb extension
- c. Median refuge island

Level D: Level C + crossing enhancements

1. Standard:
 - a. Install, as appropriate, white high-visibility crosswalk markings (pedestrian-only crossing) or Dual Use Markings (shared-use crossing).
 - b. Install W11-2 pedestrian warning sign (pedestrian-only crossing) or W11-15 pedestrian/bicycle warning sign (shared-use crossing) with W16-9P AHEAD (plaque) mounted on the side of the roadway in advance of the crossing.
 - c. Install W11-2 pedestrian warning sign (pedestrian-only crossing) or W11-15 pedestrian/bicycle warning sign (shared-use crossing) with W16-7PL diagonal downward arrow plaque mounted on the side of the roadway at the crossing.
 - d. Install "PED XING" (pedestrian-only crossing) or "BIKE XING" (shared-use crossing) advanced pavement marking.
 - e. On four-lane roadways, install R1-5 "Yield Here to Pedestrians" (pedestrian-only crossing) or R1-5PB "Yield Here to Pedestrians and Bicyclists" (shared-use crossing) signage and yield lines consisting of isosceles triangles pointing toward oncoming vehicles (see Standard Detail 01510-09A).
 - f. Consider a traffic signal or hybrid pedestrian beacon if the appropriate warrants in the TMUTCD are satisfied. Requires approval of City Traffic Engineer.
 - g. Enhancements are strongly encouraged where appropriate, including:
 - i. Raised crossing
 - ii. Curb extension
 - iii. Median refuge island

8. Driveways:
 - a. Driveways shall be designed to safely accommodate bicyclists, pedestrians and motorized vehicle users. Where a driveway crosses a dedicated on-street or off-street bikeway, the driveway should be designed to enhance the visibility of the bikeway user.

 - b. Signage:
 - i. Stops signs (R1-1) should be placed on primary commercial driveways to indicate a full stop by motor vehicles before entering and crossing a bicycle facility. Where the bicycle facility is in or immediately adjacent to the roadway, the stop sign should be placed before the bicycle facility.
 - ii. Where a stop sign is not provided on the driveway approach, Bicycle Crossing Warning Sign (W11-1) or dual Combination Bike and Ped Crossing Warning Sign (W11-15) should be considered.

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**Appendix E:
FHWA Safety Effects Of Marked Versus Unmarked
Crosswalks at Uncontrolled Locations Final Report
and Recommended Guidelines**

U.S. Department of Transportation

Federal Highway Administration

1200 New Jersey Avenue, SE
Washington, DC 20590
202-366-4000

Federal Highway Administration Research and Technology Coordinating, Developing, and Delivering Highway Transportation Innovations



This report is an archived publication and may contain dated technical, contact, and link information

[Federal Highway Administration](#) > [Publications](#) > [Research Publications](#) > [04100](#) > Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations Final Report and Recommended Guidelines

Publication Number: FHWA-HRT-04-100

Date: September 2005

Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations Final Report and Recommended Guidelines

PDF Version (3.21 MB)

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CHAPTER 4. CONCLUSIONS AND RECOMMENDATIONS

Pedestrians are legitimate users of the transportation system, and their needs should be identified routinely - and appropriate solutions selected-to improve pedestrian safety and access. Deciding where to mark crosswalks is only one consideration in meeting that objective.

The study results revealed that under no condition was the presence of a marked crosswalk alone at an uncontrolled location associated with a significantly lower pedestrian crash rate compared to an unmarked crosswalk. Furthermore, on multilane roads with traffic volumes greater than 12,000 vehicles per day, having a marked crosswalk was associated with a higher pedestrian crash rate (after controlling for other site factors) compared to an unmarked crosswalk. Therefore, adding marked crosswalks alone (i.e., with no engineering, enforcement, or education enhancement) is not expected to reduce pedestrian crashes for any of the conditions included in the study. On many roadways, particularly multilane and high-speed crossing locations, more substantial improvements often are needed for safer pedestrian crossings, such as providing raised medians, installing traffic signals (with pedestrian signals) when warranted, implementing speed-reducing measures, and/or other practices. In addition, development patterns that reduce the speed and number of multilane roads should be encouraged.

Street crossing locations should be routinely reviewed to consider the three following available options:

1. No special provisions needed.
2. Provide a marked crosswalk alone.
3. Install other crossing improvements (with or without a marked crosswalk) to reduce vehicle speeds, shorten the crossing distance, or increase the likelihood of motorists stopping and yielding.

GUIDELINES FOR CROSSWALK INSTALLATION

Marked pedestrian crosswalks may be used to delineate preferred pedestrian paths across roadways under the following conditions:

- At locations with stop signs or traffic signals to direct pedestrians to those crossing locations and to prevent vehicular traffic from blocking the pedestrian path when stopping for a stop sign or red light.
- At nonsignalized street crossing locations in designated school zones. Use of adult crossing guards, school signs and markings, and/or traffic signals with pedestrian signals (when warranted) should be considered in conjunction with the marked crosswalk, as needed.
- At nonsignalized locations where engineering judgment dictates that the number of motor vehicle lanes, pedestrian exposure, average daily traffic (ADT), posted speed limit, and geometry of the location would make the use of specially designated crosswalks desirable for traffic/pedestrian safety and mobility.

Marked crosswalks alone (i.e., without traffic-calming treatments, traffic signals and pedestrian signals when warranted, or other substantial crossing improvement) are insufficient and should not be used under the following conditions:

- Where the speed limit exceeds 64.4 km/h (40 mi/h).
- On a roadway with four or more lanes without a raised median or crossing island that has (or will soon have) an ADT of 12,000 or greater.
- On a roadway with four or more lanes with a raised median or crossing island that has (or soon will have) an ADT of 15,000 or greater.

GENERAL SAFETY CONSIDERATIONS

Since sites in this study were confined to those having no traffic signal or stop sign on the main street approaches to the crosswalk, it follows that these results do not apply to crossings controlled by traffic signals, stop or yield signs, traffic-calming treatments, or other devices. These results also do not apply to school crossings, since such sites were purposely excluded from the site selection process.

The results of this study have some clear implications on the placement of marked crosswalks and the design of safer pedestrian crossings at uncontrolled locations.

Pedestrian crashes are relatively rare at uncontrolled pedestrian crossings (1 crash every 43.7 years per site in this study); however, the certainty of injury to the pedestrian and the high likelihood of a severe or fatal injury in a high-speed crash make it critical to provide a pedestrian-friendly transportation network.

Marked crosswalks alone (i.e., without traffic-calming treatments, traffic signals with pedestrian signals when warranted, or other substantial improvement) are not recommended at uncontrolled crossing locations on multilane roads (i.e., four or more lanes) where traffic volume exceeds approximately 12,000 vehicles per day (with no raised medians) or approximately 15,000 ADT (with raised medians that serve as refuge areas). This recommendation is based on the analysis of pedestrian crash experience, as well as exposure data and site conditions described earlier. To add a margin of safety and/or to account for future increases in traffic volume, the authors recommend against installing marked crosswalks alone on two-lane roads with ADTs greater than 12,000 or on multilane roads with ADTs greater than 9,000 (with no raised median). This study also recommends against installing marked crosswalks alone on roadways with speed limits higher than 64.4 km/h (40 mi/h) based on the expected increase in driver stopping distance at higher speeds. (Few sites were found for this study having marked crosswalks where speed limits exceeded 64.4 km/h (40 mi/h).) Instead, enhanced crossing treatments (e.g., traffic-calming treatments, traffic and pedestrian signals when warranted, or other substantial improvement) are recommended. Specific recommendations are given in table 11 regarding installation of marked crosswalks and other crossing measures. It is important for motorists to understand their legal responsibility to yield to pedestrians at marked and unmarked crosswalks, which may vary from State to State. Also, pedestrians should use caution when crossing streets, regardless of who has the legal right-of-way, since it is the pedestrian who suffers the most physical injury in a collision with a motor vehicle.

On two-lane roads and lower volume multilane roads (ADTs less than 12,000), marked crosswalks were not found to have any positive or negative effect on pedestrian crash rates at the study sites. Marked crosswalks may encourage pedestrians to cross the street at such sites. However, it is recommended that crosswalks alone (without other crossing enhancements) not be installed at locations that may pose unusual safety risks to pedestrians. Pedestrians should not be encouraged to cross the street at sites with limited sight distance, complex or confusing designs, or at sites with certain vehicle mixes (many heavy trucks) or other dangers unless adequate design features and/or traffic control devices are in place.

At uncontrolled pedestrian crossing locations, installing marked crosswalks should not be regarded as a magic cure for pedestrian safety problems. However, marked crosswalks also should not be considered as a negative measure that will necessarily increase pedestrian crashes. Marked crosswalks are appropriate at some

locations (e.g., at selected low-speed, two-lane streets at downtown crossing locations) to help channel pedestrians to preferred crossing locations, but other roadway improvements are also necessary (e.g., raised medians, traffic-calming treatments, traffic and pedestrian signals when warranted, or other substantial crossing improvement) when used at other locations. The guidelines presented in table 11 are intended to provide guidance for installing marked crosswalks and other pedestrian crossing facilities.

Note that speed limit was used in table 11 in addition to ADT, number of lanes, and presence of a median. In developing the table, roads with higher speed limits (higher than 64.4 km/h (40 mi/h)) were considered to be inappropriate for adding marked crosswalks alone. This is because virtually no uncontrolled, marked crosswalk sites where speed limits exceed 64.4 km/h (40 mi/h) were found in the 30 U.S. cities used in this study. Thus, these types of high-speed, uncontrolled marked crosswalks could not be included in the analysis. Also, high-speed roadways present added problems for pedestrians and thus require more substantial treatments in many cases. That may be why Germany, Finland, and Norway do not allow uncontrolled crosswalks on roads with high speed limits. ⁽³⁰⁾

For three-lane roads, adding marked crosswalks alone (without other substantial treatments) is generally not recommended for ADTs greater than 12,000, although exceptions may be allowed under certain conditions (e.g., lower speed limits).

If nothing else is done beyond marking crosswalks at an uncontrolled location, pedestrians will not experience increased safety (under any situations included in the analysis). This finding is in some ways consistent with the companion study by Knoblauch et al. that found that marking a crosswalk would not necessarily increase the number of motorists that will stop or yield to pedestrians. ⁽¹³⁾ Research from Europe shows the need for pedestrian improvements beyond uncontrolled crosswalks. ^(17,21)

Table 11. Recommendations for installing marked crosswalks and other needed pedestrian improvements at uncontrolled locations.*

Roadway Type (Number of Travel Lanes and Median Type)	Vehicle ADT ≤ 9,000			Vehicle ADT >9,000 to 12,000			Vehicle ADT >12,000-15,000			Vehicle ADT > 15,000		
	Speed Limit**											
	≤ 48.3 km/h (30 mi/h)	56.4 km/h (35 mi/h)	64.4 km/h (40 mi/h)									
Two lanes	C	C	P	C	C	P	C	C	N	C	P	N
Three lanes	C	C	P	C	P	P	P	P	N	P	N	N
Multilane (four or more lanes) with raised median***	C	C	P	C	P	N	P	P	N	N	N	N
Multilane (four or more lanes) without raised median	C	P	N	P	P	N	N	N	N	N	N	N

* These guidelines include intersection and midblock locations with no traffic signals or stop signs on the approach to the crossing. They do not apply to school crossings. A two-way center turn lane is not considered a median. Crosswalks should not be installed at locations that could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex or confusing designs, a substantial volume of heavy trucks, or other dangers, without first providing adequate design features and/or traffic control devices. Adding crosswalks alone will not make crossings safer, nor will they necessarily result in more vehicles stopping for pedestrians. Whether or not marked crosswalks are installed, it is important to consider other pedestrian facility enhancements (e.g., raised median, traffic signal, roadway narrowing, enhanced overhead lighting, traffic-calming measures, curb extensions), as needed, to improve the safety of the crossing. These are general recommendations; good engineering judgment should be used in individual cases for deciding where to install crosswalks.

** Where the speed limit exceeds 64.4 km/h (40 mi/h), marked crosswalks alone should not be used at unsignalized locations.

*** The raised median or crossing island must be at least 1.2 m (4 ft) wide and 1.8 m (6 ft) long to serve adequately as a refuge area for pedestrians, in accordance with MUTCD and American Association of State Highway and Transportation Officials (AASHTO) guidelines.

C = Candidate sites for marked crosswalks . Marked crosswalks must be installed carefully and selectively. Before installing new marked crosswalks, an engineering study is needed to determine whether the location is suitable for a marked crosswalk. For an engineering study, a site review may be sufficient at some locations, while a more indepth study of pedestrian volume, vehicle speed, sight distance, vehicle mix, and other factors may be needed at other sites. It is recommended that a minimum utilization of 20 pedestrian crossings per peak hour (or 15 or more elderly and/or child pedestrians) be confirmed at a location before placing a high priority on the installation of a marked crosswalk alone.

P = Possible increase in pedestrian crash risk may occur if crosswalks are added without other pedestrian facility enhancements. These locations should be closely monitored and enhanced with other pedestrian crossing improvements, if necessary, before adding a marked crosswalk.

N = Marked crosswalks alone are insufficient, since pedestrian crash risk may be increased by providing marked crosswalks alone. Consider using other treatments, such as traffic-calming treatments, traffic signals with pedestrian signals where warranted, or other substantial crossing improvement to improve crossing safety for pedestrians.

In some situations (e.g., low-speed, two-lane streets in downtown areas), installing a marked crosswalk may help consolidate multiple crossing points. Engineering judgment should be used to install crosswalks at preferred crossing locations (e.g., at a crossing location at a streetlight as opposed to an unlit crossing point nearby). While overuse of marked crossings at uncontrolled locations should be avoided, higher priority should be placed on providing crosswalk markings where pedestrian volume exceeds about 20 per peak hour (or 15 or more elderly pedestrians and/or children per peak hour).

Marked crosswalks and other pedestrian facilities (or lack of facilities) should be routinely monitored to determine what improvements are needed.

POSSIBLE MEASURES TO HELP PEDESTRIANS

Although simply installing marked crosswalks by themselves cannot solve pedestrian crossing problems, the safety needs of pedestrians must not be ignored. More substantial engineering and roadway treatments need to be considered, as well as enforcement and education programs and possibly new legislation to provide safer and easier crossings for pedestrians at problem locations. Transportation and safety engineers have a responsibility to consider all types of road users in roadway planning, design, and maintenance. Pedestrians must be provided with safe facilities for travel.

A variety of pedestrian facilities have been found to improve pedestrian safety and/or ability to cross the street under various conditions. (See references 16, 31, 32, 33, and 34.) Examples of pedestrian improvements include:

- Providing raised medians (figure 31) or intersection crossing islands on multilane roads, which can significantly reduce the pedestrian crash rate and also facilitate street crossing. Also, raised medians may provide aesthetic improvement and may control access to prevent unsafe turns out of driveways. Refuge islands should be at least 1.2 m (4 ft) wide (and preferably 1.8 to 2.4 m (6 to 8 ft) wide) and of adequate length to allow pedestrians to stand and wait for gaps in traffic before crossing the second half

of the street. When built, the landscaping should be designed and maintained to provide good visibility between pedestrians and approaching motorists.



Figure 31. Raised medians and crossing islands can improve pedestrian safety on multilane roads.

- Installing traffic signals (with pedestrian signals), where warranted (see figures 32 and 33).



Figure 32. Pedestrian signals help accommodate pedestrian crossings on some high-volume or multilane roads.



Figure 33. Traffic signals are needed to improve pedestrian crossings on some high-volume or multilane roads.

- Reducing the effective street crossing distance for pedestrians by narrowing the roads or by providing curb extensions (figures 34 and 35) and/or raised pedestrian islands at intersections.



Figure 34. Curb extensions at midblock locations reduce crossing distance for pedestrians.



Figure 35. Curb extensions at intersections reduce crossing distance for pedestrians.

Another option is to reduce four-lane undivided road sections to two through-lanes with dual left-turn lanes or left-turn bays. Reducing the width of the lanes may result in slower speeds in some situations, which can benefit pedestrians who are attempting to cross the street. This creates enough space to provide median islands. The removal of a travel lane may also allow enough space for sidewalks and/or bike lanes.

- Installing traffic-calming measures may be appropriate on certain streets to slow vehicle speeds and/or reduce cut-through traffic, as described in a 1999 report titled *Traffic Calming: State of the Practice*.⁽²⁴⁾

Traffic-calming measures include raised crossings (raised crosswalks, raised intersections) (see figure 36), street narrowing measures (chicanes, slow points, "skinny street" designs), and intersection designs (traffic minicircles, diagonal diverters). Note that some of these traffic-calming measures may not be appropriate on major collector or arterial streets.



Figure 36. Raised crosswalks can control vehicle speeds on local streets at pedestrian crossings.

- Providing adequate nighttime lighting for pedestrians (figure 37). Adequate nighttime lighting should be provided at marked crosswalks and areas near churches, schools, and community centers with nighttime pedestrian activity.



Figure 37. Adequate lighting can improve pedestrian safety at night.

- Designing safer intersections for pedestrians (e.g., crossing islands, tighter turn radii).
- Providing narrower widths and/or access management (e.g., consolidation of driveways).
- Constructing grade-separated crossings or pedestrian-only streets (see figure 38). Grade-separated crossings are very expensive and should only be considered in extreme situations, such as where pedestrian crossings are essential (e.g., school children need to cross a six-lane arterial street), street-crossing at-grade is not feasible for pedestrians, and no other measures are considered to be appropriate. Grade-separated crossings must also conform to Americans with Disabilities Act (ADA) requirements.



Figure 38. Grade-separated crossings sometimes are used when other measures are not feasible to provide safe pedestrian crossings.

- Using various pedestrian warning signs, flashers, and other traffic control devices to supplement marked crosswalks (figure 39). However, the effects of supplemental signs and other devices at marked crosswalks are not well known under various roadway conditions. According to the MUTCD, pedestrian crossing signs should only be used at locations that are unusually hazardous, where crossing activity is unexpected, or at locations where pedestrian crossing activity is not readily apparent. ⁽²⁾



Figure 39. Pedestrian warning signs sometimes are used to supplement crosswalks.

- Building narrower streets in new communities to achieve desired vehicle speeds.
- Increasing the frequency of two-lane or three-lane arterials when designing new street networks so that fewer multilane arterials are required.

It is recommended that parking be eliminated on the approach to uncontrolled crosswalks to improve vision between pedestrians and motorists. The 2000 Uniform Vehicle Code specifies that parking should be prohibited within an intersection on a crosswalk, and within 6.1 m (20 ft) of a crosswalk at an intersection (which could be increased to 9.1 to 15.25 m (30 to 50 ft) in advance of a crosswalk on a high-speed road. ⁽¹⁾

Some agencies provide fences or railings in the raised medians of multilane roads that direct pedestrians to the right; this results in a two-stage crossing and increases the likelihood of pedestrians looking for vehicles coming from their right in the second half of the street (figures 40 and 41).



Figure 40. Fences or railings in the median direct pedestrians to the right and may reduce pedestrian crashes on the second half of the street.

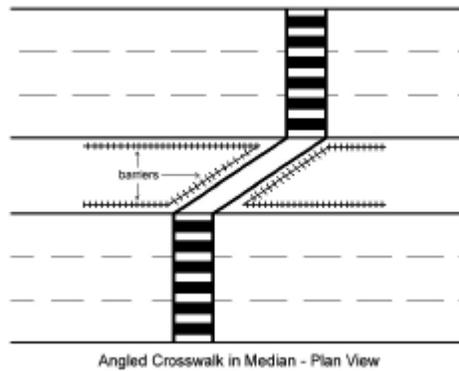


Figure 41. Angled crosswalks with barriers can direct pedestrians to face upstream and increase the pedestrian's awareness of traffic.

Proper planning and land use practices should be applied to benefit pedestrians. For example, busy arterial streets should be used as a boundary for school attendance or school busing. Major pedestrian destinations should not be separated from each other or from their parking facilities by a wide, busy street.

The MUTCD pedestrian signal warrant should be reviewed to determine whether the warrant should be modified to more easily allow for installing a traffic signal at locations where pedestrians cannot safely cross the street (and where no alternative safe crossings exist nearby).

Consideration must always include pedestrians with disabilities and proper accommodations must be provided to meet ADA requirements.

There should be continued research, development, and testing/explanation of innovative traffic control and roadway design alternatives that could provide improved access and safety for pedestrians attempting to cross streets. For example, in-pavement warning lights, variations in pedestrian warning and regulatory signs (including signs placed in the centerline to reinforce motorists yielding to pedestrians), roadway narrowing, traffic-calming measures, and automated speed-monitoring techniques deserve further research and development to determine their feasibility under various traffic and roadway conditions.

More details about these and other pedestrian facilities are contained in the *Pedestrian Facilities User's Guide: Providing Safety and Mobility*, ⁽²²⁾ and in the Institute for Transportation Engineers (ITE) publications *Design and Safety of Pedestrian Facilities* ⁽³⁵⁾ and *The Traffic Safety Toolbox* (chapter 19, "Designing for Pedestrians"). ⁽³⁶⁾

Table 11 provides initial guidance on whether an uncontrolled location might be a candidate for a marked crosswalk alone and/or whether additional geometric and/or traffic control improvements are needed. As a part of the review process for pedestrian crossings, an engineering study should be used to analyze other factors, including (but not limited to), gaps in traffic, approach speed, sight distances, illumination, the needs of special populations, and the distance to the nearest traffic signal.

The spacing of marked crosswalks should also be considered so that they are not placed too close together. Overuse of marked crosswalks may breed driver disrespect for them, and a more conservative use of crosswalks generally is preferred. Thus, it is recommended that in situations where marked crosswalks alone are acceptable (see table 11) a higher priority be placed on their use at locations having a minimum of 20 pedestrian crossings per peak hour (or 15 or more elderly and/or child pedestrians per peak hour). In all cases, good engineering judgment must be applied.

OTHER CONSIDERATIONS

Distance of Marked Crosswalks from Signalized Intersections

Marked crosswalks should not be installed in close proximity to signalized intersections (which may or may not have marked crosswalks); instead, pedestrians should be encouraged to cross at the signal in most situations. The minimum distance from a signal for installing a marked crosswalk should be determined by local traffic engineers based on pedestrian crossing demand, type of roadway, traffic volume, and other factors. The objective of adding a marked crosswalk is to channel pedestrians to safer crossing points. It should be understood, however, that pedestrian crossing behavior may be difficult to control merely by adding marked

crosswalks. The new marked crosswalk should not unduly restrict platooned traffic, and also should be consistent with marked crosswalks at other unsignalized locations in the area.

Alternative Treatments

In addition to installing marked crosswalks-or in some cases, instead of installing marked crosswalks-there are other treatments that should be considered to provide safer and easier crossings for pedestrians. Examples of these pedestrian improvements:

- Provide raised medians (or raised crossing islands) on multilane roads.
- Install traffic signals and pedestrian signals where warranted and where serious pedestrian crossing problems exist.
- Reduce the exposure crossing distance for pedestrians by:
 - Providing curb extensions.
 - Providing pedestrian median refuge islands.
 - Reducing four-lane undivided road sections to two through lanes with a left-turn bay (or a two-way left-turn lane), sidewalks, and bicycle lanes.
- Locate bus stops on the far side of uncontrolled marked crosswalks.
- Install traffic-calming measures to slow vehicle speeds and/or reduce cut-through traffic. Such measures may include:
 - Raised crossings (raised crosswalks, raised intersections).
 - Street-narrowing measures (chicanes, slow points, "skinny street" designs).
 - Intersection designs (traffic minicircles, diagonal diverters).
 - Other treatments are available; see *Traffic Calming: State of the Practice* for further details. ⁽²⁴⁾

Some of these traffic-calming measures are better suited to local or neighborhood streets than to arterial streets.

- Provide adequate nighttime street lighting for pedestrians in areas with nighttime pedestrian activity where illumination is inadequate.
- Design safer intersections and driveways for pedestrians (e.g., crossing islands, tighter turn radii), which take into consideration the needs of pedestrians.

In developing the proposed U.S. guidelines for marked crosswalks and other pedestrian measures, consideration was given not only to the research results in this study, but also to crosswalk guidelines and related pedestrian safety research in Sweden, England, Canada, Australia, the Netherlands, Germany, Norway, and Hungary. (See [references 17, 18, 19, 20, 21, 33, and 37](#).) More details on pedestrian facilities are given in the 2001 *Pedestrian Facilities User's Guide: Providing Safety and Mobility*, ⁽²²⁾ *Design and Safety of Pedestrian Facilities*, ⁽³⁵⁾ *The Traffic Safety Toolbox*, ⁽³⁶⁾ and *Making Streets That Work-Neighborhood Planning Tool*, ⁽³⁸⁾ among others.

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Page Owner: [Office of Research, Development, and Technology, Office of Safety, RDT](#)

Keywords: Marked crosswalk, Safety, Pedestrian crashes

Scheduled Update: Archive - No Update needed

This page last modified on 03/08/2016

**MASTER LICENSE AGREEMENT FOR
HIKE AND BIKE TRAILS**

This Master License Agreement (“Agreement”) is made and entered into by and between **CenterPoint Energy Houston Electric, LLC**, a Texas limited liability company (“CenterPoint” or “Licensor”), and the **City of Deer Park**, a political subdivision of the State of Texas (the “Licensee”).

RECITALS

WHEREAS, Licensor is the fee simple owner, easement holder, or licensee of certain real property located within the Licensee’s jurisdiction and identified and described in an approved Exhibit “A,” as it may be supplemented or amended from time to time (hereinafter referred to as the “Transmission Corridors”); and

WHEREAS, Licensor is now occupying or intends to occupy, in whole or in part, the Transmission Corridors for the purpose of erecting and maintaining across and thereon structures and facilities for or incidental to the transmission and distribution of electric energy and for other purposes; and

WHEREAS, Licensee has requested that Licensor make available the Transmission Corridors for Licensee to construct, install, operate and maintain pedestrian and bicycle trails (hereinafter referred to as the “Hike and Bike Trails”) in order for the general public to use the Transmission Corridors for recreational purposes;

WHEREAS, Licensor is willing to grant Licensee a revocable license to use the Transmission Corridors to construct, install, operate and maintain Hike and Bike Trails on the terms and conditions set forth in this Agreement; and

WHEREAS, Licensor and Licensee desire to enter into an agreement as contemplated by Section 75.0022 of the Texas Civil Practice and Remedies Code and further desire for Licensor to enjoy to the fullest extent the liability protections afforded therein.

NOW, THEREFORE, KNOW ALL PERSONS BY THESE PRESENTS, that for and in the consideration of the mutual promises herein contained, the parties hereto do hereby covenant and agree as follows:

1. Revocable License. Licensor hereby grants to Licensee, and Licensee hereby accepts from Licensor, a revocable license to use the Transmission Corridors identified and described in an approved Exhibit “A” (hereinafter referred to as the “Licensed Property”) to construct, install, and maintain Hike and Bike Trails on the Licensed Property for use by the general public for certain recreational purposes only (“License”), subject to the limitations of use set forth in Section 2 below. Provided further, however, that such Hike and Bike Trails shall be constructed, installed, and maintained in such a manner so as not to damage or destroy Licensor’s power lines, supporting structures, and other facilities, not to interfere with the continued operation and

maintenance of Licensor's power lines, supporting structures, and other facilities, and not to interfere with Licensor's existing and future uses of the Licensed Property.

2. Limitations of Use. This License is strictly limited to the Hike and Bike Trails to be constructed, installed, and maintained within the Licensed Property. Unless otherwise agreed to by Licensor on an approved Exhibit "A", the Hike and Bike Trails shall consist of an improved surface, not to exceed ten (10) feet in width and Licensee's use is expressly limited to biking, walking, running, roller-skating, roller-blading, skateboarding and dog walking only on the surface of the Hike and Bike Trails and only during the hours from dawn to dusk each day. All other activities on the Hike and Bike Trails, including, but not limited to, kite flying, recreational sports, picnicking and other recreational activities provided for under Section 75.001(3) of the Texas Civil Practice and Remedies Code, are strictly prohibited. This License does not extend to the use of any of Licensor's facilities located on the Licensed Property. The Hike and Bike Trails are expressly intended for individual recreational activities such as biking, walking, running, roller-skating, roller-blading, skateboarding and dog walking. Motorcycles, all terrain vehicles or any other motorized vehicles, including motorized bicycles, are not allowed unless operated by Police, Emergency or Maintenance personnel. Bollards or other similar barricades shall be installed by Licensee at all vehicular access points along the Hike and Bike Trail to the extent necessary to limit unauthorized vehicular access. It is understood that construction, installation, maintenance, operation, and/or use of the Hike and Bike Trails on any portion of the Licensed Property shall not commence, and access to such portions of the Licensed Property shall not be permitted, unless and until plans for the Hike and Bike Trails have been submitted to and approved in writing by Licensor, such plans to include a proposed Exhibit "A." All plans for the Hike and Bike Trails shall be prepared at Licensee's sole cost and expense and in conformance with the terms of this Agreement, with the specifications set forth in Exhibit "B," "Specification - CenterPoint Energy Houston Electric, LLC," #007-231-79, and with the requirements for a survey drawing set forth in Exhibit "E." In the event that the terms of Exhibit "B" or Exhibit "E" are inconsistent or conflict with the terms of this Agreement, the terms of this Agreement shall control. Licensor shall provide initial comments to Licensee's proposed plans for the Hike and Bike Trails within forty-five (45) days of receipt; provided, however, that nothing in this sentence shall limit the ability of Licensor to approve or reject Licensee's proposed plans, including any proposed Exhibit "A." Licensee further shall not place any structures, piles or debris, or change the level of the ground by excavation or mounding without Licensor's express prior written consent. No businesses, buildings, or other facilities, other than an improved Hike and Bike Trail in accordance with this Agreement, shall be permitted to be installed upon the Licensed Property.

3. Term and Consideration. Subject to the provisions of Section 4, this Agreement shall be for a term of twenty (20) years (the "Initial Term") commencing on the Effective Date. Upon expiration of the Initial Term, this Agreement will automatically be renewed on the same terms and conditions, on a year-to-year basis until terminated by either party hereto as set forth in this Agreement (the Initial Term, together with any such annual renewals, is herein referred to as the "Term"). Within thirty (30) calendar days of receipt of Licensor's invoice, Licensee shall reimburse Licensor the ad valorem taxes allocable to the Hike and Bike Trails and any other fee or tax assessed against Licensor on account of the Hike and Bike Trails.

4. Termination and Revocation of License. This Agreement may be terminated or temporarily suspended, in either case with respect to some or all of the Transmission Corridors, and the License revoked by providing written notice of termination to the other party in the event of any of the following:

- a. Licensor determines that the Hike and Bike Trails interfere with the Licensor's existing and/or future uses of the Licensed Property, including, but not limited to: (i) the continued operation and maintenance of Licensor's power lines, supporting structures, and other facilities, or the facilities of Licensor's affiliates, (ii) construction or expansion of the facilities of Licensor or its affiliates, (iii) the continued operation and maintenance of third-parties' facilities, and (iv) construction or expansion of third-parties' facilities. In the event of a termination under Section 4(a), Licensor shall provide Licensee ninety (90) days written notice of termination.
- b. Licensor determines that this Agreement or the Hike and Bike Trails interfere or conflict with, or detract from, Licensor's electrical transmission and distribution business, other business purposes, or the business purposes of its affiliates. In the event of a termination under Section 4(b), Licensor shall provide Licensee ninety (90) days written notice of termination.
- c. Licensor or Licensee determine that the Hike and Bike Trails pose a hazard to the users.
- d. Licensor determines that Licensee or its contractors failed to comply with one of the provisions of this Agreement or defaulted in any of their obligations under this Agreement and failed to correct such default or noncompliance to the satisfaction of Licensor within thirty (30) days after written notice from Licensor.
- e. Licensor determines that events beyond its control make it impossible, illegal, impractical or unreasonable for Licensor to perform under this Agreement, including, but not limited to: applicable law or regulation, acts or rulings of the courts, the Public Utility Commission of Texas, or any federal, state or local agency having jurisdiction over Licensor; termination or non-renewal of the franchise granted by Licensee to Licensor to conduct an electric delivery business within the Licensee's jurisdiction and for other business purposes; interruptions of Licensor's electrical transmission and distribution services or damage to Licensor's towers, facilities or related appurtenances; fires, epidemics, floods, storms, heavy rains, hurricanes, tornadoes, ice or hail storms; explosions, war, terrorist acts, riots, court orders, acts of superior governmental or military authority; material changes in industry practices, standards or customs; or any repeal of or amendment to Section 75.0022 of the Texas Civil Practice and Remedies Code.

Upon notice of termination, Licensee shall have the right to remove the Hike and Bike Trails, related appurtenances and other improvements made to the Licensed Property by the Licensee (collectively "the Improvements").

5. Condition upon Termination. Upon termination of this Agreement, Licensee shall surrender the Licensed Property to the Licensor in the same condition as received except for ordinary wear and tear. In addition, Licensor may require Licensee to remove the Improvements upon termination of this Agreement and restore the Licensed Property to its condition immediately prior to construction of the Hike and Bike Trails, at Licensee's expense. All Improvements not removed by Licensee shall, in Licensor's sole discretion, (i) become Licensor's property at no cost or expense to Licensor, or (ii) be removed by Licensor, in either case without further notice and without liability to Licensee. Licensee shall reimburse Licensor the cost and expense of having the Improvements removed from the Licensed Property. Licensee shall pay such amount to Licensor within thirty (30) calendar days of receipt of Licensor's invoice.

6. Safety and Security. Licensee shall be solely responsible for maintaining peace and order upon the Hike and Bike Trails and shall prevent any nuisances in or upon or connected with the Hike and Bike Trails. In accordance with Texas Utilities Code §251.001, prior to any construction activities, Licensee or Licensee's contractor shall contact the appropriate utility locating service to identify all underground utilities and pipelines. Licensee shall trim and maintain any vegetation approved by Licensor and installed by Licensee to ensure all areas surrounding the Hike and Bike Trails remain visible to the users of the Hike and Bike Trails. Licensee and its agents, contractors and subcontractors shall be aware of and abide by all federal, state and local rules and regulations which govern work near power lines including, but not limited to, OSHA regulations and Chapter 752 of the Texas Health and Safety Code. Licensee agrees to include a requirement in its contracts with contractors performing work under this Agreement that such contractors will be responsible for damage to Licensor's or third parties' structures and facilities located on the Licensed Property, including, but not limited to, overhead power lines, underground pipelines, and underground fiber optics telecommunication lines, and shall promptly reimburse Licensor or third parties all reasonable costs to repair such facilities.

7. Complaints. Licensee shall be solely responsible for responding to and resolving, to Licensor's satisfaction, any complaints from homeowners, businesses or governmental entities relating to the construction, installation, operation, use, maintenance, repair, modification, removal or presence of Licensee's Hike and Bike Trails on the Licensed Property.

8. Licensor's Access. Licensor, its authorized agents, contractors, assignees or other licensees shall have the right to enter the Licensed Property at any time for any purpose for their full enjoyment and dominant use. Licensor, its agents, contractors, assignees or other licensees, retain the superior right to enter upon and fully use the Licensed Property for any purpose, including, but not limited to, inspecting, maintaining, installing, removing or replacing electrical distribution and transmission facilities and structures, PCS cell sites/telecommunication lines and equipment, pipelines, or other utilities or facilities. It is understood that from time to time entry will be necessary for inspection, maintenance, and work upon Licensor's or third-parties' facilities located upon the Licensed Property and, on such occasions, Licensor may in its sole discretion determine that it is necessary to temporarily close all or portions of the Hike and Bike Trails and prohibit the public from using same. Where reasonably practical, in its sole discretion, Licensor agrees to give notice by electronic mail to a designated representative of Licensee of planned inspection, maintenance or work by Licensor that necessitates temporary closure of more than twenty-four (24) hours of all or portions of the Hike and Bike Trails, such

notice to indicate, to the extent reasonably practical, if heavy equipment is to be used in such inspection, maintenance or work by Licensor. In the event heavy equipment is used by Licensor for inspection, maintenance, or other work, Licensor will attempt to avoid or minimize damage to Licensee's facilities, where reasonably practical and in Licensor's sole discretion. Notwithstanding the foregoing, Licensor shall have no liability for any damage to Licensee's facilities. This License is not exclusive, and Licensor, its employees, agents, contractors, assignees, representatives, and others whom it may license, may for any purpose go upon the Licensed Property, make improvements upon and traverse the Licensed Property and make changes in the location of or additions to Licensor's or third-parties' facilities located thereon without payment of compensation to Licensee, and without liability for any damage to Licensee's facilities, including but not limited to, the Hike and Bike Trails and approved vegetation, or for any interruption of use of the Hike and Bike Trails.

9. Future Construction. Licensor has expressed intentions and hereby notifies Licensee of plans to build upon and expand its facilities on the Licensed Property or to allow third-parties to build or expand their facilities on or under the Licensed Property. Licensor hereby retains the right to terminate or temporarily suspend the License if and when such construction or expansion takes place. Licensor is not responsible for any repairs to the Improvements as a result of Licensor's construction or maintenance activities, or as a result of those activities conducted by contractors or another entity licensed to use said Licensed Property.

10. Existing Easement Holders, Lessees, or Other Interests. Prior to construction, installation, maintenance, and use of the Hike and Bike Trails, Licensee and its agents, contractors and subcontractors shall: (i) observe and comply with, at Licensee's sole cost and expense, all notification requirements of Texas Utilities Code §251.001, the Underground Facility Damage Prevention and Safety Act, when working along, within, and/or near the Licensed Property, and (ii) shall provide written notice to any and all easement holders, lessees, fee owners, or other interests affecting the Licensed Property, with a copy of such notice to the Licensor. Licensee and its employees agents, contractors and subcontractors shall comply with any and all safety codes and laws that apply when working along, within and/or near the Licensed Property, as well as with the requirements of any easement, lease, fee interest, or other interest or any other requirement affecting the Licensed Property. In like manner, prior to construction of the Hike and Bike Trails on the Licensed Property, Licensee shall obtain written consent from any easement holder, lessee, fee owner or any other party whose interest affects the Licensed Property, and shall further deliver copies of such consents to Licensor prior to commencing construction. Licensee shall be solely responsible for compliance in all respects with the requirements of any easement, lease, fee interest or other interest affecting the Licensed Property to the extent any such interest affects the Licensed Property, the License, the Hike and Bike Trails or any other right of Licensee under this Agreement.

11. Acceptance of Premises. **LICENSEE ACKNOWLEDGES AND AGREES THAT IT HAS FULLY INSPECTED THE LICENSED PROPERTY AND ACCEPTS THE LICENSED PROPERTY "AS IS," "WHERE IS" AND IN ITS PRESENT CONDITION AS SUITABLE FOR THE PURPOSES FOR WHICH IT IS LICENSED. LICENSEE SPECIFICALLY ACKNOWLEDGES THAT THE TRANSMISSION CORRIDORS ARE OR MAY BE USED FOR THE TRANSMISSION AND DISTRIBUTION OF ELECTRICITY OVER HIGH VOLTAGE POWER LINES AND THAT THE**

TRANSMISSION AND DISTRIBUTION OF ELECTRICITY OVER SUCH LINES RESULTS IN THE EXISTENCE OF ELECTRIC AND MAGNETIC FIELDS THAT MAY EXTEND TO THE HIKE AND BIKE TRAILS AND ANY INDIVIDUALS WHO UTILIZE SUCH HIKE AND BIKE TRAILS. Licensee shall not make or cause to be made any improvements to the Licensed Property other than as approved by Licensor in advance, in writing, and then only at the sole cost and expense of Licensee.

12. Assignment and Subletting. The License is personal to Licensee and may not be sold, transferred, assigned or sublet, except to a political subdivision, as contemplated by Section 75.0022 of the Texas Civil Practice and Remedies Code, and only with the prior written consent of Licensor, which shall not be unreasonably withheld. Construction, operation and maintenance activities may be subcontracted, in accordance with Section 14 below, by Licensee to contractors approved by Licensor. Any other purported transfer or assignment shall be null and void ab initio and of no force or effect. It is the intention of this Agreement not to confer benefits, rights, or privileges on any person or entity other than Licensor and Licensee.

13. Construction Requirements. Licensee shall not commence construction, installation, maintenance, operation and/or use of the Hike and Bike Trails until plans for same have been approved in writing by Licensor. All construction and ongoing maintenance activities submitted to Licensor shall conform to the terms of this Agreement and the specifications attached as Exhibit "B" to this License. In the event that the terms of Exhibit "B" are inconsistent or conflict with the terms of this Agreement, the terms of this Agreement shall control. If any mechanics' or materialmen's lien is filed against the Licensed Property for work claimed to have been undertaken for or on behalf of Licensee, whether such lien relates to the initial construction of the Hike and Bike Trail or Licensee's ongoing maintenance obligations hereunder, Licensee, at its sole cost and expense, shall discharge and obtain and record a release of any such lien within thirty (30) days of such lien being filed, or shall provide a bond for such lien in compliance with all applicable laws and deliver to Licensor evidence of such release or bond. If Licensee shall fail to obtain a release or bond for any such lien, Licensor may, at its option, discharge the same and Licensee shall reimburse Licensor for the cost thereof, together with costs and attorneys' fees, within thirty (30) days of being invoiced by Licensor.

14. Work to be Performed by Contractors. All work within the Licensed Property or under this Agreement shall be performed by contractors for the Licensee and not by the Licensee itself, provided such contractors have been approved by Licensor in writing in advance of the work to be performed. Any references herein to Licensee working within the Licensed Property or under this Agreement shall be construed to refer to Licensee's contractors performing such work. Licensor reserves the right, at any time, to prohibit one or more of the Licensee's contractors from working if Licensor concludes, in its sole discretion, that such contractors are not qualified. Licensee shall provide evidence satisfactory to Licensor that Licensee's contractors have provided all insurance and indemnities required by this Agreement.

15. Maintenance of Hike and Bike Trails. Licensee, at its sole cost and expense, at all times during the term of this Agreement, agrees to maintain and keep clean to Licensor's satisfaction the area depicted on an approved Exhibit "A" (hereinafter referred to as the "Maintenance Area"), including the Hike and Bike Trails and any other improvements which may be placed or erected on the Licensed Property by Licensee. Unless otherwise indicated on an approved

Exhibit "A," the Maintenance Area shall include a ten (10) foot strip on each side of the Hike and Bike Trails. Trash, graffiti or debris removal and mowing must be performed as often as necessary to maintain and keep clean the Maintenance Area, and whenever requested by Licensor. In the event that Licensee fails to properly maintain the Maintenance Area as provided herein, Licensor shall have the right, but not the obligation, to have such maintenance completed, and Licensee agrees to reimburse Licensor its costs and expenses for such work. Licensee shall pay such amount to Licensor within thirty (30) calendar days of receipt of Licensor's invoice. Licensee further agrees that it shall not issue citations or fines to Licensor with respect to the condition or maintenance, including mowing and debris removal, of the Licensed Property, without providing Licensor at least 30 days written notice of the alleged violation and an opportunity to remedy such violation.

16. Tower Protection and Liability for Damage. No self-propelled equipment shall be allowed directly beneath Licensor's lattice towers. In the event Licensee, its agents, contractors, or subcontractors damage Licensor's structures, facilities, equipment, or other property, including, but not limited to, overhead power lines, underground pipelines, and underground fiber optics telecommunication lines, Licensee agrees to reimburse Licensor its costs and expenses of necessary repairs. Licensee shall pay such amount to Licensor within thirty (30) calendar days of receipt of Licensor's invoice.

17. Vegetation. Licensee shall not plant shrubs, bushes, or any vegetation on the Licensed Property without the prior written permission of Licensor. Under no circumstances shall Licensee plant trees or other vegetation with a mature height exceeding three (3) feet above ground level or install any type of irrigation system upon said Licensed Property. Licensee shall refer to Exhibit "C," attached hereto and as may be supplemented or amended from time to time on www.centerpointenergy.com, for examples of low-growing vegetation; provided, however, that nothing in this sentence shall limit or otherwise modify the requirement of the first sentence of this Section 17.

18. Water Channelization, Detention, and Drainage. Licensee shall have no water channelization, canals, detention facilities, or ditches on the Licensed Property, including but not limited to any channels, canals, detention facilities, ditches, or altered drainage patterns arising from Licensee's Hike and Bike Trails located on adjacent or nearby property. Licensee shall maintain current and natural drainage patterns and shall be solely responsible for the drainage of the Hike and Bike Trails and all adjoining property. Licensee shall further be responsible for obtaining, at its sole cost and expense, all necessary permits and/or approvals for the construction, installation, maintenance, operation and/or use of the Hike and Bike Trails from the Harris County Flood Control District or any other governmental agency of any kind having jurisdiction over the Licensed Property. Licensee shall be solely responsible for any damages to the Licensed Property and Licensor's adjoining property relating to drainage, channelization, canals, detention facilities, or ditches on the Licensed Property.

19. Lighting. Licensee may, at its sole cost and expense, install and maintain adequate security lighting, along with all related appurtenances, conduits, conductors, switches and devices, along the Hike and Bike Trails. Only low profile lighting, not to exceed 6 feet in height, shall be installed by Licensee along the Hike and Bike Trails. Licensee shall address the details of its proposed security lighting installation in the plans to be submitted to Licensor for approval

prior to the construction, installation, maintenance, operation and/or use of the Hike and Bike Trails.

20. Signage. Licensee will be solely responsible for installing and maintaining adequate signs along the Hike and Bike Trails to address matters such as: hours of operation, prohibited activities, appropriate cautionary statements, and an acknowledgement of Licensor's ownership (where applicable) of the Licensed Property. Details concerning such signage will be addressed in the plans to be submitted to Licensor for approval prior to the construction, installation, maintenance, operation and/or use of the Hike and Bike Trails.

21. Contractor/Subcontractor Insurance. At all times during the term of this Agreement, Licensee shall cause its contractors to procure and maintain in full force and effect, at the contractor's sole expense, insurance of the following types and amounts, written by insurance companies satisfactory to Licensor having an A.M. Best's Rating of not less than "A- VII" and authorized to do business in the State of Texas.

a. Workers' Compensation. Each contractor shall carry statutory workers' compensation insurance covering the contractor's employees in compliance with all requirements of the workers' compensation laws of the State of Texas.

b. Employer's Liability. Licensee's contractors shall carry employer's liability insurance covering the contractor's operations and work under this Agreement or involving the Licensed Property in an amount not less than the following:

Each Accident	\$1,000,000
Each Disease Each Employee	\$1,000,000
Disease Policy Limit	\$1,000,000

c. General Liability. Each contractor shall carry general liability insurance on a form no less broad than the coverage provided by a "Commercial General Liability Insurance" form (dated 2004 or thereafter) promulgated by the Insurance Services Office, and containing language affording coverage for contractual liability, the products and completed operations hazards, broad form property damage liability, and the explosion, collapse and underground hazards, as respects all recreational use(s), operations and work hereunder, for all liability arising out of injury to or death of one or more persons, and injury to or destruction of property, in any one occurrence, in amounts not less than the following:

General Aggregate	\$ 2,000,000
Products Comp/Ops Aggregate	\$ 1,000,000
Personal & Advertising Injury	\$ 1,000,000
Each Occurrence	\$ 1,000,000

d. Automobile Liability. Each contractor shall carry commercial automobile liability insurance on a form no less broad than the coverage provided by a Business Automobile Liability Insurance form (dated 2004 or thereafter) promulgated by the Insurance Services Office, on all owned or hired autos, as well as non-owned autos, in an amount not less than \$1,000,000 (combined single

limit), for all liability arising out of injury to or death of one or more persons, and injury to or destruction of property, in any one occurrence.

- e. Excess Liability. Each contractor shall carry excess liability insurance that follows the form of the underlying primary liability insurance required by Sections 21(b), 21(c), and 21(d), in an amount not less than \$10,000,000 per occurrence and \$10,000,000 in the aggregate, unless lower amounts for a contractor have been agreed to in writing by Licensor prior to work by the contractor.
- f. Deductibles. Any and all deductibles, or self-insured retentions, of all insurance policies required hereunder shall be assumed by, for the account of, and at the contractor's sole risk and expense, and shall not be billed to or payable by Licensor, or its direct and indirect subsidiaries and affiliates, including limited liability companies.
- g. Additional Insureds. The insurance required by this Section shall include Licensor, including its direct and indirect subsidiaries and affiliates, including limited liability companies, as additional insureds with respect to all recreational use(s), operations, and work under this Agreement or involving the Licensed Property, as to the full limits of liability purchased by the contractor (including limits greater than the minimum limits required herein), and shall include language providing:
 - i. that such insurance applies separately to each insured against whom claim is made or suit is brought; and coverage to Licensor, including its direct and indirect subsidiaries and affiliates, including limited liability companies, no less broad than one or the other of the following alternatives: (a) the coverage afforded to the named insured under the policy with respect to the recreational use(s), operations, and work under this Agreement; or (b) the coverage afforded by the combination of Insurance Services Office Endorsements' CG 20 33 07 04 (entitled "Additional Insured – Owners, Lessees or Contractors – Automatic Status When Required in Construction Agreement with You") and CG 20 37 07 04 (entitled "Additional Insured – Owners, Lessees or Contractors – Completed Operations"); and,
 - ii. that such insurance shall respond as primary insurance and shall not require contribution from any other insurance that may be maintained by Licensor, or its direct and indirect subsidiaries and affiliates, including limited liability companies.
- h. Waiver of Subrogation. The insurance required by this Section shall include full waivers of subrogation in favor of Licensor, including its direct and indirect subsidiaries and affiliates, including limited liability companies.

- i. Certificates of Insurance. Each contractor shall furnish Licensor with certificates of insurance signed by the contractor's insurance agent, showing the contractor's procurement of the insurance required hereunder. Each such certificate shall accurately reflect insurance in place, shall be in a form satisfactory to Licensor, and shall contain language:
 - i. expressly and specifically referring to this Agreement;
 - ii. providing that thirty (30) days written notice (except ten (10) days written notice in the case of nonpayment of premium) shall be given to Licensor prior to cancellation of or material change in the coverage (and, the word "endeavor" or similar term used in the standard Accord form shall be stricken);
 - iii. confirming that Licensor, including its direct and indirect subsidiaries and affiliates, including limited liability companies, are additional insureds, as required by Section 21(g);
 - iv. confirming waiver of subrogation in favor of Licensor, including its direct and indirect subsidiaries and affiliates, including limited liability companies, as required by Section 21(h); and,
 - v. attaching the endorsement(s) by which Licensor, including its direct and indirect subsidiaries and affiliates, including limited liability companies, is made an additional insured, has a waiver of subrogation, and coverage is primary and non-contributing.

Licensee's contractors shall warrant and represent that each certificate of insurance furnished to Licensor is accurate and evidences contractor's procurement of the insurance required hereunder. Licensee's contractors shall provide Licensor with the written notice required by Section 21(i)(ii).

- j. Claims-Made Insurance. If the insurance required under this Section is procured on a form affording "claims-made" coverage, then (i) all limits stated above as "per occurrence" shall be understood to mean "per claim" or "per occurrence," as is consistent with the terms of the "claims-made" policy; and, (ii) such claims-made insurance shall not provide for a retroactive date later than the commencement of the contractor's performance under this Agreement. All insurance as required by this section shall be primary to any other insurance coverage purchased and shall be issued by an insurer authorized to do business in the State of Texas having an A. M. Best's Rating of not less than "A- VII."
- k. Reinstatement of Impaired Limits. In the event that the required aggregate limits of liability of any insurance required by this section are reduced or impaired by fifty percent (50%) or more, the contractor shall give Licensor notice of the impairment and promptly cause such impaired limits to be reinstated to the required limits.

- l. Subcontractors' Insurance. Each contractor shall cause its subcontractors, including all persons hired by the contractor who are not employees of the contractor, who perform any part of the work hereunder, to: (i) procure and maintain in full force and effect insurance of the types and amounts, and meeting the requirements described in Sections 21(a), 21(b), 21(c), 21(d) and 21(e), and (ii) comply with Sections 21(g), 21(h), 21(i), 21(j), 21(k), and 21(m).
 - m. Term of Required Insurance. All terms of these insurance requirements shall survive termination of this Agreement and shall continue until thirty (30) days past the final completion of all work or operations performed under this Agreement, including the performance of any warranty work. In addition, each contractor shall maintain in full force and effect completed operations coverage under the insurance policies required by general liability and excess liability, and any "claims-made" coverage under Section 21(j), for a minimum of two (2) years after final completion of all work or operations hereunder. Each contractor shall purchase an extended reporting period, or "tail coverage," if necessary to comply with the latter requirement.
 - n. No Waiver by Licensor. A contractor's failure to provide insurance as required hereunder, or failure to supply certificates of insurance that comply with Section 21(i), or the failure of Licensor to require evidence of insurance or to notify Licensee or contractor of any breach of the requirements of these provisions or deficiencies in the insurance obtained, shall not constitute a waiver by Licensor of any of the these insurance requirements, or a waiver of any other terms and conditions of this Agreement, including the contractor's and the Licensee's obligations to defend, indemnify, and hold harmless Licensor as required herein.
 - o. Policy Requirements. The foregoing insurance requirements are minimum requirements intended to benefit Licensor, shall not be interpreted to limit the Licensee's or contractor's liability to Licensor in any manner whatsoever; and, are separate from and independent of Licensee's or contractor's other obligations under this Agreement, including the obligations to defend, indemnify and hold harmless Licensor.
22. Licensee Insurance. At all times during the term of this Agreement, Licensee shall procure and maintain in full force and effect, at Licensee's sole expense, insurance of the following types and amounts, written by insurance companies satisfactory to Licensor having a Standard and Poor's Rating of not less than "A" and authorized to do business in the State of Texas.
- a. Workers' Compensation. Licensee shall carry statutory workers' compensation insurance covering the Licensee's employees in compliance with all requirements of the workers' compensation laws of the State of Texas.
 - b. Employer's Liability. Licensee shall carry employer's liability insurance covering the Licensee's operations and work under this Agreement or involving the Licensed Property in an amount not less than the following:

Each Accident	\$1,000,000
Each Disease Each Employee	\$1,000,000
Disease Policy Limit	\$1,000,000

- c. General Liability. Licensee shall carry general liability insurance on a form no less broad than the coverage provided by a "Commercial General Liability Insurance" form (dated 2004 or thereafter) promulgated by the Insurance Services Office, and containing language affording coverage for contractual liability, the products and completed operations hazards, broad form property damage liability, and the explosion, collapse and underground hazards, as respects all recreational use(s), operations and work hereunder, for all liability arising out of injury to or death of one or more persons, and injury to or destruction of property, in any one occurrence, in amounts not less than the following:

General Aggregate	\$ 2,000,000
Products Comp/Ops Aggregate	\$ 1,000,000
Personal & Advertising Injury	\$ 1,000,000
Each Occurrence	\$ 1,000,000

- d. Automobile Liability. Licensee shall carry commercial automobile liability insurance on a form no less broad than the coverage provided by a Business Automobile Liability Insurance form (dated 2004 or thereafter) promulgated by the Insurance Services Office, on all owned or hired autos, as well as non-owned autos, in an amount not less than \$1,000,000 (combined single limit), for all liability arising out of injury to or death of one or more persons, and injury to or destruction of property, in any one occurrence.

- e. Excess Liability. Licensee shall carry excess liability insurance that follows the form of the underlying primary liability insurance required by Sections 22(b), 22(c), and 22(d), in an amount not less than \$10,000,000 per occurrence and \$10,000,000 in the aggregate.

- f. Deductibles. Any and all deductibles, or self-insured retentions, of all insurance policies required hereunder shall be assumed by, for the account of, and at the contractor's sole risk and expense, and shall not be billed to or payable by Licensor, or its direct and indirect subsidiaries and affiliates, including limited liability companies.

- g. Additional Insureds. The insurance required by this Section shall include Licensor, including its direct and indirect subsidiaries and affiliates, including limited liability companies, as additional insureds with respect to all recreational use(s), operations, and work under this Agreement or involving the Licensed Property, as to the full limits of liability purchased by the contractor (including limits greater than the minimum limits required herein), and shall include language providing:

- i. that such insurance applies separately to each insured against whom claim is made or suit is brought; and coverage to Licensor, including its direct and indirect subsidiaries and affiliates, including limited liability companies, no less broad than one or the other of the following alternatives: (a) the coverage afforded to the named insured under the policy with respect to the recreational use(s), operations, and work under this Agreement; or (b) the coverage afforded by the combination of Insurance Services Office Endorsements' CG 20 33 07 04 (entitled "Additional Insured – Owners, Lessees or Contractors – Automatic Status When Required in Construction Agreement with You") and CG 20 37 07 04 (entitled "Additional Insured – Owners, Lessees or Contractors – Completed Operations"); and,
 - ii. that such insurance shall respond as primary insurance and shall not require contribution from any other insurance that may be maintained by Licensor, or its direct and indirect subsidiaries and affiliates, including limited liability companies.
- h. Waiver of Subrogation. The insurance required by this Section shall include full waivers of subrogation in favor of Licensor, including its direct and indirect subsidiaries and affiliates, including limited liability companies.
- i. Certificates of Insurance. Licensee shall furnish Licensor with certificates of insurance signed by the contractor's insurance agent, showing the contractor's procurement of the insurance required hereunder. Each such certificate shall accurately reflect insurance in place, shall be in a form satisfactory to Licensor, and shall contain language:
- i. expressly and specifically referring to this Agreement;
 - ii. providing that thirty (30) days written notice (except ten (10) days written notice in the case of nonpayment of premium) shall be given to Licensor prior to cancellation of or material change in the coverage (and, the word "endeavor" or similar term used in the standard Accord form shall be stricken);
 - iii. confirming that Licensor, including its direct and indirect subsidiaries and affiliates, including limited liability companies, are additional insureds, as required by Section 22(g);
 - iv. confirming waiver of subrogation in favor of Licensor, including its direct and indirect subsidiaries and affiliates, including limited liability companies, as required by Section 22(h); and,
 - v. attaching the endorsement(s) by which Licensor, including its direct and indirect subsidiaries and affiliates, including limited liability companies, is made an additional insured, has a waiver of subrogation, and coverage is primary and non-contributing.

Licensee shall warrant and represent that each certificate of insurance furnished to Licensor is accurate and evidences contractor's procurement of the insurance required hereunder. Licensee shall provide Licensor with the written notice required by Section 22(i)(ii).

- j. Claims-Made Insurance. If the insurance required under this Section is procured on a form affording "claims-made" coverage, then (i) all limits stated above as "per occurrence" shall be understood to mean "per claim" or "per occurrence," as is consistent with the terms of the "claims-made" policy; and, (ii) such claims-made insurance shall not provide for a retroactive date later than the commencement of the contractor's performance under this Agreement. All insurance as required by this section shall be primary to any other insurance coverage purchased and shall be issued by an insurer authorized to do business in the State of Texas having an A. M. Best's Rating of not less than "A- VII."
- k. Reinstatement of Impaired Limits. In the event that the required aggregate limits of liability of any insurance required by this section are reduced or impaired by fifty percent (50%) or more, the contractor shall give Licensor notice of the impairment and promptly cause such impaired limits to be reinstated to the required limits.
- l. Term of Required Insurance. All terms of these insurance requirements shall survive termination of this Agreement and shall continue until thirty (30) days past the final completion of all work or operations performed under this Agreement, including the performance of any warranty work. In addition, each contractor shall maintain in full force and effect completed operations coverage under the insurance policies required by general liability and excess liability, and any "claims-made" coverage under Section 22(j), for a minimum of two (2) years after final completion of all work or operations hereunder. Each contractor shall purchase an extended reporting period, or "tail coverage," if necessary to comply with the latter requirement.
- m. No Waiver by Licensor. A contractor's failure to provide insurance as required hereunder, or failure to supply certificates of insurance that comply with Section 22(i), or the failure of Licensor to require evidence of insurance or to notify Licensee or contractor of any breach of the requirements of these provisions or deficiencies in the insurance obtained, shall not constitute a waiver by Licensor of any of the these insurance requirements, or a waiver of any other terms and conditions of this Agreement, including the contractor's and the Licensee's obligations to defend, indemnify, and hold harmless Licensor as required herein.
- n. Policy Requirements. The foregoing insurance requirements are minimum requirements intended to benefit Licensor, shall not be interpreted to limit the Licensee's or contractor's liability to Licensor in any manner whatsoever; and, are separate from and independent of Licensee's or contractor's other obligations under this Agreement, including the obligations to defend, indemnify and hold harmless Licensor.

23. **INDEMNITY.** TO THE FULLEST EXTENT PERMITTED BY THE TEXAS TORT CLAIM ACT AND THE TEXAS CONSTITUTION, LICENSEE HEREBY BINDS ITSELF, ITS SUCCESSORS, ASSIGNS, AND AGENTS TO PROTECT, DEFEND, INDEMNIFY AND HOLD HARMLESS LICENSOR, ITS EMPLOYEES, CONTRACTORS, SUBCONTRACTORS, AGENTS, DIRECTORS, OFFICERS, SHAREHOLDERS, AFFILIATES, SUBSIDIARIES, SUCCESSORS, ASSIGNS, AND THEIR RESPECTIVE EMPLOYEES, AGENTS, DIRECTORS, AND OFFICERS, FROM AND AGAINST ANY AND ALL LIABILITIES, DAMAGES, LOSSES, CLAIMS, DEMANDS, JUDGMENTS, COSTS, CAUSES OF ACTION, ACTIONS, AND SUITS (INCLUDING ALL COSTS THEREOF AND ATTORNEYS' FEES) OF EVERY KIND AND CHARACTER, WHICH ARISE IN FAVOR OF THE LICENSEE OR ANY THIRD PARTY (INCLUDING, BUT NOT LIMITED TO, THE GENERAL PUBLIC, PERSONNEL FURNISHED BY LICENSEE, AND LICENSEE'S CONTRACTORS AND SUBCONTRACTORS OF ANY TIER), ON ACCOUNT OF BODILY INJURY, DEATH, DAMAGE TO PROPERTY, TRESPASS, NUISANCE OR OTHER CAUSE OF ACTION ARISING OUT OF, INCIDENT TO, OR IN ANY WAY CONNECTED WITH THE CONSTRUCTION, INSTALLATION, OPERATION, USE, MAINTENANCE, REPAIR, MODIFICATION, REMOVAL OR PRESENCE OF LICENSEE'S HIKE AND BIKE TRAILS ON THE LICENSED PROPERTY OR THE GRANT OF RIGHTS TO THE LICENSEE FROM LICENSOR HEREUNDER, ALL REGARDLESS OF THE NEGLIGENCE OR FAULT OF LICENSOR, ITS EMPLOYEES, CONTRACTORS, SUBCONTRACTORS, AGENTS, DIRECTORS, OFFICERS, AFFILIATES, SHAREHOLDERS, SUBSIDIARIES, SUCCESSORS AND ASSIGNS, AND EVEN AS A RESULT OF THE JOINT, CONTRIBUTORY, COMPARATIVE, CONCURRENT, OR SOLE NEGLIGENCE OR FAULT OF LICENSOR, ITS EMPLOYEES, CONTRACTORS, SUBCONTRACTORS, AGENTS, DIRECTORS, OFFICERS, AFFILIATES, SHAREHOLDERS, SUBSIDIARIES, SUCCESSORS AND ASSIGNS.

THE PARTIES AGREE THAT LICENSEE SHALL SATISFY ITS OBLIGATION TO DEFEND LICENSOR BY: (i) PAYING THE ATTORNEYS' FEES, EXPENSES AND COSTS OF COUNSEL SELECTED BY LICENSOR; (ii) PAYING THE ATTORNEYS' FEES, EXPENSES AND COSTS OF COUNSEL SELECTED BY LICENSEE TO DEFEND LICENSOR, PROVIDED THAT SUCH COUNSEL SHALL BE SELECTED FROM THE LIST OF COUNSEL APPROVED BY BOTH LICENSOR AND LICENSEE AND IDENTIFIED ON EXHIBIT "D," AS IT MAY BE SUPPLEMENTED OR AMENDED FROM TIME TO TIME; OR (iii) PROCURING INSURANCE COVERAGE, IF AVAILABLE, TO PAY THE ATTORNEYS' FEES, EXPENSES AND COSTS OF COUNSEL SELECTED BY LICENSOR, PROVIDED THAT LICENSOR CONFIRMS IN WRITING ITS SATISFACTION IN ITS SOLE DISCRETION WITH SUCH INSURANCE COVERAGE AND FURTHER PROVIDED THAT LICENSEE SHALL REMAIN LIABLE HEREUNDER FOR ANY DEDUCTIBLE AND FOR ANY COSTS NOT COVERED BY SUCH INSURANCE.

24. **CONTRACTOR'S INDEMNITY.** Licensee shall require the following indemnity provision in the contracts between Licensee and all contractors performing work under this Agreement or on the Licensed Property:

AS PART OF THE CONSIDERATION FOR THIS AGREEMENT, CONTRACTOR HEREBY BINDS ITSELF, ITS SUCCESSORS, ASSIGNS, AND AGENTS TO PROTECT, DEFEND, INDEMNIFY AND HOLD HARMLESS CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC, ITS CORPORATE AFFILIATES AND THEIR RESPECTIVE OFFICERS, DIRECTORS, EMPLOYEES AND AGENTS, FROM AND AGAINST ANY AND ALL CLAIMS, DEMANDS, CAUSES OF ACTION, SUITS OR OTHER LITIGATION (INCLUDING ALL COSTS THEREOF AND ATTORNEYS' FEES) OF EVERY KIND AND CHARACTER ARISING IN FAVOR OF CONTRACTOR OR ANY THIRD PARTY (INCLUDING, BUT NOT LIMITED TO, PERSONNEL FURNISHED BY CONTRACTOR OR ITS SUPPLIERS AND SUBCONTRACTORS OF ANY TIER) ON ACCOUNT OF BODILY INJURY, DEATH, DAMAGE TO PROPERTY, TRESPASS, NUISANCE OR OTHER CAUSE OF ACTION IN ANY WAY OCCURRING, INCIDENT TO, ARISING OUT OF OR IN CONNECTION WITH THE WORK PERFORMED OR TO BE PERFORMED HEREUNDER OR OCCURRING, INCIDENT TO, ARISING OUT OF OR IN CONNECTION WITH THE PRESENCE OF CONTRACTOR PERSONNEL, AGENTS, SUPPLIERS AND SUBCONTRACTORS (AND THEIR RESPECTIVE PERSONNEL) ON THE LICENSED PROPERTY, ALL REGARDLESS OF WHETHER SUCH INJURY, DEATH OR DAMAGE IS CAUSED BY THE JOINT, CONCURRENT, CONTRIBUTING, COMPARATIVE, OR SOLE NEGLIGENCE OR FAULT OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC, ITS CORPORATE AFFILIATES, OR THEIR RESPECTIVE OFFICERS, DIRECTORS, EMPLOYEES OR AGENTS.

25. LIMITED LIABILITY. AS PART OF THE CONSIDERATION FOR THIS AGREEMENT, LICENSEE AGREES THAT LICENSOR, ITS ASSIGNEES, OR OTHER LICENSEES SHALL NOT BE RESPONSIBLE FOR ANY DAMAGES DONE TO THE LICENSED PROPERTY OR HIKE AND BIKE TRAILS AND RELATED APPURTENANCES ON THE LICENSED PROPERTY, AND, AS PART OF THE CONSIDERATION FOR THIS AGREEMENT, LICENSEE HEREBY RELEASES ALL SUCH CLAIMS THAT IT HAS NOW, OR MAY HAVE IN THE FUTURE FOR SUCH DAMAGES. IN NO EVENT SHALL LICENSOR OR ITS PARENT CORPORATION, SUBSIDIARIES, AFFILIATES, OFFICERS, DIRECTORS, EMPLOYEES, OR ANY COMBINATION OF THEM, BE LIABLE (IN CONTRACT OR IN TORT OR OTHERWISE, INCLUDING NEGLIGENCE, GROSS NEGLIGENCE, AND STRICT LIABILITY) TO LICENSEE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES, RESULTING FROM LICENSOR'S PERFORMANCE, NON-PERFORMANCE, OR DELAY IN PERFORMANCE.

26. No Real Property Interests; Limitations on Rights. Licensee acknowledges the following: (i) the License is not a right or interest in real property, and this Agreement does not confer, assign or create any right or interest in real property; (ii) Licensor makes no warranties or representations, express or implied, with respect to its title to any real property interest in the Licensed Property; (iii) the License and Licensee's rights hereunder are subject to all outstanding encumbrances to Licensor's title with respect to the Licensed Property; (iv) in each case where Licensor owns less than a fee title interest in a portion of the Licensed Property (e.g., where Licensor holds an easement or leasehold interest), Licensee's rights are limited to the rights of

License No. MA153184

Licensor, and subject to the same terms, limitations and conditions as those applicable to Licensor; (v) to the extent the grant of the License is subject to the approval of any landlord, grantor under an easement, or other third party, the grant of the License is subject to obtaining such approval; and (vi) to the extent the grant of the License herein would cause a default under any applicable lease or easement of Licensor, the License shall be deemed void with respect to such lease or easement, with the same effect as if never granted.

27. Notices. All written notices required under this License must be hand delivered or sent by certified mail addressed to the proper party at the following addresses:

To Licensor: CenterPoint Energy
P.O. Box 1700
Houston, Texas 77251
Attention: Manager, Surveying & Right-of-Way

To Licensee: City of Deer Park
610 E. San Augustine
Deer Park, TX 77536
Attn: Charlie Sandberg

28. Texas Law. This Agreement shall be construed under, and in accordance with, the laws of the State of Texas. Licensor reserves the right to deny access to the Licensed Property to Licensee or the general public if deemed necessary to comply with governmental laws or regulations. This License is performable in Harris County, Texas, and exclusive venue for enforcing same shall be Harris County, Texas.

29. Amendment. No amendment, modification, or alteration of the terms of this Agreement shall be binding unless it is in writing, dated subsequent to this Agreement, and duly executed by the parties hereto.

30. Exercise of Rights. No delay or omission by Licensor in exercising any right hereunder shall operate as a waiver or a forfeiture of such right.

31. Effective Date. This Agreement shall become effective following execution by Licensor and the countersignature by the City Controller for Licensee.

LICENSOR:

CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC

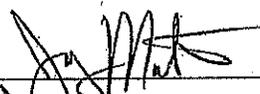
By: Matthew R. Dowell
Matthew R. Dowell
Manager, Land Management
Agent & Attorney-in-Fact

Date: January 4, 2021

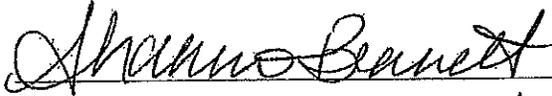
License No. MA153184

LICENSEE:

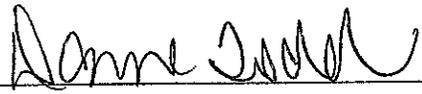
CITY OF DEER PARK

By: 
Name: Jerry Mouton Jr.
Title: Mayor
Date: 12/15/2020

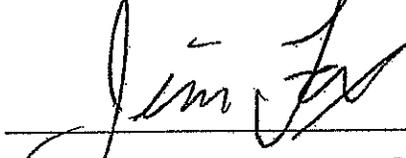
ATTEST/SEAL:


City Secretary Date: 12/15/2020

COUNTERSIGNED:


City Controller Date: 12-15-2020

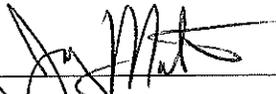
APPROVED AS TO FORM:


City Attorney Date: 12/15/2020

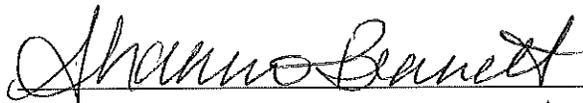
License No. MA153184

LICENSEE:

CITY OF DEER PARK

By: 
Name: Jerry Mouton Jr.
Title: Mayor
Date: 12/15/2020

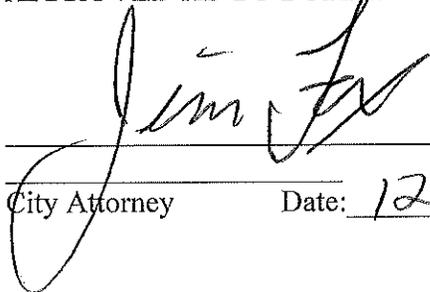
ATTEST/SEAL:


City Secretary Date: 12/15/2020

COUNTERSIGNED:

City Controller Date: _____

APPROVED AS TO FORM:


City Attorney Date: 12/15/2020

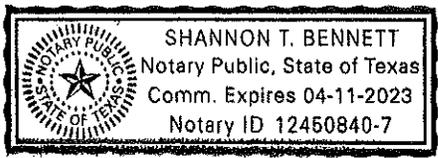
License No. MA153184

STATE OF TEXAS }

COUNTY OF HARRIS }

This instrument was acknowledged before me on December 15, 2020, by Jerry Moulton, Mayor of City of Deer Park, a political subdivision of the State of Texas, acknowledging they have full authority to execute the foregoing document and that they executed the same for the purposes and consideration therein expressed on the behalf of said political subdivision.

Shannon T. Bennett
Notary's Signature



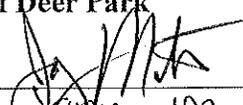
Shannon T. Bennett
(Name typed or printed)

License No. MA153184

Exhibit "A"
to the
Master License Agreement for
Hike and Bike Trails
between
CenterPoint Energy Houston Electric, LLC
and
The City of Deer Park, Texas

[Each Exhibit "A" will meet the requirements shown on Exhibit "E", include the signature block shown at the bottom of this form Exhibit "A" upon the signature of both Licensor and Licensee.]

City of Deer Park

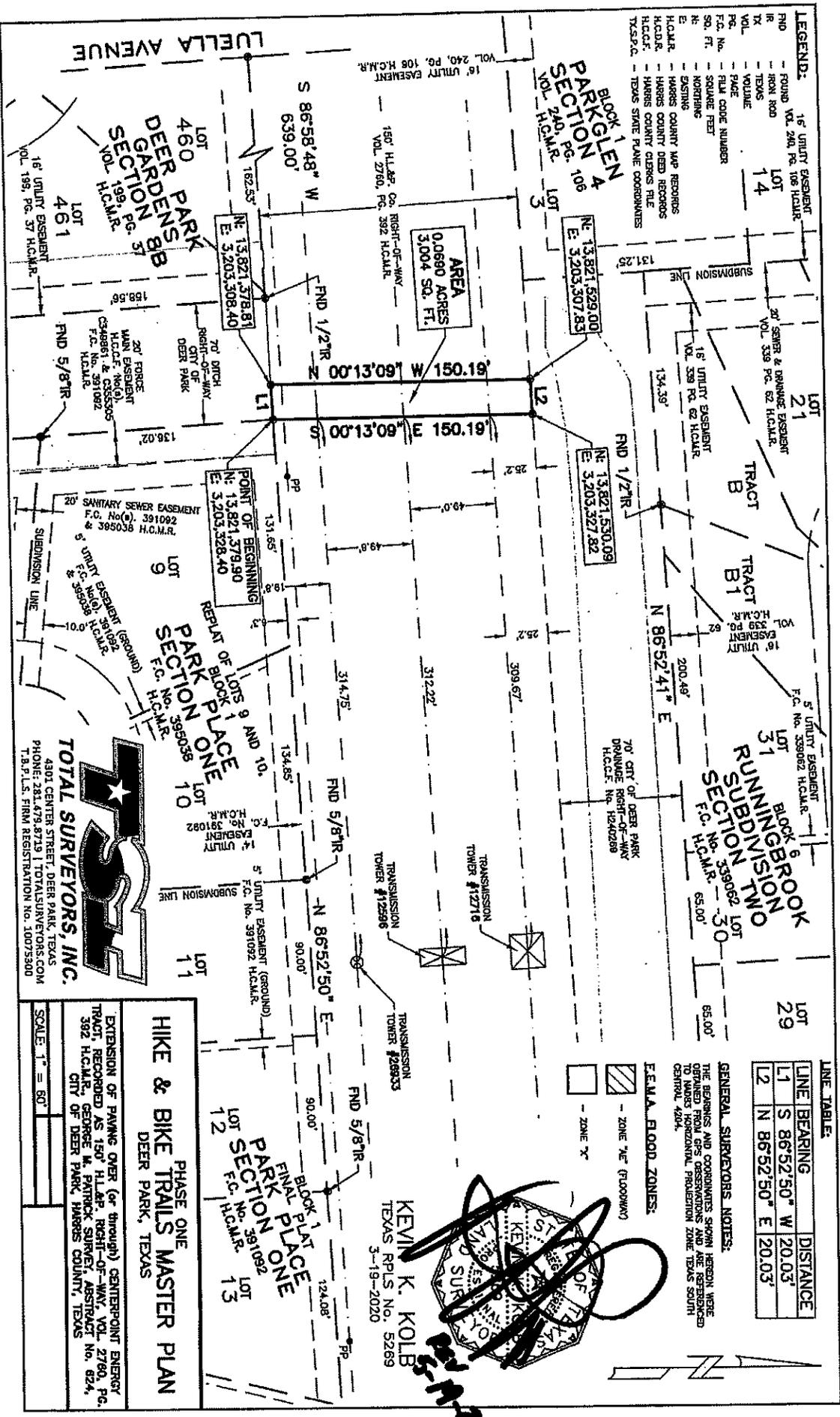
By: 
Name: Jerry Mouton Jr.
Title: Mayor
Date: 2/15/2020

CenterPoint Energy Houston Electric, LLC

By: _____
Name: _____
Title: _____
Date: _____

LEGEND:

- 16' UTILITY EASEMENT
- FOUND VOL. 240, PG. 108 H.C.M.R.
- FROM ROAD
- 14
- TRMS
- VOLUME
- FACE
- FILM CODE NUMBER
- SQUARE FEET
- NORTHING
- EXISTING
- HARRIS COUNTY MAP RECORDS
- H.C.M.R.
- HARRIS COUNTY DEED RECORDS
- H.C.D.R.
- HARRIS COUNTY CLERKS FILE
- H.C.C.F.
- TEXAS STATE PLANE COORDINATES
- TXS.P.C.



LINE TABLE:

LINE	BEARING	DISTANCE
L1	S 86°52'50" W	20.03'
L2	N 86°52'50" E	20.03'

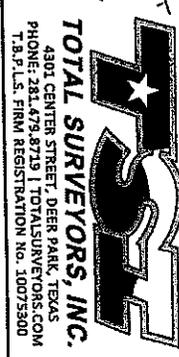
GENERAL SURVEYORS NOTES:

THE BEARINGS AND COORDINATES SHOWN HEREON WERE OBTAINED FROM GPS OBSERVATIONS AND ARE NEAR SOUTH TO NAD83 HORIZONTAL PROJECTION ZONE 16S TEXAS SOUTH CENTRAL 4823.

E.M.A. FLOOD ZONES:

- ZONE "A" (FLOODING)
- ZONE "X"

KEVIN K. KOLB
TEXAS RPLS No. 5269
3-19-2020



TOTAL SURVEYORS, INC.
4301 CENTER STREET, DEER PARK, TEXAS
PHONE: 281.479.8719 | TOTALSURVEYORS.COM
T.B.P.L.S. FIRM REGISTRATION NO. 10075300

HIKE & BIKE TRAILS MASTER PLAN
DEER PARK, TEXAS

PHASE ONE
EXTENSION OF PAVING OVER (or through) CENTERPOINT ENERGY TRACT, RECORDED AS 150' H.L.A.P. RIGHT-OF-WAY, VOL. 2780, PG. 392 H.C.M.R., GEORGE M. PATRICK SURVEY, ABSTRACT NO. 624, CITY OF DEER PARK, HARRIS COUNTY, TEXAS

SCALE: 1" = 60'

License No. MA153184

Exhibit "B"
to the
Master License Agreement for Hike and Bike Trails
between
CenterPoint Energy Houston Electric, LLC
and
The City of Deer Park, Texas

SPECIFICATION

**CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC
P. O. BOX 1700, HOUSTON, TEXAS 77251-1500**

A. CONSTRUCTION

Reference Drawings:

CenterPoint Energy Transmission Standards Manual

- Drawing No.: 006-203-01
006-203-02
006-203-04
006-203-07
GC3GATE
Hike and Bike Trail Specification

Reference Specifications:

- CenterPoint Energy #007-229-06
- Texas Health & Safety Code -- Chapter 752
- Federal Regulations, Title 29, CFR 1926.651, CFR 1910.333 ASTM C76
- Texas Highway Department Standard Specifications for Construction of Highways, Streets and Bridges: Item 162, Item 164, Item 166
- American Association of State Highway and Transportation Officials (AASHTO) 17TH Edition-2002

B. SPECIAL AND TECHNICAL CONDITIONS, FLEXIBLE BASE ROAD AND YARD PAVING

REFERENCE SPECIFICATIONS:

Texas Highway Department (THD)		Item 260
a/k/a Texas Department of Transportation (TxDOT)		
1972 Standards for Construction		Item 264
Of Highways, Streets and Bridges		Item 270
Texas Highway Department	Tex-101E-1966	ASTM C14-75
Test Methods	Tex-104E-1968	ASTM C76-75
	Tex 106E-1962	ASTM C506-75
	Tex 110 E 1968	ASTM C150-76
	Tex 114E-1965	ASTM D2487-69
	Tex 115E 1962	AWPA C1-73
	Tex-116E 1962	AWPA C2-73
		AWPA A5-76
		AWPA P8-64
		AWPA P9-73

NO.	DATE	REVISION SECTION(S) AFFECTED	BY	CH	APP
1	07/03/86	Created	RDT	RNM	REB
2	05/05/03	Revised all sections	LRS	LRS	MJP
3	02/18/08	Revised all - Split Sec. 9	LRS	LRS	MJP
4	10/20/09	Revised Sect. 4	LRS	LRS	MJP
5	01/19/12	Revised Gate & Access Widths	LRS	LRS	MJP
6	02/10/14	Overall Revision	MDL	LRS	JHD

SPECIFICATION			
SHEET 1 of 35 SHEETS			
SPEC ID	007	231	79

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1.0 SCOPE

- a. This specification covers the requirements that a Grantee/Contractor shall adhere to when performing work on the property of CenterPoint Energy.
- b. At the time of this revision, the active Company Representatives for these specifications and or their successors are:

Ms. Janice Coburn
Office 713-207-6138
Cell 281-460-0635

Mr. Lee R. Stoerner
Office 713-207-6480
Cell 713-906-5473

Mr. D. Scott Humble
Office 713-207-6747
Cell 713-855-7836

Mr. Mark Twardowski
Office 713-207-6481
Cell 281-935-4671

Office Fax 713-207-4031

2.0 DEFINITIONS

- a. Company – CenterPoint Energy Houston Electric, LLC, which also may be referred to as Grantor in associated documents.
- b. Company's Representative - The person or persons designated in the agreement to inspect the work performed on Company Property.
- c. Company's Property - All property in which the company has an interest (easement or fee) including distribution easements, district office locations, and substations as they pertain to transmission use including towers, poles and wires, which also may be referred to as Grantor's Property in associated documents
- d. Agreement – The written contract, letter agreement, or Document by which the company formally authorizes the use of its property by an outside party
- e. Grantee - The actual owner, developer, lessee, private person, partnership, company, corporation or governmental entity that is responsible for the maintenance and control of the facility or work authorized by the Agreement, which also may be referred to as Grantee in associated documents.
- f. Contractor – Any individual or business firm, separate from the grantee, but contracting to perform or supply part or all of the activity or facilities under the Grantee.

SPECIFICATION			
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- g. Subcontractor - Any individual or business firm, separate from the contractor, but contracting to perform or supply part or all of the activity or facilities under the Contractor. Any work performed by the Subcontractor and its agents or employees shall comply with the provisions of the Agreement as if they were employees of the Contractor.

3.0 GENERAL REQUIREMENTS FOR CONSTRUCTION

- a. The following General Requirements in this section are applicable to a Grantee/Contractor requesting permission to perform construction work on Company's Property. The Special Requirements in other sections apply in addition to these General Requirements.
- b. Any violation of the requirements contained herein shall be considered as grounds, by the Company's Representative, to stop the construction until corrective actions are taken.
- c. No work shall be performed on Saturdays, Sundays or holidays on Company's Property unless approved by the Company's Representative forty-eight (48) hours in advance.
- d. The Grantee/Contractor shall furnish to the Company's Representative access at all times to the work being done and to the premises used by the Grantee/Contractor, and shall provide every reasonable accommodation for the purpose of inspection, even to the extent of discontinuing portions of the work temporarily, or of uncovering or taking down portions of finished work.
- e. Upon project completion, the Grantee/Contractor shall return Company's Property to its original condition or better, including roads, fences, and gates.

 - The Grantee/Contractor shall grade Company's Property to a smooth finish, and all excess material shall be either removed from, or distributed on Company's Property as directed by the Company's Representative.
 - All swales, ditches, and other surface graded areas disturbed during construction shall be seeded with Bermuda grass in accordance with Texas Highway Department Item 164. Fertilizer application shall conform to Texas Highway Department Item 166 and shall have an analysis of 16-8-8.
 - All debris, vegetation or cleared materials shall be removed from Company's Property by the Grantee/Contractor, including:

 - ❖ Trash, rubble and any flammable materials.
 - ❖ Sand, concrete and construction materials.

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- ❖ Containers of any type or character for the purpose of storing trash.
- ❖ Any material defined in environmental regulations as a solid waste, regulated toxic material or hazardous material.

f. DOCUMENTATION REQUIREMENTS

- The Grantee/Contractor shall have a copy of the signed Agreement at all times at the construction site where the operation of equipment is within Company's Property. It is the Grantee's responsibility to provide a copy of this specification to the Contractor and to ensure that all the provisions in the Agreement are followed.
- Any necessary field changes or modifications to the Agreement must be approved in writing by the Company's Representative prior to construction by the Grantee/Contractor.
- It is the Grantee/Contractor's responsibility to examine all the available records and to make a field inspection of the site and Company's Property for determination of the surface conditions and surface water conditions to be encountered, and the character of equipment and facilities needed for the desired work.

g. NOTIFICATION REQUIREMENTS

- The Grantee/Contractor shall be responsible for notifying all parties having an interest in or an easement on, under or above the subject Company's Property. The construction requirements of the parties with prior rights shall be observed; however, the Company's Specification for Construction shall be adhered to as a minimum.
- The Grantee/Contractor shall notify the Company's Representative seven (7) days prior to beginning any type of work so that an inspection of Company's facilities and/or properties can be arranged. The Grantee/Contractor shall provide the name and telephone number of their representative responsible for the construction activities to coordinate a preliminary inspection. The executing party of the Agreement shall pay the repair cost for damages to Company's facilities caused by the Grantee/Contractor.
- The Grantee/Contractor shall be responsible to call the One-Call Network at "8-1-1", forty- eight (48) hours prior to construction, to locate the Company's underground fiber optics line, and/or underground distribution facilities, and/or underground transmission facilities.

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h. DAMAGE MITIGATION REQUIREMENTS

- Any use of land necessary by the Grantee/Contractor's operations which causes damage to property, crops, etc. shall be mitigated by the Grantee/Contractor at his expense.
- Any damage to Company's facilities or Company's Property caused by the Grantee/Contractor's operations shall be mitigated by the Grantee/Contractor at his expense.

i. SAFETY AND EQUIPMENT REQUIREMENTS

- It shall be the Grantee's responsibility to ensure that the Contractor be familiar with and comply with all local, state, and federal codes (i.e. Texas Health and Safety Code Chapter 752 and Federal Regulations, Title 29, CFR 1910.333, CFR 1926.1407-1411) for construction operations in close proximity to electrical power lines. The Grantee/Contractor shall comply with all applicable federal, state, and local environmental regulations concerning the loading and transportation of hazardous materials.
- The Grantee/Contractor shall take all precautions necessary, shall be responsible for the safety of the work, and shall maintain all lights, guards, barriers, barricades, signs, temporary passageways, or other protection necessary for that purpose. The work shall be carried on to completion without damage to any work or property of the Company or of others and without interference with the operation of existing machinery or equipment.
- The Grantee/Contractor shall be responsible at all times for the safety of the general public and for the protection of persons who may for any reason enter within the limits of his work and shall comply with all the laws of the State of Texas and the United States and with all valid rules and regulations now in force or hereafter adopted pursuant thereto. Effective barricades with acceptable warning and detour signs shall protect roads and highways closed to traffic. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset to sunrise. The Grantee/Contractor shall bear the entire expense and shall not be reimbursed directly or separately by the Company for providing and maintaining all necessary or required barricades, warning lights, danger signals, signs or other precautions for the protection of the work and safety of the public.

SPECIFICATION			
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- If at any time the Grantee/Contractor's methods, materials or equipment appear to the Company's Representative to be unsafe, inefficient or inadequate for securing the safety of the workers, the public, or any Company's facilities, he may order the Grantee/Contractor to increase his safety, efficiency and adequacy, and the Grantee/Contractor shall comply with such orders. The failure of the Company's Representative to make such demands shall not relieve the Grantee/Contractor of his obligation to secure the quality and safe conduct of the work, and the grantee/Contractor alone shall be and remain liable and responsible for the safety, efficiency and adequacy of his methods, materials, working force and equipment, irrespective of whether or not any changes are made as a result of any orders received from the Company's Representative.
- The Grantee/Contractor shall immediately remove from the job, whenever requested to do so by the Company's Representative, any person considered to be disposed or disorderly, or for any other reason unsatisfactorily complying with the requirements of this specification, and such person shall not again be employed on the work without the consent of the Company.
- The Grantee/Contractor shall not permit or suffer the introduction or the use of intoxicating liquor or narcotic drugs upon any of the grounds occupied or controlled by the Company.
- No structure of any type shall be constructed on Company's Property unless a final set of detailed drawings have been reviewed and approved by the Transmission Operations Department. Structures include but are not limited to signs, fences, paving, lighting, drainage facilities, etc. All structures of any type must be properly grounded.
- No temporary fuel tanks shall be stored on Company's Property unless prior written approval has been granted. Prior to approval, a specific location will be determined by the Company's Representative and the Grantee/Contractor. Fuel tanks within Company's Property must be adequately grounded and bermed for spill protection.
- No equipment or material shall be permitted on Company's Property at a height greater than 15 feet above natural ground elevation, unless approved by the Company's Representative. Cranes, lifts, etc. shall be blocked so that operators may not bring the boom to a greater height.
- Trenching and excavation will not be permitted within twenty (20) feet of any structure foundation or other facilities measured at ground level unless approved by the Company's Representative.

SPECIFICATION			
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- Excavation shall comply with CFR 1926.651. The installation of sheet piling, cribbing or other protective measures beyond the scope of CFR 1926 .651 will be required if stipulated by the Company's Representative.
- No self-propelled equipment shall be allowed directly beneath a lattice tower.

j. RIGHT OF WAY ACCESS REQUIREMENTS

- The Grantee/Contractor shall not sell, assign, or remove equipment or materials which have been installed by or which are owned by the Company and may be necessary for right-of-way access or any other activities without the written consent of the Company's Representative.
- No equipment, material, or railroad cars shall be stored on Company's Property without prior written consent.
- A minimum 20-foot wide access path along Company's Property shall be kept free of obstacles at all times to provide a passable area for the Company's equipment to travel.
- The Grantee/Contractor upon the request of the Company's Representative shall use matting on the right-of-way for temporary access on or across Company's Property.

k. DRAINAGE REQUIREMENTS

- Under no circumstances shall the natural drainage pattern of Company's Property be blocked or altered by construction. All previously existing ditches shall be re-established.
- All reinforced concrete pipes installed on Company's Property should be Class IV as specified by ASTM Specification C76 and should have a minimum of 12 inches of cover.
- All corrugated steel pipe and high density polyethylene pipe used for culverts and installed on Company's Property should be 16 gauges with 2 & 2/3" x 1/2" or 3" x 1" corrugations and have a minimum of 12 inches of cover or manufacturer's specified cover.
- The top of all manholes shall be built at final grade and must be capable of HS-20-44 loading, (A ASHTO 17th Edition-2002). All manholes must be protected with a minimum of four 6" diameter bollards made of wood or steel that are 6' long and set at least 24" in the ground with 48" above the ground.

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I. SPOILING REQUIREMENTS

- No spoiling is allowed unless written approval has been obtained.
- Spoiling, if allowed, shall be done as directed by the Company's Representative. The spoil material shall be free of concrete, asphalt, steel, wood, or any other objectionable material. Spoil material shall not be stockpiled or placed over any distribution manholes, pull holes, etc. The spoil material shall be spread in lifts not to exceed 12" and compacted as required by the Company's Representative. The end results of spoiling and grading shall yield positive drainage and flow with no ponding.
- The elevation beneath any of the Company's structures within the limits of the proposed work shall be maintained equal to or greater than the surrounding finished grade elevation. Spoil material, if approved in writing, shall not exceed a point six (6) inches below the top elevation of the concrete cap of a tower foundation. Any spoil material added beneath the tower shall be compacted to 95% density with a tamper or hand vibratory equipment and shaped to a smooth finish to provide proper drainage.

4.0 SPECIAL REQUIREMENTS FOR PIPELINES AND VALVE SITES, COMMUNICATION CABLES AND CABLE TELEVISION INSTALLATIONS

- a. Pipelines shall have a minimum cover of four (4) feet, measured from the top of the pipe to the natural ground level, unless otherwise specified in the Agreement.
- b. Pipelines to be installed within twenty (20) feet of any structure foundation shall be installed by either boring, tunneling, or other protective methods approved by the Company Representative. Where boring is performed, the hole shall not be more than one (1) inch greater than the outside diameter of the pipe and the protective coating or casing. Where tunneling is performed and column bents of concrete are used, the top of the concrete shall be a minimum of three (3) feet below ground level and the remainder of the column shall be filled and compacted at lifts not to exceed twelve (12) inches to 95% Standard Proctor density. De-watering will not be permitted unless approved by the Company's Representative.
- c. Trenches shall be backfilled, sufficiently compacted to prevent future settlement, and crowned as required by the Company's Representative. For any settlement that occurs as a result of access for the associated pipeline installation, the owner of the pipeline, upon request, shall fill or smooth the Company's right-of-way as directed.

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- d. No structure of any type shall be constructed on Company's Property unless described in detail in the formal agreement document, except for test point terminals and pipeline markers, which shall be installed in locations such that they do not create an obstruction to Company's equipment traveling within Company's Property.
- e. If at any time the pipe is abandoned, the pipe shall be removed by the pipeline owner. If the pipe cannot be removed because of possible damage to Company's facilities (tower foundation, poles, etc.), the pipeline shall be cut 20' away from each side of the Company facility and the abandoned pipe section filled with grout to prevent future caving or settling.
- f. Pipelines with a proposed location between a Company's structure and a down guy anchor or other appurtenance will be bored or tunneled unless specific approval has been granted by the Company's Representative.
- g. New or relocated pipeline occupations that are located between a lattice tower's foundations will require the Company to install "Mower Guards" (Company Drawing #006-203-07) at each tower at the expense of the requesting pipeline company.
- h. The following are additional requirements applicable to installations of valve and metering sites within Company's Property.
 - No valve site or station is to be located closer than fifty (50) feet to a transmission structure or appurtenance without exclusive written consent.
 - Valve sites or stations are to be located on Company's Property such that they do not limit access along Company's Property.
 - Valve sites or stations are to have perimeter barricades or fences installed in order to prevent damage from equipment traveling along Company's Property.
 - Valve sites or stations, plus an additional three (3) feet outside the site area, shall be kept free of high grass and weeds at all times by the valve owners.
 - Valve sites or stations are to be well marked with the owner's name and telephone number to be called in cases of emergency.
 - No blow-off vents or flares are to be located on Company's Property.
 - Grounding/Anode Beds will be treated as a Valve Site, separately from the pipelines.

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i. The following are additional requirements for pipeline crossings of the Company's underground electric distribution facilities.

- The Company will furnish upon Grantee/Contractor's request any drawings of the existing underground distribution facilities.
- If a crossing is required, the pipeline shall be installed beneath the Company's underground distribution facilities. A minimum vertical clearance of eighteen (18) inches must be maintained between the Company's underground distribution facilities and any other facilities (i.e. outside pipe wall to outside concrete encasement or pipe wall).
- If a pipeline is installed parallel to the Company's underground electric distribution facilities, a minimum horizontal clearance of five (5) feet must be maintained between the Company's underground distribution facilities and any other facilities (i.e. outside pipe wall to outside concrete encasement or pipe wall).
- If the Company's concrete encased duct bank is to be exposed during the installation or maintenance of a pipeline, the Company's duct bank must be fully supported every four (4) feet.
- Upon completion of the work, Grantee shall furnish the Company with a complete set of as-built drawings. Any substitutions or changes made by the Contractor/Grantee for the purpose of fabrication or installation shall be marked by Contractor/Grantee on those drawings and accompanied by a complete revised metes and bounds or centerline description if applicable.

j. COMMUNICATION CABLES AND CABLE TELEVISION INSTALLATIONS

- Overhead cables must be approved by a Representative from the Asset Planning and Optimization Transmission Encroachment & 3rd Party Use Department, for location and maximum and minimum height requirements.
- All underground occupations must be buried with a minimum 4.0' of cover and all above ground appurtenances must be approved for location.

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5.0 SPECIAL REQUIREMENTS FOR DRAINAGE DITCHES

- a. Ditch side slopes along Company's Property shall be "Asphalt Mulch Seeded" with Bermuda grass in accordance with Texas Highway Department, Item 164. Application of seed shall be at the rate of forty (40) pounds per acre. Asphalt Film Spray Emulsion SS-1, CSS-1, CMS-25, or MS-2 shall be used. This spray is to be applied at the rate of 0.2 to 0.4 gallons per square yard. Fertilizer application shall conform to Texas Highway Department, Item 166 and shall have an analysis of 16-8-8 urea form.

ALTERNATE: The Grantee/Contractor may use solid "Block Sodding" on ditch side slopes in accordance with Texas Highway Department, Item 162.

- b. Cement stabilized limestone and cement stabilized sand shall conform to Company's Specification #007-229-06, attached hereto and made a part hereof.
- c. Unless specified otherwise, the Grantee/Contractor shall install, for the exclusive use of the Company, a culvert crossing for access to Company's Property with a roadway width of twenty four (24) feet. The Grantee/Contractor shall install the roadway at the location stipulated in the Agreement or as determined by the Company's Representative.
- d. Ditch design shall be such that erosion and slope stability is controlled by flat side slopes, natural vegetation, riprap or other approved methods. The side slopes of ditches shall not be steeper than 4:1.
- e. The high bank of any ditch shall not be closer than twenty four (24) feet to any structure foundation measured at ground level unless approved by the Company's Representative. The high bank of any ditch shall not be closer than three (3) feet to any wood poles or appurtenances measured at ground level unless approved by the Company's Representative. If this is not possible, the wood poles will be braced or relocated by the Company at the Grantee/Contractor's expense.

6.0 SPECIAL REQUIREMENTS FOR STREETS, ROADS, HIKE AND BIKE TRAILS, AND PLAY GROUND EQUIPMENT

- a. Barricades to protect the Company's structures shall be installed as required before construction of the street or road begins.
- b. Unless specified otherwise, the Grantee/Contractor shall install, for the exclusive use by the Company, a twenty four (24) foot wide drive on both sides of the street or road. The Grantee/Contractor shall install the drive at the location stipulated in the Agreement or as determined by the Company's Representative. Curb cut-outs shall be installed with a five (5) foot radius.

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- c. Adequate drainage for Company's Property shall be provided and indicated on plan and profile drawings at each street or road crossing. Installation of drainage structures and/or shaping of the adjacent property to ensure proper drainage of Company's Property shall be done at Grantee/Contractor's expense.
- d. Hike and Bike Trail minimum standards are referenced on CenterPoint Energy Transmission Standard, Hike and Bike Trails, Minimum Standards Drawings. Subject to full review and subject to change based on the field notes.
- e. PLAY GROUP EQUIPMENT or ANY RECREATION FACILITIES is prohibited within Company's Property without any exception.

7.0 SPECIAL REQUIREMENTS FOR SPUR TRACKS

- a. Company's structures located within twelve (12) feet of the nearest rail of the proposed rail spur shall be relocated at the spur track owner's expense. The Company's construction forces will relocate the structures.
- b. For the exclusive use of the Company, the Grantee/Contractor shall install a twenty four (24) foot wide grade crossing over the spur track in accordance with local railroad specifications. Before construction can begin, the Grantee/Contractor shall assume responsibility for the exact location of the grade crossing with respect to the Company's right-of-way line as determined by the Company's Representative. If the spur right-of-way is to be cross-fenced, a twenty four (24) foot wide gate shall be installed in each cross fence at/and parallel to the grade crossing.
- c. The top rail elevation shall not exceed four (4) feet above the natural ground elevation of the Company's right-of-way.

8.0 SPECIAL REQUIREMENTS FOR PARKING FACILITIES

- a. Parking lot plans showing the area to be surfaced, curbs, fences, drainage and traffic access routes as applicable must be submitted to and approved by the Company's Representative prior to the granting of the Agreement.
- b. No through roads will be allowed along Company's Property; therefore, if the parking lot has multiple entrances, the lot must be so constructed that through traffic is not possible.
- c. Company's Property requested for parking must be immediately adjacent or substantially close to the Grantee's property.

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- d. The Grantee/Contractor shall be responsible for any damage to Company's facilities. This includes all existing structures as well as future structures. Barriers will be required if the proposed parking facility or any drives associated with the parking area are closer than ten (10) feet to any transmission facility. Barriers in accordance with Company's Drawing #006-203-01, 006-203-02, or 006-203-04, attached hereto and made a part hereof, shall be installed.
- e. If fences or traffic restrictors are placed across Company's Property, the Grantee/Contractor must install a twenty four (24) foot gate in accordance with Company's Drawing #GC3GATE, attached hereto and made a part hereof, on which the Company will install a chain and lock.
- f. The Company reserves the right to enter and traverse any parking facility as required for inspection, maintenance or construction purposes and reserves the right to cancel all or part of the agreement as may be required for the installation of future facilities or maintenance of existing facilities.

9.0 SPECIAL REQUIREMENTS FOR NURSERY OPERATIONS

- a. Liquid fertilizer is not allowed on Company's Property.
- b. No permanent sprinkler systems are allowed on Company's Property.
- c. Only containerized trees and plants will be allowed on nursery operations and only to a maximum height of ten (10) feet.
- d. No berms or earthen mounds will be allowed.
- e. The Company is not to be held responsible for any plants that may be damaged due to emergency repair of the Company's facilities.

10.0 SPECIAL REQUIREMENTS FOR DECORATIVE PLANTING

- a. No plants which at maturity are taller than ten (10) feet will be approved and subject to approval on a case by case basis. No planting shall be made closer than twenty (20) feet to any Company's structure.
- b. No trees of any type will be allowed.
- c. No berms or earthen mounds will be allowed.
- d. No permanent sprinkler systems are allowed on Company's Property.
- e. Liquid fertilizer is not allowed on Company's Property.

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- f. The Company reserves the right to have plantings removed by the Grantee/Contractor without notice. Should plantings not be removed, the Company will remove the plantings and not be liable for their replacement.
- g. Any vegetation placed within Company's Property without prior written approval may be removed by the Company. The Grantee/Contractor shall be responsible for reimbursing the Company for removal of unauthorized plantings.
- h. The Company is not to be held responsible for any decorative grass or plants that may be damaged.
- i. Grantee shall keep Company Property free of high grass, weeds, and trash within the area covered by the Agreement.

11.0 SPECIAL REQUIREMENTS FOR PROTECTING CULTURAL RESOURCES, ARCHAEOLOGICAL SITES, AND THREATENED AND ENDANGERED PLANTS AND ANIMALS

a. Archaeological and historical sites

- Known or potential archaeological or historical site(s)

- ❖ The Grantee/Contractor shall conspicuously mark the site areas in the field to ensure the areas are avoided by construction activities.
- ❖ If a site is determined to be located in a wooded area, any necessary vegetation clearing shall be done in such a manner that the root zone is not disturbed until an archaeologist has completed and investigation of the site, including removal of all artifacts. This may be accomplished by using manually operated chain saws or mechanical cutters to cut down trees at ground level and lifting them onto trucks for transport out of the right of way rather than dragging them. When archaeological work is completed, stump grinders may be used to remove the remaining portions of large trees below ground level, after which the surrounding surface can be prepared for construction. More specific procedures for avoidance or lessening of damage to sites will be decided on a site-by-site basis, or as directed by the State Historic Preservation Office.
- ❖ In certain circumstances, it may be necessary for vehicles to cross the identified archaeological/ historical areas. In such cases, loose earth fill, or other temporary ground cover, in a thickness necessary to prevent damage by the passage of vehicles over the site surface will be placed on such sites. The fill shall be a contrasting color or texture so as to allow re-establishment of the original site surface at a later date. The Grantee/Contractor shall document the placement and removal of such temporary fill.

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- Unknown archaeological or historical site(s)
 - ❖ Upon discovery of any evidence of an archaeological or historical site (e.g. accumulations of oyster shells or other seashells, pottery or pottery pieces, animal or human bones, rusted metal such as nails or cannon balls), all construction operations in the immediate vicinity shall cease. The Grantee/ Contractor shall promptly contact the Company's Representative.
 - ❖ The Company will contact qualified environmental contractors to investigate the discovered site in accordance with applicable procedures and guidelines. The area of significance will be conspicuously marked in the field so that construction activities may proceed while avoiding the site.
- Mitigation process
 - ❖ If a structure or site cannot be protected through any relocation, stabilization or restoration technique, then mitigation of the construction effects on archaeological and/or historical sites will be performed in accordance with applicable procedures and guidelines as directed by the State Historic Preservation Office.

b. Endangered or threatened plants and animals

- Known locations of species and/or their habitats
 - ❖ The company may provide the Grantee/Contractor any previously documented sites of any known endangered and threatened species that it has discovered along the construction route. Where such documentation is provided, the Grantee/Contractor shall implement any mitigating actions required by the Company.
- Unknown locations of species and/or their habitats
 - ❖ If during construction, the Grantee/Contractor discovers an endangered or threatened plant or animal species, the Grantee/Contractor shall cease all work in that immediate area. The Grantee/Contractor shall promptly notify the Company's Representative who will notify the appropriate State/Federal agencies for any required mitigating actions.

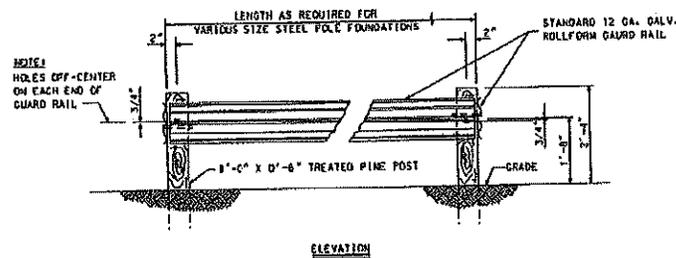
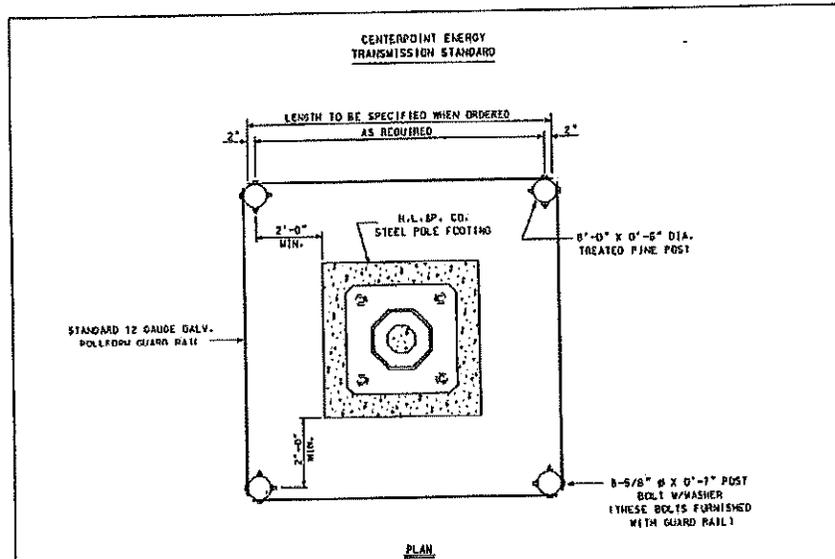
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❖ If during construction, the Grantee/Contractor discovers an endangered or threatened plant or animal species, the Grantee/Contractor shall cease all work in that immediate area. The Grantee/Contractor shall promptly notify the Company's Representative who will notify the appropriate State/Federal agencies for any required mitigating actions.

- Mitigation process

❖ Any mitigation concerning endangered and/or threatened species, applicable to the project construction, will be reviewed by the Company and communicated to the Grantee/Contractor. Only when necessary mitigation measures have been completed by the Grantee/Contractor will construction work be reinitiated

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FOR USE ON HOUSTON LIGHTING AND POWER CO.
RIGHTS-OF-WAY.

BARRIERS

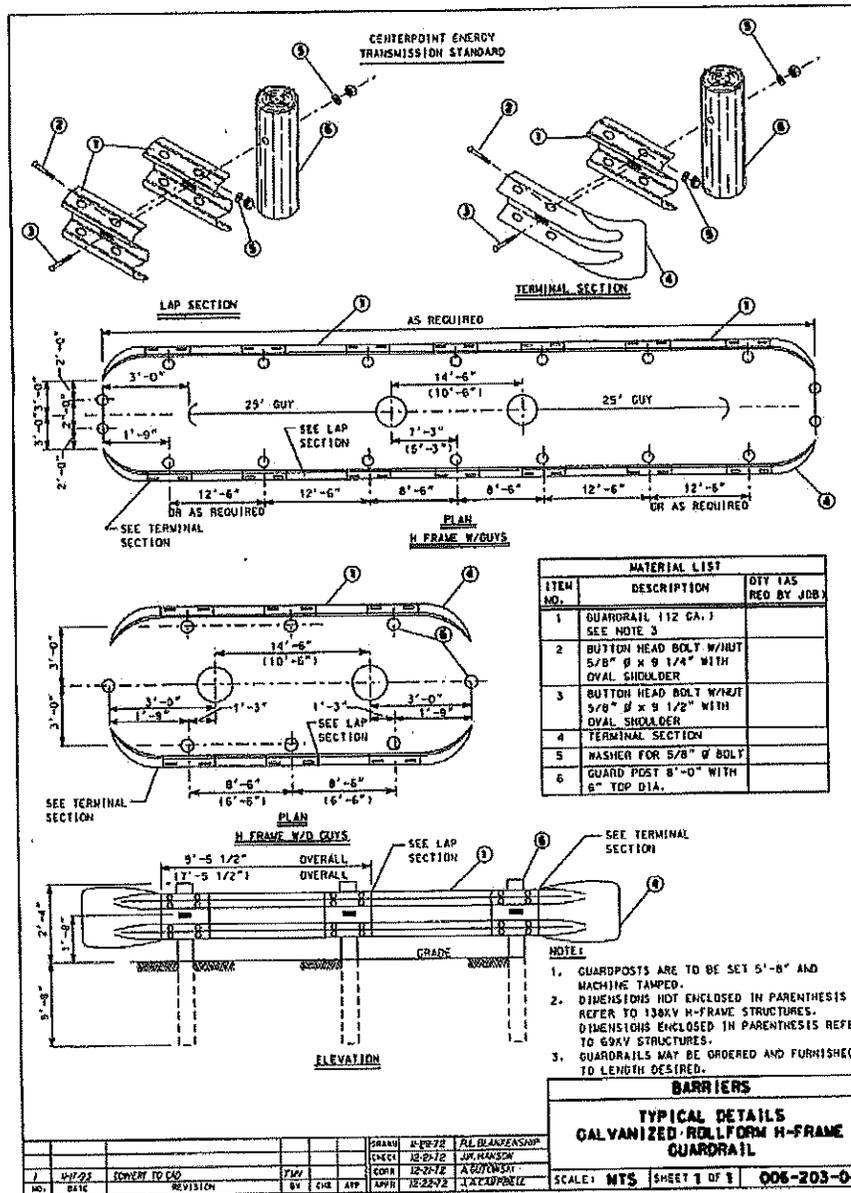
**TYPICAL DETAILS
GALVANIZED ROLLFORM
STEEL POLE GUARD RAIL**

NO.	DATE	REVISION	BY	CHK	APP	APPR	DRW	PROJ	FLY	REMARKS
1	11-19-93	CONVERT TO CAD	AKM				SS220			

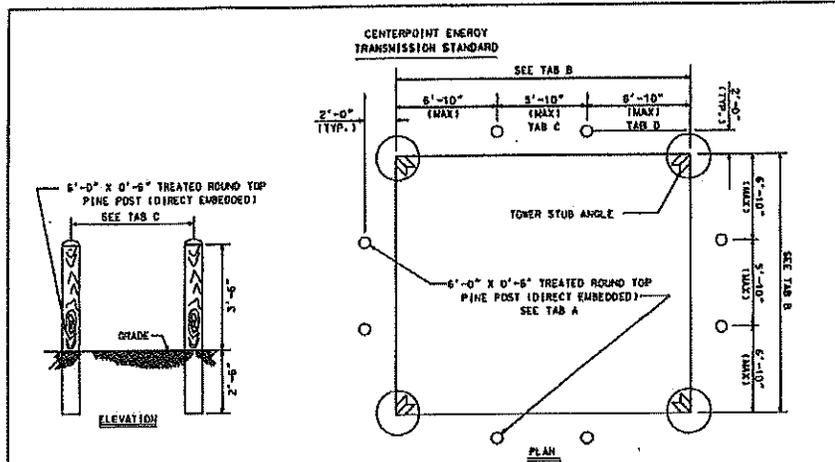
SCALE: **NTS** SHEET 1 OF 1 **006-203-02**

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DIMENSIONAL SPACING OF WOOD BARRIERS FOR SQUARE BASE TOWERS			
A	B	C	D
NO. OF BARRIERS PER SIDE	DIMENSION BETWEEN TOWER LEGS	DIMENSION BETWEEN BARRIERS	DIMENSION BETWEEN BARRIERS AND TOWER LEG
2 BARRIERS	14'-9" TO 17'-5"	4'-11" TO 5'-10"	EVENLY SPACED
	17'-6" TO 19'-6"	5'-10" (MAX)	5'-10 1/2" TO 6'-10" (MAX)
3 BARRIERS	19'-7" TO 23'-4"	4'-11" TO 5'-10"	EVENLY SPACED
	23'-5" TO 25'-4"	5'-10" (MAX)	5'-10 1/2" TO 6'-10" (MAX)
4 BARRIERS	25'-5" TO 29'-2"	5'-1" TO 5'-10"	EVENLY SPACED
	29'-3" TO 31'-2"	5'-10" (MAX)	5'-10 1/2" TO 6'-10" (MAX)
5 BARRIERS	31'-3" TO 35'-0"	5'-2" TO 5'-10"	EVENLY SPACED
	35'-1" TO 37'-0"	5'-10" (MAX)	5'-10 1/2" TO 6'-10" (MAX)
6 BARRIERS	37'-1" TO 40'-10"	5'-3 1/2" TO 5'-10"	EVENLY SPACED
	40'-11" TO 42'-10"	5'-10" (MAX)	5'-10 1/2" TO 6'-10" (MAX)
7 BARRIERS	42'-11" TO 46'-8"	5'-4 1/2" TO 5'-10"	EVENLY SPACED
	46'-9" TO 48'-8"	5'-10" (MAX)	5'-10 1/2" TO 6'-10" (MAX)

INSTRUCTIONS:

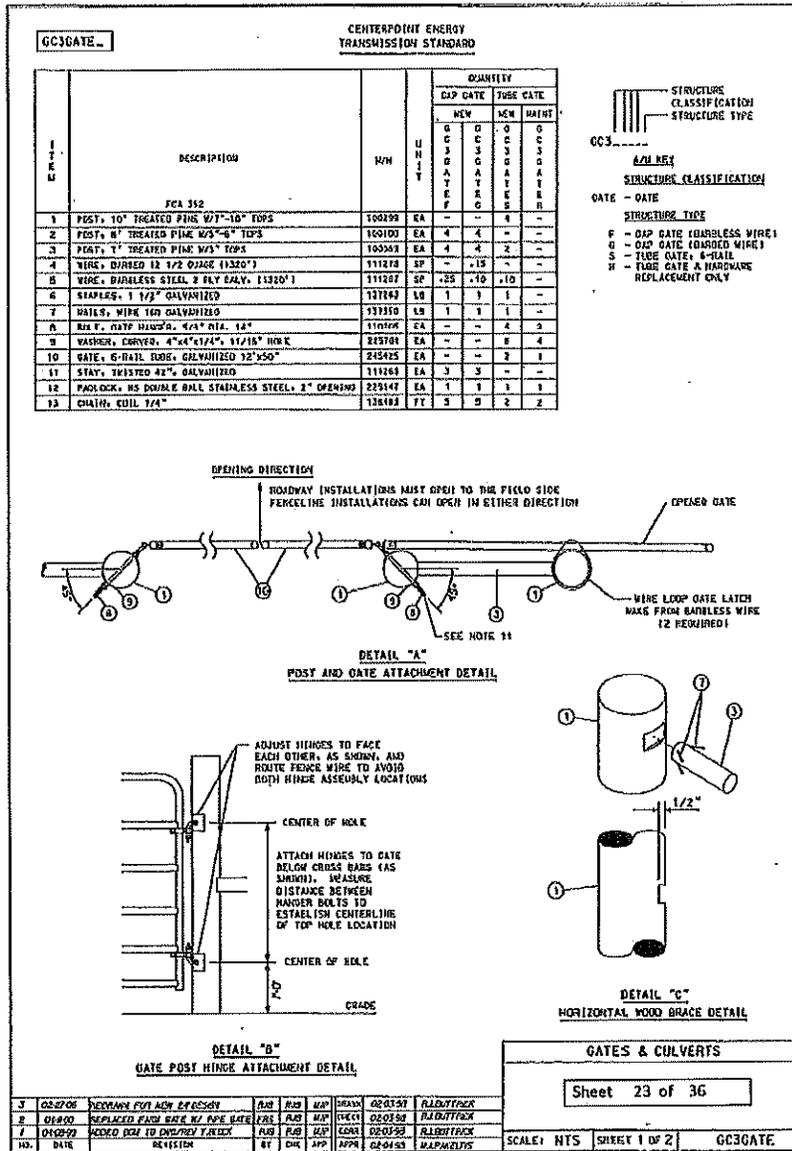
1. MEASURE DISTANCE BETWEEN TOWER LEGS AT STUB ANGLES.
2. LOCATE DIMENSION IN TAB "B".
3. DETERMINE BARRIER SPACING FROM TAB "C" AND "D". BARRIERS MAY BE SPACED EVENLY OR UP TO A MAXIMUM OF 5'-10" BETWEEN BARRIERS AND A MAXIMUM OF 6'-10" BETWEEN THE END BARRIER AND TOWER LEG.
4. BARRIERS TO BE LOCATED 2'-0" OUTSIDE THE PERIMETER OF THE BASE, MEASURED FROM THE STUB ANGLE (SEE PLAN VIEW).
5. POST TO BE SET 2'-6" DEEP
6. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES BEFORE DIGGING.

LOCAL POST SUPPLIERS: SAM BASSETT LUMBER
 ADDRESS: 3839 POLK STREET
 PHONE: 713-223-9154

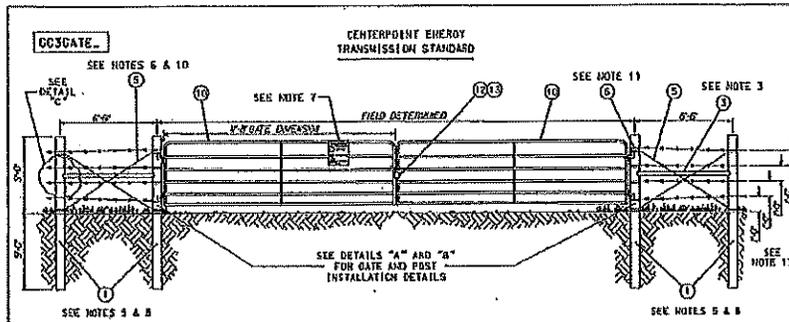
BARRIERS		
WOOD POST MOWER BARRIER INSTALLATION FOR TOWERS		
SCALE: NTS	SHEET 2 OF 2	006-203-07

NO.	DATE	REVISED POST SUPPLIER	BY	CHK	APP	DATE	BY	CHK	APP	DATE

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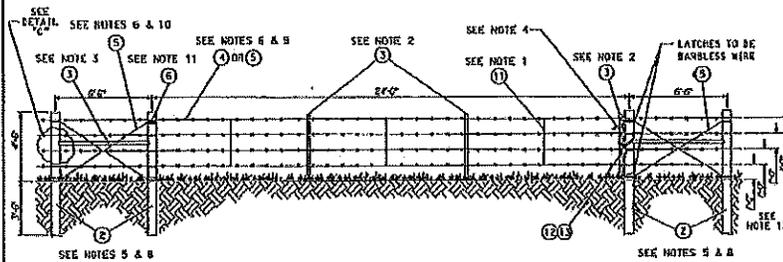


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TYPICAL 24' DOUBLE STEEL TUBE GATE

GC30GATE 24' TUBE GATE
GC30GATE 12' TUBE GATE REPLACEMENT



TYPICAL 24' GAP GATE

GC30GATEF 24' GAP GATE WITH BARBLESS WIRE
GC30GATE 24' GAP GATE WITH BARBED WIRE

NOTES:

1. 2" DIAMETER WOOD POST MAY BE SUBSTITUTED FOR STAYS, (NON-STOCK ITEM).
2. VERTICAL BRACE POSTS AND LATCH POST TO BE FABRICATED OUT OF POST FROM M/W 100089, CUT TO 4'-8".
3. HORIZONTAL BRACE POST TO BE FABRICATED OUT OF POST FROM M/W 100089, CUT TO 6'-6".
4. WOOD CHAIR TO BE FABRICATED FROM WOOD POST SCRAP.
5. ALL TIMBER AND POSTS SHALL BE TREATED IN ACCORDANCE WITH ANPA SPEC. 2-1, 2-5, 8-1 LATEST REVISION. FINAL NET RETENTION OF CREOSOTE TREATED BY ASSAY = 8 PCF.
6. ALL WIRE SHALL BE 12 1/2 GAUGE AND MUST MEET ASTM SPEC. A-122.
7. NOTICE SIGNS TO BE INSTALLED AT ALL ROADWAY INSTALLATIONS ON PROPERTY OWNED BY CENTERPOINT ENERGY. TO INSTALL NOTICE SIGN USE ASSEMBLY UNIT [SCHEDULE].
8. POSTS ARE TO BE FENCED WITH NATIVE BACKFILL.
9. BARBLESS WIRE TO BE USED WITHIN INCORPORATED CITY LIMITS.
10. BRACE WIRES ARE TO BE WRAPPED TWICE AROUND POSTS, PULLED, AND STAPLED.
11. WHEN DEPENDING WIRE, PULL UNDER FULL TENSION, WRAP TWICE AROUND POST, THEN TWICE AROUND WIRE, AND STAPLE SEVERAL PLACES ON POST.
12. ALL NUTS ON GATE BOLTS SHALL BE WELDED OR GATE BOLTS STRIPPED TO PREVENT REMOVAL.
13. WIRE SPACING MAY VARY IN ORDER TO BE COMPATIBLE WITH EXISTING FENCE.

GATES & CULVERTS

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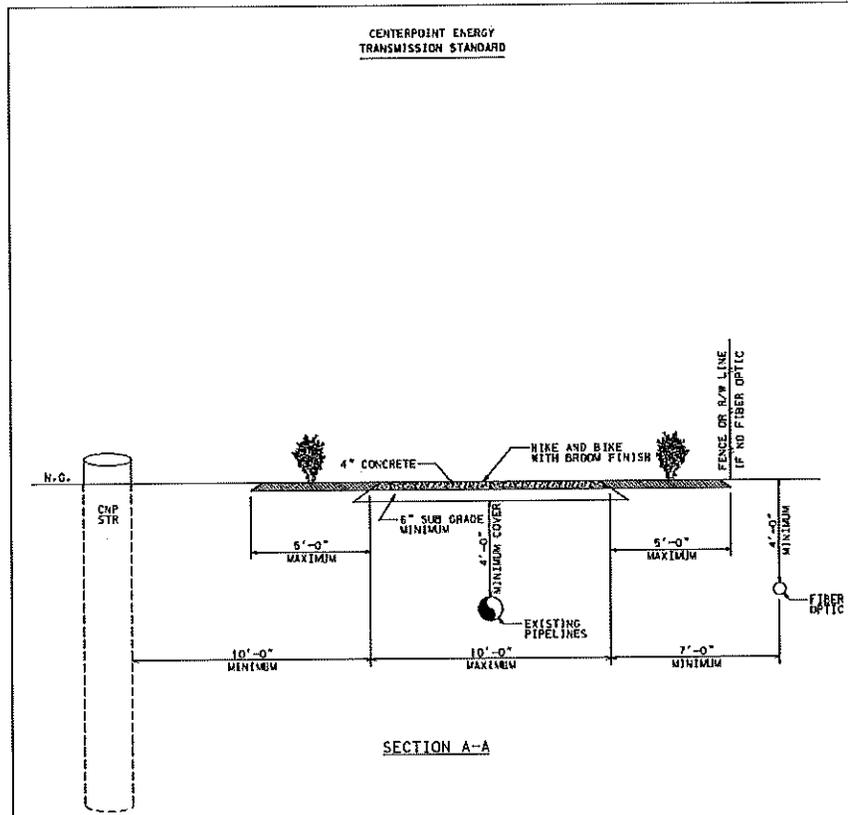
NO.	DATE	REVISION	BY	CHK.	APP.	DATE	DESCRIPTION
3	02-27-09	REDESIGN FOR NEW BY DESIGN	RUB	RUB	JUP	02-27-09	RJL/DT/TKC
2	04-28-09	REPLACED FURN GATE W/ PPK GATE	RUB	RUB	JUP	02-03-09	RJL/DT/TKC
1	01-08-09	MOVED ROW TO OVERLAY TAILRAIL	RUB	RUB	JUP	02-03-08	RJL/DT/TKC

SCALE: NTS SHEET 2 OF 2 GC30GATE

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SECTION A-A

										HIKE AND BIKE TRAILS		
										MINIMUM STANDARDS		
						DRWN	01-20-14	C. GREGG			SCALE: NTS	SHEET 2 OF 2
						CHKD	01-21-14	D. PLANE				
						ENGR	02-26-14	C. GREGG				
						APPR	02-27-14	C. GREGG				
NO.	DATE	REVISION	BY	CR	APP							

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12.1 SCOPE

- a. This specification covers the furnishing of labor, material, equipment, permits and supervision necessary for the installation of flexible base road and yard paving on CenterPoint Energy's property.

12.2 GENERAL

- a. The paving work shall be done in accordance with the CenterPoint Energy's Purchase Order, CenterPoint Energy's drawings, CenterPoint Energy's Job Specifications, General Conditions for Construction (CenterPoint Energy's Specification 007-231-79), this specification, the Texas Highway Department Standards (THD), American Society for Testing Materials Standards (ASTM), and the American Wood Preservers Association Standards (AWPA).
- b. In case of conflict, the order of precedence shall be the CenterPoint Energy's Purchase Order, CenterPoint Energy's Job Specification, CenterPoint Energy's drawings, this Specification, the General Conditions for Construction, and the THD, ASTM and AWPA Specifications.
- c. The equipment for proper prosecution of the work shall be at the work site and approved by the CenterPoint Energy's Representative prior to the beginning of construction operations.
- d. The Contractor shall maintain on the job site, at all times, a complete and readable copy of all specifications and any drawings provided by CenterPoint Energy governing the subject paving installation.
- e. No deviation from this specification will be permitted without authorization from CenterPoint Energy.

12.3 MATERIAL ESTIMATES

- a. The quantities indicated on the CenterPoint Energy's drawings are estimated by CenterPoint Energy utilizing plan dimensions, and shall be verified by the Contractor. If the Contractor detects any discrepancies in the quantities estimated by CenterPoint Energy, he should amend the figures on the inquiry sheet to reflect the quantities he has estimated. The quantities shown on the inquiry sheet by CenterPoint Energy, or as amended by the Contractor, shall be the quantities which appear on the purchase order when issued and will be the quantities for which the Contractor will be paid.

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12.4 SCHEDULING

- a. The Contractor shall state in his proposal the number of working days required to complete the job.
- b. The Contractor shall give CenterPoint Energy notice 72 hours prior to the start of construction.
- c. All work shall be performed between the hours of 7:00 a.m. to 7:00 p.m. Work shall not be performed on Saturdays or holidays without a 48 hour advance approval by CenterPoint Energy. Work shall not be performed on Sundays.

12.5 GRUBBING AND EXCAVATION

- a. The area to be paved shall be excavated and shaped to conform with the typical sections shown on the paving drawing.
- b. The area to be paved shall be "cleared and grubbed" removing and disposing of all trees, stumps, brush, roots and stripped of all vegetation, logs, rubbish and other undesirable matter to a depth of four (4) inches.
- c. Very soft or unstable soils that are deemed unfit due to high humus content, high water content, low density, etc., shall be removed to a depth determined by CenterPoint Energy.
- d. All holes, ruts and depressions shall be filled with material approved by the CenterPoint Energy's Representative.
- e. The Contractor shall not use excavated material as fill material without specific authorization from the CenterPoint Energy's Representative.
- f. The Contractor shall exercise care when grading, to stay clear of power lines, structures, pipes, septic tanks, fences or any underground facilities installed prior to the road and/or paving construction.
- g. The Contractor shall reimburse CenterPoint Energy for the repair or replacement of any of the previously mentioned equipment he damages.

12.6 SELECT FILL MATERIAL

- a. Select fill material shall conform to a CL (clay) or SM (sand) soil classification designated in ASTM D-2487 unless otherwise approved by the CenterPoint Energy's Representative.

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- b. Select fill material shall meet the following Atterberg limits:

Class A Fill Material

Liquid Limit 30-45
Plasticity Index 7.5 – 15

Class B Fill Material

Maximum Liquid Limit 35
Maximum Plasticity Index 20

12.7 SOIL STERILANTS

- a. When required, Krovar-1 and Dowpon soil sterilants shall be applied to the area to be paved at the rate of 30 lbs. of Krovar-1 and 30 lbs of Dowpon in 200 gallons of water per acre.
- b. The soil sterilants shall be applied by a state licensed applicator.
- c. The Contractor shall notify the CenterPoint Energy's Representative 48 hours prior to applying soil sterilants so that spraying operation may be inspected.
- d. Failure to abide by this shall be cause for the Contractor to re-spray the designated area at his expense.

12.8 CEMENT STABILIZED SOIL

- a. Soil that CENTERPOINT ENERGY requires to be stabilized with cement shall be done in accordance with THD Standards, Item 270.
- b. The entire area shall be stabilized to the depth shown on the CenterPoint Energy's paving drawings prior to the placement of the fill material.
- c. The amount of Portland cement will be specified by CenterPoint Energy as required by the soil conditions.
- d. The Contractor shall assume full responsibility for damage resulting from cement that has washed or blown off the subgrade.

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12.9 LIME STABILIZED SOIL

- a. Soil that CenterPoint Energy requires to be stabilized with lime shall be done in accordance with THD Standards, Items 260 and 264.
- b. The lime shall be furnished and spread as dry lime.
- c. The road and yard areas shall be stabilized to the depth shown on the paving drawings upon completion of grubbing operations and prior to the placement of any select fill.
- d. The amount of lime stabilization will be specified by CenterPoint Energy as required by the soil conditions.
- e. Sprinkling may be employed to reduce dusting problems during spreading, but excessive wetting of the lime shall be avoided until mixing operations commence.
- f. The Contractor shall assume full responsibility for damages resulting from lime that has washed or blown off the subgrade.

12.10 COMPACTION REQUIREMENTS

- a. All select fill material, stabilized soil, existing yard paving and excavated areas shall be compacted to 95% density as established by the Standard Proctor Density Test with moisture content within 2% optimum.
- b. The select fill material shall be compacted in lifts not to exceed eight (8) inches.
- c. The CenterPoint Energy's Representative shall approve the equipment the Contractor proposes to use for compaction of the fill material.
- d. CenterPoint Energy will check the in-place density using Nuclear Test Methods.

12.11 FORMING

- a. The forms for the paving shall be constructed of Southern yellow pine treated with pentachlorophenol.
- b. The pentachlorophenol solution shall be in accordance with AWPA P8 and AWPA P9, and shall contain a minimum of 5% pentachlorophenol by weight as determined by AWPA A5.
- c. The preservative treatment shall be by the Empty-Cell Process in accordance with AWPA C1 and C2.

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- d. The lumber shall be treated to 0.40 pounds per cubic foot final net retention of pentachlorophenol by assay.
- e. The forms shall be installed in accordance with the plans and shall be true in both horizontal and vertical planes.
- f. The forms shall be of the size, shape and type indicated on the plans.
- g. Forms and stakes shall be of sound heartwood and shall be free of knots, clustered birdseye, checks, splits, and sapwood. Occasional sound or hollow birdseye when not in clusters will be permitted, provided the board is free from any other defects that will impair its usefulness as a form.
- h. Any forms damaged beyond repair due to the Contractor's negligence shall be replaced at his expense.

12.12 CONCRETE PIPE

- a. All concrete pipe shall be constructed in accordance with ASTM C-14, Tongue and Groove.
- b. All reinforced concrete pipe shall be constructed to comply with ASTM C-76, Class IV, Wall B, Reinforced Concrete Pipe.

12.13 GRASS SEEDING

- a. The substation site shall be seeded with hulled Bermuda at the rate of 110 pounds per acre. Gulf Coast Rye shall also be planted with the Bermuda when the ground is 70°F or below. When Bermuda and Gulf Coast Rye are planted together they shall be proportioned as follows:

Bermuda: 50 pounds per acre
Gulf Coast Rye: 100 pounds per acre

- b. Seeding shall not be performed when the wind velocity would be detrimental to the uniform distribution of the seed.
- c. The area to be seeded shall be lightly raked to provide a seed bed.
- d. The required seed mixture shall be sown uniformly in accordance with the Manufacturer's recommendations.
- e. After sowing, the area shall be evenly raked to provide cover for the seeds.
- f. The lawn area shall be watered in a manner so as not to cause surface erosion.

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12.14 AGGREGATES

- a. The aggregates for the base and sub-base shall consist of one or more of the following: shell, sand, gravel, limestone, or granite gravel.
- b. The aggregates when properly slaked and tested shall conform to the following size requirements:

<u>AGGREGATE TYPE</u>	<u>U.S. STANDARD SIEVE SIZE</u>	<u>PERCENT RETAINED BY WEIGHT</u>	<u>MAX. LIQUID LIMIT</u>	<u>MAX. PLASTIC INDEX</u>
Oyster Shell	2"	0-12%		
	7/8"	12-37%		
	No. 40	50-85%		
	No. 200	88-100%	35	12
Sand	No. 10	0-5%		
	No. 20	5-20%		
	No. 50	75-90%		
	No. 100	95-100%	--	--
Gravel	1 3/4" Screen	0-10%		
	No. 4	30-75%		
	No. 40 Mesh Sieve	70-85%	35	12
Shell and Sand	1 3/4" Sieve	0-10%		
	No. 4 Sieve	40-65%		
	No. 40 Sieve	50-75%	35	12
Limestone	1 3/4" Sieve	0		
	3/4" Sieve	15-45%		
	No. 4 Sieve	45-75%		
	No. 40 Sieve	60-85%	40	12
Granite Gravel	3/8" to 3/4" Sieve	10-15%		
	No. 4	15-25%		
	No. 8	40-55%		
	No. 16	55-70%		
	No. 40	65-90%	32	14

- c. Local material suppliers shall be approved by CenterPoint Energy.
- d. The aggregate shall be free from excess salt, alkali, vegetable matter, clay or otherwise objectionable matter.

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- e. At the discretion of CenterPoint Energy, the following THD test methods will utilized to verify compliance with these specifications:

1. Tex-101-E, Preparation of Soil & Flexible Base material for Testing
2. Tex-104-E, Liquid Limit
3. Tex-106-E, Plastic Index
4. Tex-110-E, Sieve Analysis

12.15 CEMENT

- a. Cement shall be Type 1 of a standard brand of Portland cement and shall conform to the requirements of ASTM C-150.

12.16 GROUND BOXES

- a. Ground boxes will be set by CenterPoint Energy before final grading. The Contractor shall set the ground boxes to finish grade.
- b. The Contractor shall set ground boxes to grade over base line monuments.

12.17 STABILIZED BASE COURSES

- a. The approximate combination of aggregates stabilized with Portland cement or flue dust may be provided for the base or subbase in accordance with the following percent mixtures:

<u>Cement-Dual Base</u>		<u>Cement-Tri-Base</u>		<u>Flue Dust-Dual Base</u>	
Oyster Shell	60%	Oyster Shell	30-55%	Oyster Shell	60%
Sand	33%	Gravel	18-35%	Sand	33%
Cement	7%	Sand	35-45%	Flue Dust	7%
		Cement	1.17-7%		

- b. The percent of Portland cement in the Cement-Dual Base and the percent of flue dust in the Flue Dust-Dual Base shall be to the exact proportion given above.
- c. The percent of Portland cement in the Cement-Tri-Base will range from 1.17-7%, with the actual proportion given in the CenterPoint Energy purchase order.
- d. The Portland cement or flue dust stabilized base courses shall not be mixed or placed when the air temperature is 40°F (or below) and falling.

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12.18 MIXING

- a. The cement, aggregate and water shall be thoroughly mixed in a pugmill type mixer approved by CenterPoint Energy.
- b. The plant shall be equipped with feeding and metering devices which will add the aggregate, cement or flue dust and water into the mixer in the specified quantities.
- c. The moisture content of the mixture shall be maintained between optimum moisture and two percentage points above optimum moisture to protect against dehydration during shipment.
- d. The optimum moisture content and desirable density shall be determined by the Texas Highway Department test Method Tex-114-E, latest revision, and checked in the field by the Nuclear Method.

12.19 CONSTRUCTION METHODS

- a. The Contractor shall apply the base in lifts of not more than 6" or less than 3".
- b. After each lift is spread, it shall be sprinkled and rolled to secure maximum compaction with succeeding layers placed similarly until the course is completed. The material shall be tamped with floats and/or rolled with a roller weighing not less than three (3) tons.
- c. All areas and "nests" of segregated coarse or fine material shall be corrected or removed and replaced with well-graded material, then be sprinkled as required and rolled until a uniform compaction is secured.
- d. 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.
- e. When the uncompacted stabilized base mixture is wetted by rain so that at the time of final compaction the average moisture content exceeds the range specified in the test, the entire section shall be removed or additional stabilizer shall be added at the Contractor's expense.
- f. The stabilized base shall be compacted to a density of not less than 95 percent of compaction ratio density as established by the Standard Proctor Density Test. After completion of compaction, the surface that forms the ramp shall be thoroughly wetted and slush rolled to work sufficient mortar to the surface to provide a broom finish for the ramp.

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- g. Prior to each day's construction, a straight joint shall be formed by cutting back into the entire depth of completed work to form a true vertical face free of loose and shattered material.
- h. The stabilized base shall be protected against rapid drying for a period not less than three days.
- j. After the final course of the stabilized base is compacted, the surface shall be finished to grade and section by blading and shall be sealed with approved pneumatic tire or flat wheel rollers.
- k. The finished shape of the course shall be smooth and conform to the typical sections shown on plans, and to the established lines and grades. The surface shall be finished to a tolerance of 1/2 inch in ten (10) feet under a straight edge.
- l. Not more than two (20) hours shall elapse between the start of mixing and the time of starting the compaction of the stabilized base on the prepared subgrade.
- m. The compaction shall be completed within six (6) hours of the time water is added to the mixture.
- n. The CenterPoint Energy's Representative may at his/her option reject any stabilized material that is not in accordance with this specification.
- o. The Contractor shall erect and maintain sufficient barricades to prevent traffic on the newly paved area(s) for a period of 72 hours.

12.20 GRADING

- a. The Contractor shall surface grade the entire substation property including drainage facilities to provide a smooth finish and good drainage.
- b. In the event the paving installation is performed in two phases, the Contractor shall surface grade the substation area after each phase.
- c. When grading, it shall be the Contractor's responsibility to stay clear of power lines and structures. When pipes, septic tanks, or any other underground facilities have been installed prior to road and paving construction, care shall be taken to avoid damage during construction. If these structures are damaged due to the Contractor's negligence, they shall be replaced at his expense.

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12.30 JOB COMPLETION

- a. The Contractor shall remove all debris, scrap material, broken asphalt or concrete and any other objectionable material.
- b. Private property that was damaged during construction shall be repaired, replaced or otherwise corrected at the Contractor's expense.
- c. The unpaved areas shall be sufficiently smooth to allow machine mowing and drainage of all areas.
- d. All clean-up work and surface grading shall be complete before the final inspection by the CenterPoint Energy's Representative.

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License No. MA153184

Exhibit "C"
to the
Master License Agreement for Hike and Bike Trails
between
CenterPoint Energy Houston Electric, LLC
and
The City of Deer Park, Texas

Low-Growing Vegetation List

CenterPoint Energy carefully removes trees and controls the vegetation within its transmission line corridors to provide for a low-growing, predictable environment. Do not plant anything within a transmission right-of-way without first seeking approval from the CenterPoint Energy Surveying & Right of Way Department at 713-207-5769.

The following low-growing perennial plants grow to a mature height of 10 feet or less. Some species or varieties of xeric (requiring little water) plants are also included. For questions about low-growing species or varieties, please contact CenterPoint Energy at 713-207-2222 or 1-800-332-7143, and request that a company forester be notified to assist you.

Earth-Kind® Roses

The Texas AgriLife Extension Service of Texas A&M University has selected a variety of shrub roses it has designated as Earth-Kind® roses. This designation is based on the results of extensive research and field trials and is awarded only to those roses demonstrating superior pest tolerance, combined with outstanding landscape performance. These roses require no pesticides or fungicides to maintain a healthy appearance, and only limited fertilization will ensure a constant display of flowers from spring through the first heavy frost in the Fall. Earth-Kind® roses also require less watering than most other roses.

Earth-Kind® roses do well in a variety of soil types, ranging from well-drained acid sands to poorly aerated, highly alkaline clays. Once established, these roses also have excellent heat and drought tolerance, but they benefit from a three-inch layer of mulch and supplemental watering during dry periods, especially during the first year after transplanting. Another advantage of Earth-Kind® roses is that they are readily available at most plant nurseries in Texas, and the varieties listed here grow to less than 10 feet. All photographs and many of the descriptions contained in this section of the plant list are taken from the website, <http://aggie-horticulture.tamu.edu/earthkind/roses/cultivars/>, of the Texas AgriLife Extension Service and used with their permission.

Dwarf Shrub Roses:

'Marie Daly' Rose:

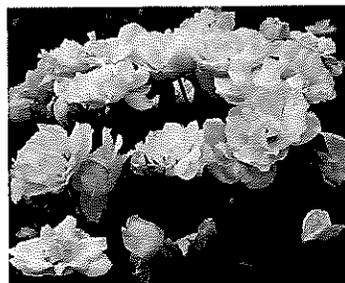
This fragrant, semi-double Polyantha rose with light pink blooms (fading to almost white in intense heat) has very few thorns. It needs full sun and good air circulation and well drained soil to do its best. 'Marie Daly' is an excellent choice for a low hedge or a formal mass planting bed and it can also be grown in individual containers.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'Marie Daly'	3'	3'	5'	Low-Moderate; tolerates salt	Spring-Fall	Needs full sun; hedges or formal beds

'Souvenir de St. Anne's' Rose:

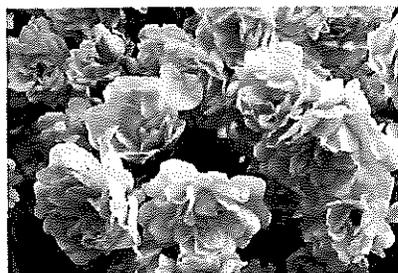
This Bourbon rose is rated by the Texas AgriLife Extension Service as the most fragrant of all the Earth-Kind® roses. It should be planted in full sun and have good air circulation. This variety is not recommended for areas having an elevated salt content in the water.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'Souvenir de St. Anne's'	3'	3'	5'	Low-Moderate; does not tolerate salt	Spring-Fall	One of the most fragrant varieties

'The Fairy' Rose:

This Polyantha rose has blooms that are medium to light pink blooms and fully double, relatively small in size, but they have little or no fragrance. It does well in a variety of temperatures and can be grown in all parts of Texas. "The Fairy" should be grown in full sun. This rose is a good candidate for hedges as well as mass bed plantings and can also be grown as a container plant.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'The Fairy'	3'	4'	6'	Low-Moderate	Spring-Fall	A great hedge rose; full sun; no fragrance

Small Shrub Roses:

'Cecile Brunner' Rose:

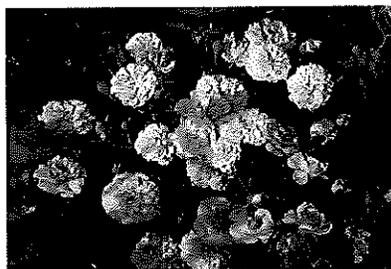
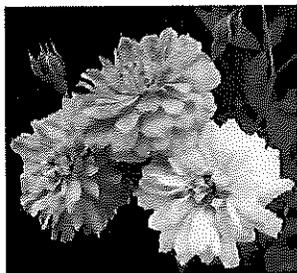
Texas AgriLife Extension Service calls 'Cecile Brunner' one of the easiest to grow rose varieties. This Polyantha rose is sometimes called 'Mme. Cécile Brünner' and may also be called The Sweetheart Rose. It is of French ancestry and has numerous double light pink blooms with darker pink centers.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'Cecile Brunner'	4'	3'	5'	Low-Moderate	Spring-Fall	Sweet fragrance

'Caldwell Pink' Rose:

This is a "found" rose of unknown origin introduced by Dr. Bill Welch of Texas A&M University in the 1980s. It is sometimes called the Summer Carnation Rose due to the form of its flowers, which are described as lilac pink but can fade to almost white under high heat conditions. 'Caldwell Pink' has no fragrance, but it is extremely carefree and makes an excellent back border for beds. It can also be planted as a hedge and as a container plant.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'Caldwell Pink'	4'	4'	6'	Low-Moderate	Spring-Fall	Good along back borders or as a hedge; no fragrance

'Perle d'Or' Rose:

This French rose dating from the 1880s is sometimes called "Yellow Cecile Brunner". The blooms begin as an apricot-colored bud, and then open to a golden buff pink. Plants need good air circulation and they should be in full sun. Texas AgriLife Extension Service named 'Perle d'Or' its Earth-KindSM Rose of the Year in 2007.

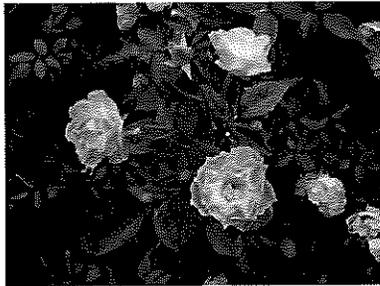


Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'Perle d'Or'	4'	4'	6'	Low; does not tolerate salt or overwatering	Spring-Fall	Very fragrant; can be grown in clay soils if given good drainage

Medium Shrub Roses:

'La Marne' Rose:

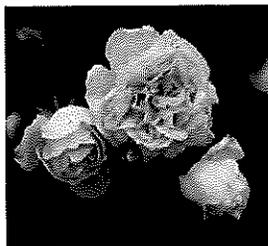
This Polyantha rose was developed in 1915 in France. Individual bushes have only a few thorns. The semi-double blooms are made up of a pink and white combination of loosely cupped and ruffled petals. Full sun and a well-drained soil are needed.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'La Marne'	5'	4'	6'	Low-Moderate; does not tolerate salt	Spring-Fall	One of the best medium-sized hedge roses; light fragrance

'Spice' Rose:

This fully double China rose cultivar has blooms ranging from blush pink to white in color, the color fading in hot weather. Its origins are unclear, but some believe it to be Hume's Blush Tea-Scented China rose dating from 1810. It has been used to produce many of the popular varieties of roses in existence today. 'Spice' should be planted in full sun and in an area where it will get good air circulation for optimum performance.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'Spice'	5'	4'	6'	Low-Moderate	Spring-Fall	Peppery spice fragrance; good starter rose for beds or containers

'Belinda's Dream' Rose:

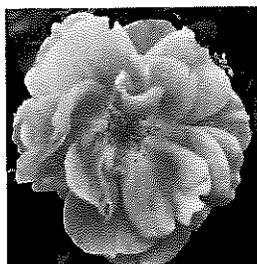
This cultivar was developed in 1992 by a Texas A&M mathematics professor specifically to withstand the high summer temperatures we experience. 'Belinda's Dream' was the first of the Earth-Kind[®] roses and continues to be the favorite of many people. The 4-inch medium pink blooms are very full, having over 100 petals per bloom. In addition to mass plantings, this rose makes an excellent specimen plant and can be easily grown in a large container.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'Belinda's Dream'	5'	5'	7'	Low-Moderate	Spring-Fall	Mildly fragrant

'Carefree Beauty' Rose:

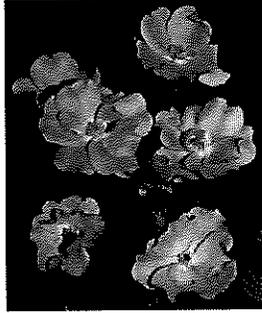
This cultivar was developed at Iowa State University to withstand the long, cold winters of the Midwest. It has proven to be just as hardy in Texas and was recognized as the 2006 Earth-Kind[®] Rose by the Texas AgriLife Extension Service. Individual blooms are semi-double, are deep pink in color, and are moderately fragrant. An added attraction is that large orange rose hips are produced by almost every flower, which provides color during the winter when the flowers are dormant.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'Carefree Beauty'	5'	5'	7'	Low-Moderate; salt tolerated if drip irrigation used	Spring-Fall	Formerly called 'Katy Road Pink'; moderate fragrance

'Else Poulsen' Rose:

This Floribunda semi-double rose was developed in 1924 by a Danish rose breeder named S. Poulsen. It is a relatively large shrub rose, and it has large clusters of upright blooms that have been described as looking like a giant Cyclamen pot plant. Blooms are light pink with a slightly darker pink on the reverse side. Its large size makes 'Else Poulsen' a good choice for placing at the back of a bed, where it provides a colorful backdrop for the shorter plants in front of it. This rose needs full sun.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'Else Poulsen'	5'	5'	7'	Low-Moderate	Spring-Fall	No fragrance; needs good air circulation; tolerates poor soils

'Ducher' Rose:

'Ducher' is a China shrub rose developed in the 1860s by the Ducher family of France. It has very double ivory-white blooms. The new leaves have a bronze coloration, gradually lightening to light green. Individual plants have a rounded appearance and they make excellent container-grown specimen plants.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'Ducher'	6'	4'	6'	Low-Moderate	Spring-Fall	Fruity fragrance; needs good air circulation

'Duchesse de Brabant' Rose:

This Tea rose was developed in 1857 in France and was often worn in the lapel of his suits by President Theodore Roosevelt. The blooms are described as cupped, rose pink in color, and fully double in form. It is an excellent bedding plant, as a specimen or in mass plantings, and also makes a good large container specimen plant.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'Duchess de Brabant'	6'	4'	6'	Low-Moderate	Spring-Fall	Strong tea fragrance; needs full sun and good air circulation

'Georgetown Tea' Rose:

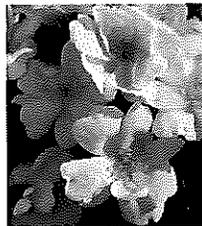
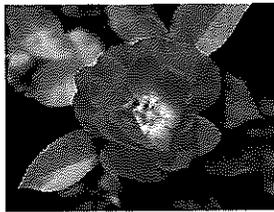
This relatively large Tea rose was discovered in the yard of a daycare center in Georgetown, Texas by Texas A&M professor of horticulture Dr. Bill Welch. The double blooms have a tea-like fragrance, are salmon pink in the center fading to lilac pink at the edges, and have an unusual pointed appearance due to rolling of each petal at its tip. This rose can be used in mass plantings or as a specimen plant.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'Georgetown Tea'	6'	6'	8'	Low-Moderate	Spring-Fall	Tea fragrance; needs good air circulation

'Knock Out' Rose:

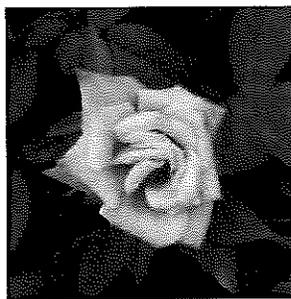
Introduced in 2000, the single, cherry red petals and carefree nature have made it one of the most widely-used varieties of roses in landscape plantings. Since it was named the All American Rose Selection in 2000, breeders have developed several other colors and bloom types of 'Knock Out' rose, including semi-double and double varieties in light pink, a combination of light pink and yellow, and a pure yellow variety. They do equally well in full sun or part sun. Rose hips are produced in the fall and provide winter color. This rose has been known to bloom non-stop during mild winters, and the new reddish-bronze foliage gradually becomes a medium green color.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'Knock Out'	6'	6'	8'	Low-Moderate	Spring-Fall	Non-fragrant in its pink and red colors, but mildly fragrant yellow color blooms

'Mme. Antoine Mari' Rose:

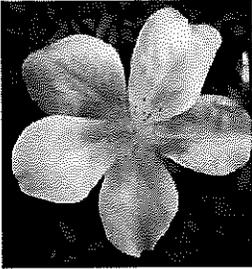
This Tea rose cultivar, named 2008 Earth-Kind[®] Rose of the Year by the Texas AgriLife Extension Service, was developed in France in 1901. New leaves are a deep maroon color, becoming a medium green color at maturity. The blooms have the typical downturned petals of a Tea rose. The petals are a dark pink at the base and become light pink at the tips.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'Mme. Antoine Mari'	6'	6'	8'	Low-Moderate	Spring-Fall	Tea fragrance; needs good air circulation

'Mutabilis' Rose:

This China rose cultivar is a single blossom variety developed in 1894. 'Mutabilis' is a shrub rose that "mutates" through three distinct color phases, each blossom starting out yellow, gradually darkening to pink, and finally becoming crimson. Texas AgriLife Extension Service named 'Mutabilis' its 2005 Earth-Kind[®] Rose of the Year for its disease resistance and high tolerance for hot, humid summer weather.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Miscellaneous
'Mutabilis'	6'	6'	8'	Low-Moderate	Spring-Fall	Non-fragrant; also known as the Butterfly Rose

Texas Superstar® Perennial Plants

The Texas AgriLife Extension Service of Texas A&M University has selected a variety of plants that will reliably return year after year (perennials), have been found in field trials to be tough enough to withstand the high heat and humidity of Texas summers, and are also disease and pest resistant. CenterPoint Energy has selected the following plant species/ varieties from among the Texas Superstar® plants to include on this list because of their hardiness under low water conditions. All photographs and descriptions of Texas Superstar® plants are taken from the website of the Texas AgriLife Extension Service, <http://texassuperstar.com/plants/index.html>, and used with their permission.

'Katie' Dwarf Mexican Petunia:

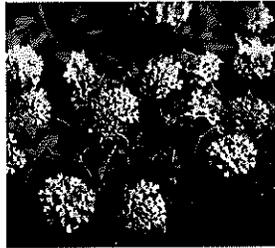
'Katie', which is a variety of the species *Ruellia brittoniana*, is a rugged, drought-resistant ground cover plant that is covered by violet, light purple, pink, and even white flowers that last only one day. The next day, they are completely replaced by a new set of flowers. It produces seeds freely and will quickly cover the ground in either full sun or part shade. The leaves are grass-like, being broader at the base and pointed at the tip ends.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Katie' Dwarf Mexican Petunia	8-12"	12"	12-18"	Low	Spring-Fall	Short Ground Cover

'Blue Princess' Verbena:

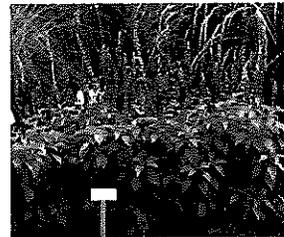
This hybrid variety of *Verbena* sp. is covered with lavender blue clusters of flowers. This easy-care plant attracts butterflies but resists diseases which attack plants under stress from summer heat, such as powdery mildew. Deer also tend to avoid it as a food source. Plants should be sheared to remove spent blooms at the end of each blooming cycle, which will result in more blooms being produced.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Blue Princess' Verbena	12"	3'	3'	Low	Spring-Fall	Short Ground Cover

'Mystic Blue Spires' Salvia:

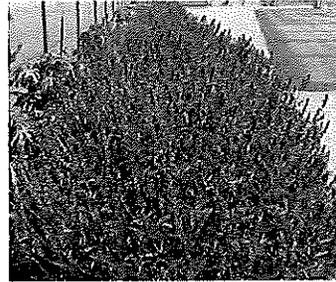
This is a hybrid variety of sage, created by crossing *Salvia farinacea* with *Salvia longispicata*, another popular salvia species sold under the cultivar name of 'Indigo Spires'. 'Mystic Blue Spires' is more compact and produces flowers over a longer period of time, even during hot, dry periods in the summer. This variety is carefree if planted in a well-drained soil. It should not be fertilized heavily and will produce fewer flowers if it receives too much water. Deer and other pests will not bother it. After new growth starts in the spring, the plants can be cut to just above ground level, which will encourage new, compact growth.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Mystic Blue Spires' Salvia	18-30"	12-18"	12-18"	Low	Spring-Summer	Medium Bedding Plant

'Henry Duelberg' Salvia:

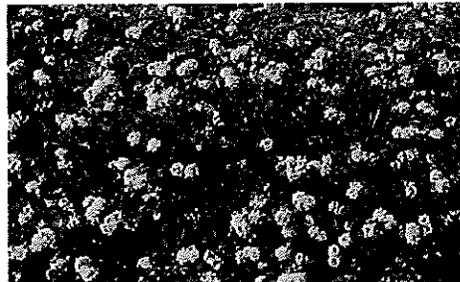
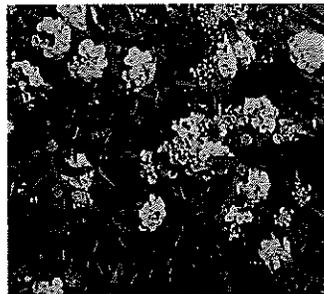
Salvia farinacea 'Henry Duelberg' is a cultivar of this Texas native sage species that was discovered growing in a cemetery in central Texas. It has bluer flowers, and more of them, than other cultivars of this species. The leaves are also a deeper green in color than other varieties. 'Henry Duelberg' salvia blooms in full sun during the hot summer season. Deer will eat it only as a last resort, making it a valuable landscape plant for areas unprotected by fencing.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Henry Duelberg' Salvia	3'	3'	4-5'	Low	Spring-Fall	Tall Bedding Plant

'New Gold' Lantana:

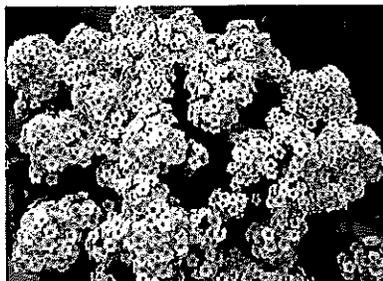
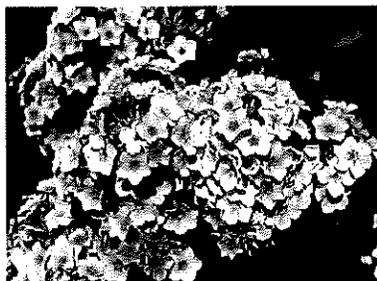
This hybrid variety of *Lantana* is drought tolerant once established and is also deer resistant. 'New Gold' is an excellent candidate for a tall ground cover in areas receiving full sun. The golden yellow flowers produce few, if any, fruit and grow best under summer heat conditions that most other flowering plants do not tolerate.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'New Gold' Lantana	2-4'	4'	5-6'	Low	Spring-Fall	Tall Ground Cover

'John Fanick' Perennial or Garden Phlox:

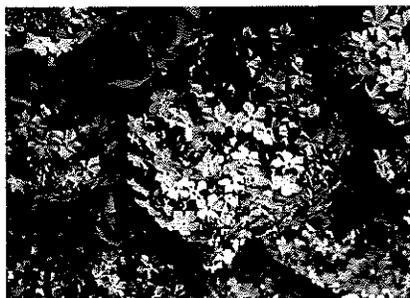
Phlox paniculata 'John Fanick' is a summer-blooming hardy variety of phlox that tolerates heat, drought, and powdery mildew. The showy clusters of light pink flowers with darker pink throats contrast with the dark green leaves. This plant exhibits a compact growth habit, and prefers full sun.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'John Fanick' Garden Phlox	3'	2'	3'	Low-Moderate	Late Spring-Fall	Tall Bedding Plant

'Victoria' Perennial or Garden Phlox:

Phlox paniculata 'Victoria' is another summer-blooming hardy variety of phlox that tolerates heat, drought, and powdery mildew. It has a more open growth habit than 'John Fanick' and the flowers are magenta. The leaves are a lighter green than 'John Fanick'.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Victoria' Garden Phlox	3'	2'	3'	Low-Moderate	Late Spring-Fall	Tall Bedding Plant

Firebush:

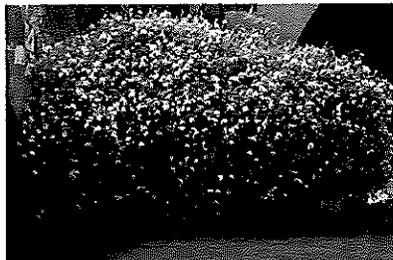
Hamelia patens is a small shrub, sometimes called hummingbird bush. It is very heat tolerant and pest resistant, and attracts hummingbirds with its abundant, tubular red-orange flowers. It may be planted in well-drained soil in the ground or in containers. Although Firebush may suffer freeze damage, it is root-hardy in Zone 8 and southward.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
Firebush, <i>Hamelia patens</i>	3'	3'	5-6'	Low	Summer-Fall	Small Shrub

'Imperial Blue' Cape Plumbago:

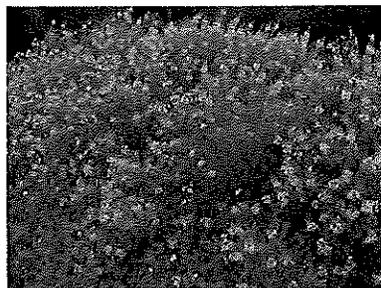
Plumbago auriculata, a native of South Africa, has an unusual sky-blue color not found in many other plants. The variety 'Imperial Blue' grows well in the hot Texas summers and will continue to bloom until the first frost. It is considered to be a tender perennial, which means it will likely suffer damage during a prolonged sub-freezing period unless it is covered and mulched heavily. Removal of spent flowers will encourage more blooms, and some pruning to maintain a compact shape will be required.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Imperial Blue' Cape Plumbago	3-4'	5'	6-8'	Low-Moderate	Summer-Fall	Small Shrub

Thyrallis:

Thyrallis or Showers-of-Gold, *Galphimia glauca*, is a woody shrub with bright yellow, upright blooms that stand above the evergreen leaves and dark stems. It must have well-drained soil and full sun or light shade, whether planted directly in the ground or in containers. Showers-of-Gold Thyrallis benefits from periodic pruning to maintain a denser growth habit.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
Thyrallis or Showers-of-Gold	3-5'	5'	5-6'	Low	Late Spring-Fall	Shrub or Hedge

'Gold Star' Esparanza or Yellow Bells:

Tecoma stans 'Gold Star' is a Texas native shrub that is both heat tolerant and pest resistant, with golden yellow trumpet-shaped flowers and attractive dark green leaves. 'Gold Star' does best when grown in full sun, and it can be planted in the ground or grown in containers.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Gold Star' Esparanza or Yellow Bells	4'	3'	6'	Low-Moderate	Late Spring-Fall	Shrub

Grandma's Yellow Rose:

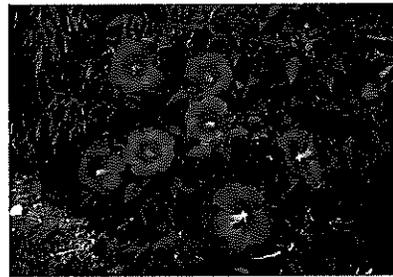
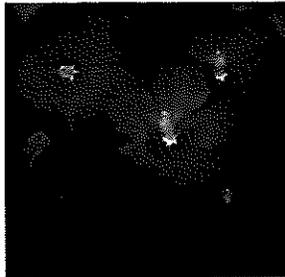
Rosa 'Nacogdoches', or Grandma's Yellow Rose, is a floribunda type shrub rose with flowers having a rich yellow color, a light, spicy fragrance, and repeat blooms from spring until frost. It needs at least 6 hours of direct sun per day and prefers a slightly acid soil, but it will tolerate alkaline clay soil that has good drainage. The leaves are a bronze color when they first appear but change to a dark green color when mature. During extremely wet conditions, the leaves may be attacked by black spot fungus and benefit from a fungicide treatment. If black spot does cause some leaves to drop, they will be replaced by new ones shortly and the plant will recover nicely.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
Grandma's Yellow Rose, <i>Rosa</i> 'Nacogdoches'	4-5'	3'	6'	Low-Moderate	Spring-Fall	Shrub or Hedge

'Flare' Rose Mallow Hibiscus:

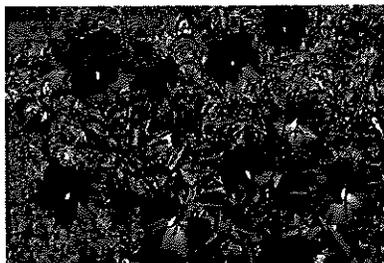
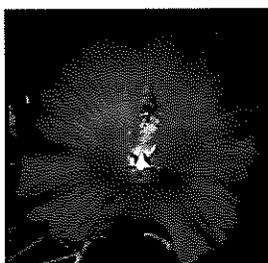
Once established, this refined *Hibiscus moscheutos* hybrid variety requires only moderate amounts of water to produce beautiful fuchsia-colored blooms from summer to frost. 'Flare' prefers to be planted where it will receive full sun most of the day, and alkaline soils are tolerated well.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Flare' Rose Mallow Hibiscus	4'	4'	7'	Low; tolerates alkaline soil	Summer-early Fall	Shrub

'Lord Baltimore' Rose Mallow Hibiscus:

This hybrid hardy *Hibiscus* sp. variety prefers neutral to slightly acid soil. When planted in full sun, it will produce beautiful red flowers during a long blooming period from summer to frost. The petals on 'Lord Baltimore' are slightly ruffled and the leaf margins are lobed.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Lord Baltimore' Rose Mallow Hibiscus	5'	5'	8'	Low	Summer-early Fall	Shrub

'Moy Grande' Texas Giant Hibiscus:

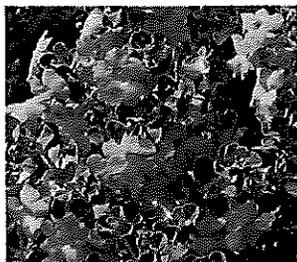
Texas AgriLife Extension Service states that 'Moy Grande' may have the largest bloom of any hibiscus on earth, the pink blooms reaching the size of a dinner plate. During the blooming season, summer through frost, seed pods should be removed after the flowers fall off to encourage further blooming because 'Moy Grande' is not a sterile hybrid like 'Flare' and 'Lord Baltimore'.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Moy Grande' Giant Texas Hibiscus	5'	5'	8'	Low; tolerates neutral to alkaline soils	Summer-early Fall	Shrub

'Lowery's Legacy' Cenizo or Texas Sage:

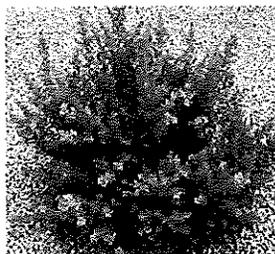
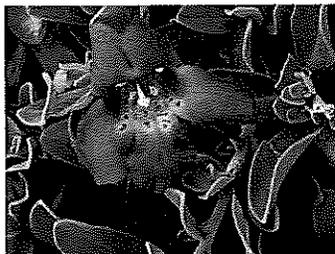
Leucophyllum langmaniae 'Lowery's Legacy' has a more gray-green color than 'Green Cloud' Texas Sage, its flowers are a true lavender color, and it requires the same well-drained soils and full sunlight to do its best. This variety is not as dependent on changes in humidity levels for blooming and it blooms more often during a growing season. 'Lowery's Legacy' has a rounded growth form and tends to have a denser blooming habit than other varieties of Texas Sage.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Lowery's Legacy' Texas Sage	5'	5'	7-8'	Low; requires good drainage	Late Spring-Fall	Shrub or Hedge

'Green Cloud' Texas Sage:

Leucophyllum frutescens 'Green Cloud' is a cultivar with green leaves that are larger in size than the silver or grey-green varieties of Texas Sage. It should be pruned heavily in late winter-early spring to encourage compact growth and more blooms. In mild winters, most of the leaves will remain on the plant, but there can be substantial leaf drop after a very heavy frost. 'Green Cloud' may be used as a specimen plant or as a tall hedge row plant.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Green Cloud' Texas Sage	5-6'	5'	7-8'	Low; requires good drainage	Late Spring-Fall	Shrub or Hedge

Ornamental Grasses

Many species and varieties of ornamental grasses, both natives and Texas-adapted non-natives, are available at local nurseries and over the internet. They range in height from just a few inches to well over 10 feet, but the species and varieties listed here grow to less than 10 feet. Ornamental grasses are listed according to their published maximum heights of the leaves, starting with the shortest and proceeding to the tallest. The flowers or inflorescence may extend above the leaves, often as tall as the leaves themselves.

'Little Bunny' Fountain Grass:

Pennisetum alopecuroides 'Little Bunny' is one of the smallest ornamental grasses, making it ideal for planting in the foreground of a planting bed. It is adaptable to a wide range of soil types and moisture regimes, but soggy conditions should be avoided. The growth form is upright and it should be grown in full sun to partial shade. The leaves are green and the flower heads are white to whitish green.

Entire Plant:



Single Inflorescence:

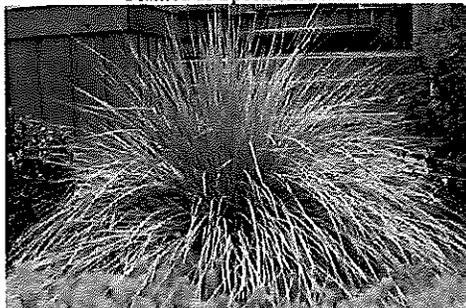


Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Little Bunny' Fountain Grass	8-10"	12-24"	3'	Low; requires good drainage	Summer-Fall	Clumping, upright

Blue Oat Grass:

Helictotrichon sempervirens, Blue Oat Grass, is a better choice for planting in the Houston area than Blue Fescue Grass, another ornamental grass offered for sale by online nurseries. Blue Fescue does not hold up to the heat and humidity combination we experience. Blue Oat Grass foliage is described by many as being "metallic blue" in color. This grass likes full sun and dry to moderately moist, well drained soil. The greenish flowers appear in early summer, mature to a golden wheat color in the fall, and extend about two feet above the leaves.

Planted as Specimen Plant:



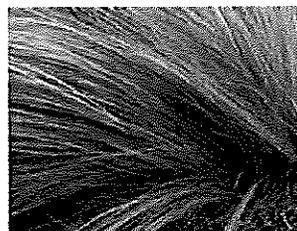
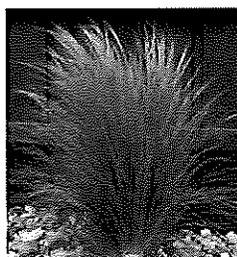
Closeup of Inflorescence:



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
Blue Oats Grass	12-18"	20-24"	3-4'	Low-moderate; requires good drainage	Summer-Fall	Clumping, upright in center, arching outer leaves

***Nassella tenuissima*:**

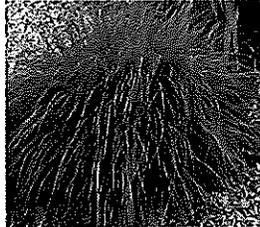
Mexican Feather Grass is a relatively short ornamental grass with narrow leaves that arch gracefully and move with the slightest breeze. It is very drought tolerant once it is well established, requiring only minimal supplemental watering. The inconspicuous white flowers, which appear in late Summer through Fall, are only slightly longer than the leaves. This grass looks great in mass plantings or as a specimen plant. It turns a pleasing tan color in Winter.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
Mexican Feather Grass	12-24"	12-24"	3'	Low-moderate; good drainage required	Summer-Fall	Clumping, leaves arching

Dwarf Fountain Grass 'Hameln':

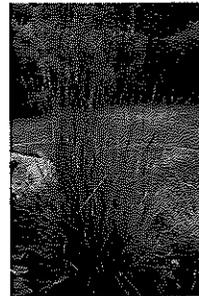
Pennisetum alopecuroides 'Hameln' is a relatively short fountain grass, reaching a maximum height of 1-2 feet. It needs full sun. The bright green narrow leaves arch gracefully. The flowers are white with a rose-copper tint and resemble bottle brushes. This grass is great for planting along the edges of borders or paths and even along steep banks.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Hameln' Dwarf Fountain Grass	12-24"	18"	2-3'	Low-moderate, requires good drainage	Summer-Fall	Clumping, arching

Variegated Feather Reed Grass 'Overdam':

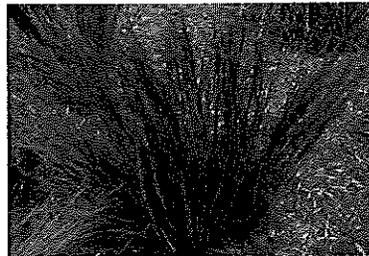
Calamagrostis acutiflora 'Overdam' is a mid-sized ornamental grass with white and green variegated leaves that are moderately wide. Unlike many other ornamental grasses, 'Overdam' does well in heavy clay soils as well as in other soil types. 'Overdam' prefers moist, but not soggy, well drained soil. The flower color is described as pinkish green, and in the fall and winter the leaves turn a pleasing tan color.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Overdam' Variegated Feather Reed Grass	12-24"	18"	2-3'	Low-moderate, requires good drainage	Summer-Fall	Clumping, upright in center, arching outer leaves

Little Bluestem:

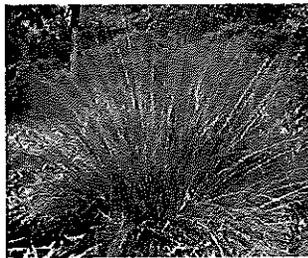
Schizachyrium scoparium, commonly known as Little Bluestem but sometimes called Sagegrass or Beardgrass, is a native North American prairie grass which will tolerate poor soils and partial sun. It has a pleasing bluish green color, turning to rusty orange in the fall and winter. Flower stems are reddish in color, turning to tan after a frost. The flowers are white. This grass looks best in mass plantings and provides a natural food source for many native birds.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
Little Bluestem	3-4'	2-2.5'	3'	Low-moderate, requires good drainage	Summer	Clumping, upright

Gulf or Pink Muhly Grass:

Muhlenbergia capillaris, commonly known as Gulf Muhly or Pink Muhly Grass, is a clump-forming grass native to the prairies of the southern United States and Mexico. It tolerates a wide range of soils from sand to marly clay and dry to wet conditions as long as drainage is good. The leaves are narrow, almost wiry. In the early Fall, the inflorescence extends above the leaves and opens to reveal the wispy pink seed heads. When viewed from a distance on an early October morning, especially in bright sunlight, the plants take on the appearance of cotton candy. After the first frost, the seed heads turn a tan color. This grass can be grown as a tall ground cover or can be used as specimen plants if planted singly.

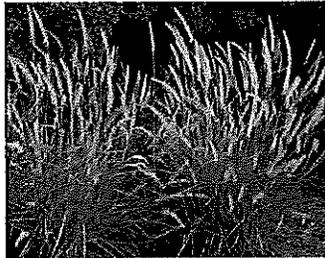


Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
Gulf Muhly Grass	3'	3'	4-5'	Low-moderate, requires good drainage	Summer	Clumping, upright in center, arching outer leaves

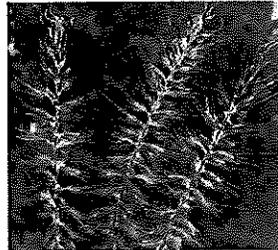
'Karley Rose' Grass:

Pennisetum orientale 'Karley Rose' is one of the fountain grasses with bright green leaves. From early Summer through Fall, a succession of rose-purple flowers appear above the leaves and move freely in the slightest breeze. It is adaptable to a wide range of soil types as long as good drainage is maintained. 'Karley Rose' looks great in mass plantings as well as planted individually among other perennials and annuals.

Entire Plant:



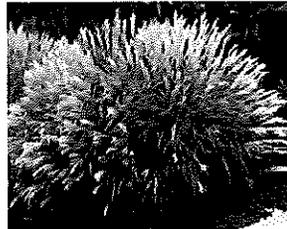
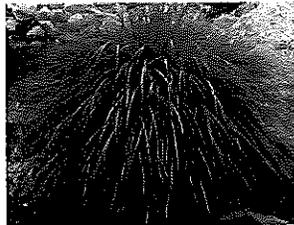
Inflorescence:



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Karley Rose' Grass	3-4'	2-3'	4'	Low-moderate, requires good drainage	Summer	Clumping, upright in center, arching outer leaves

***Miscanthus sinensis* 'Adagio':**

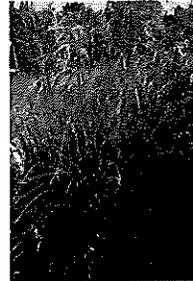
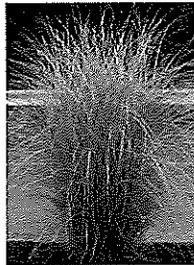
'Adagio' is one of the more compact Maiden Grasses, reaching a height of 3-4 feet and a width of 3-4 feet. It has an arching growth form and the green leaves have a white midrib stripe. The flowers open in late Summer as a pinkish plume held above the leaves, but gradually fade to white by Fall. It does well in a variety of soil types, but likes to have good drainage and does best in full sun. 'Adagio' can be used as a specimen plant or planted in mass.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season	Growth Form
'Adagio' Maiden Grass	3-4'	3-4'	5'	Low-moderate, requires good drainage	Summer	Clumping, upright in center, arching outer leaves

Variegated *Miscanthus sinensis* 'Morning Light':

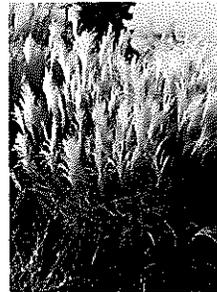
Miscanthus sinensis is commonly called Maiden Grass and the variety 'Morning Light' is a variegated type with the fine textured green leaves having a white midrib and margins, giving it an almost silvery appearance. It will thrive in all types of soil as long as the bed or container has excellent drainage and access to full sun. The flowers appear in the Fall and are described as reddish bronze plumes. 'Morning Light' makes a great specimen plant, but also can be used toward the back of planting beds.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season	Growth Form
'Morning Light' Maiden Grass	4-5'	2-3'	6'	Low-moderate, requires good drainage	Fall	Clumping, columnar growth pattern, with arching outer leaves

***Miscanthus sinensis* 'Huron Sunrise':**

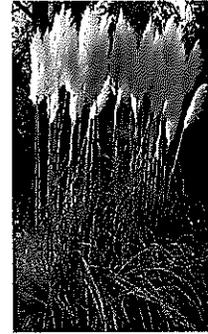
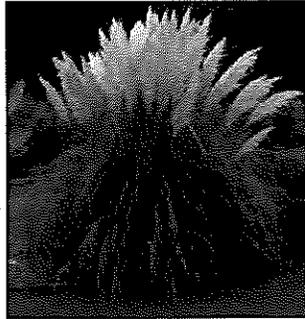
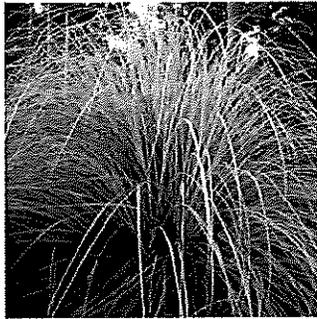
'Huron Sunrise' Maiden Grass is another of the tall, columnar ornamental grasses. It is very tolerant of different soil types and can grow in both full sun and part shade. It prefers moderate amounts of soil moisture and is one of the few ornamental grasses that does not require good drainage. The green leaves turn a golden color after the first frost and the flowers are initially burgundy in color fading to white, first appearing in mid-Summer and lasting well into Fall.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Huron Sunrise' Maiden Grass	5-6'	2-3'	6'	Moderate, poor drainage tolerated	Summer-Fall	Clumping, columnar growth pattern, with arching outer leaves

Cortaderia selloana:

Pampas Grass, native to Argentina, is a large ornamental grass with multiple white flower plumes extending above the gracefully arching green leaves. White- (shown at left below) and gold-stripped leaf varieties have been developed and are available over the internet. Flowers appear in late Summer and last through Fall. Pink- and yellow-flowered (shown in the middle photo below) varieties are available over the internet. Pampas Grass is drought tolerant after it is well established and will grow well in all soil types except for supersaturated, flooded soils. The leaves are finely serrated, making annual late Winter trimming of the leaves to within a foot of the ground challenging. It is recommended that individual clumps be planted far enough apart to keep them separated from each other to expedite the annual leaf trimming.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
Pampas Grass	5-8'	6-8'	12'	Low-moderate; drainage not critical	Summer-Fall	Clumping; arching leaves and large plume-like flowers

Ground Covers and Non-woody Perennials:

Trachelospermum asiaticum 'Salsa':

'Salsa' is a fairly new variety of Asian Jasmine that is supposed to have yellow, orange, red, and cream colored leaves, but when planted in full sun, it tends to revert back to the dark green coloration of the species. It forms a dense ground cover, ranging from 6-12" in height, spreading by above-ground stems. Unless contained by edging, this plant can become invasive and spread across lawns and beds where it is not wanted, but 'Salsa' does have one advantage over the original Asian Jasmine: in full sun, it does not spread as rapidly as the species.

'Salsa':



Species:



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Salsa' Asian Jasmine	6-12"	Unknown	12" for 4" pots	Moderate, drainage not important	Flowers infrequently in Summer	Dense ground cover

Lantana camara 'Irene':

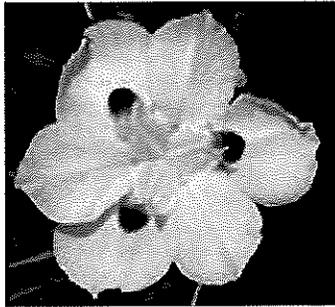
'Irene' *Lantana* is one of the newer varieties of *Lantana*. It is classified as a moderately tall ground cover and has multicolored flower clusters made up of individual flowers in colors of red, pink, orange, and yellow. 'Irene', like 'New Gold', is very heat and drought tolerant and blooms from late Spring through Fall. This plant is a great butterfly attractor. The dark berries that appear after flower drop are eaten by birds, but children should be kept away from them as they are poisonous to humans.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Irene' Lantana	2-3'	6-8'	24-36"	Low-moderate, prefers good drainage	Flowers Spring-Fall	Shrub-like ground cover

Dietes bicolor:

African Iris has green, grass-like leaves that reach a height of 2-3'. This plant spreads by underground tubers and has unique Summer-early Fall flowers ranging in color from pale to medium yellow, with each flower having three dark brown eye spots surrounded by orange. African Iris is very drought resistant and grows in any type of soil. Periodic thinning may be required to maintain good bloom production. They can also be grown in containers to control spreading.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
African Iris	2-3'	Variable	3-4'	Low-moderate	Summer- early Fall	Clumping, upright leaves

***Salvia greggii* 'Red':**

Red Autumn Sage is a cultivated variety of this Texas native perennial sage. *Salvia greggii* does well in its dry native habitat of southern Texas to northern Mexico, so it is well adapted to living in semi-desert conditions. This makes it a great candidate for planting in areas with only limited availability of supplemental watering, like transmission rights-of-way. Its dark red flowers attract butterflies, bees, and hummingbirds. In early spring, individual plants should be pruned by at least one third to maintain a dense growth of leaves.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Red' Autumn Sage	3-4'	3'	4-5'	Low; requires good drainage	Summer- Fall	Semi-woody, shrublike

Hesperaloe parvifolia:

Red Yucca, which is actually in the Agave family, is a succulent native to the desert and semi-desert portions of Texas and northern Mexico. This plant is highly adaptable and will thrive in the high humidity of the Texas Gulf Coast as long as it has excellent drainage. It is often used in elevated beds in the medians of highways because of its ability to produce multiple stalks with clusters of dark pink to light red flowers which have yellow inner petals, even under the driest conditions. The flowers produce pods containing many black papery seeds which can be planted to grow new plants, although it can take three or more years to produce a flowering specimen.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
Red Yucca	3-5'	4'	6'	Low, requires good drainage	Summer- Fall	Fountain-like arching leaves

Woody Shrubs:

Raphiolepis indica 'Snow White':

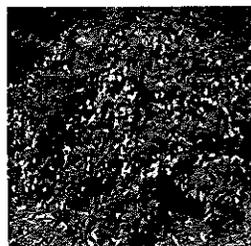
'Snow White' Indian Hawthorn is a medium-sized flowering shrub which maintains a neat, mounded appearance without the need for pruning. As the name implies, the early Spring flowers are pure white. They are replaced in the Summer by dark bluish black fruits. After they become established, 'Snow White' Indian Hawthorns are very drought tolerant.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Snow White' Indian Hawthorn	3'	4-5'	6'	Low-moderate; requires good drainage	Early Spring	Mounded shrub

Abelia grandiflora:

Glossy Abelia is an evergreen shrub in the Houston area. It has relatively small, medium to dark green leaves occurring the entire length of the upright to cascading branches. The tubular white flowers are mildly fragrant and attract butterflies, and since they occur on the new growth of the plant, even trimming back the branches during the growing season of Spring through Fall to control the height of the shrub tends to increase blooming. Glossy Abelia is not attacked by disease or insects and can be used in mass plantings or in informal hedges. Soil type is not important, but relatively good drainage should be provided.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
Glossy Abelia	3-6'	4-5'	6-7'	Low-moderate; requires good drainage	Spring - Fall	Cascading shrub

***Loropetalum chinense* 'Sizzling Pink':**

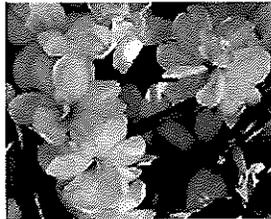
'Sizzling Pink' Chinese Fringe Flower is a medium size shrub with leaves that undergo a color change during the year, being a dark maroon to purple color during the winter months and turning a lighter color with some green showing through in the Spring through Summer seasons. The most notable thing about the fringe flower is that it blooms during the cooler months of the year, and the hot pink flowers really stand out against the dark leaves. The fringe flower has few pests or diseases that attack it, and it is not particular about soil type as long as it has good drainage.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
'Sizzling Pink' Chinese Fringe Flower	4-6'	4-5'	6-7'	Low-moderate; requires good drainage	Late Winter – Early Spring; sometimes repeats in Fall	Mounding shrub

***Jasminum mesnyi*:**

Primrose Jasmine is a large shrub exhibiting highly arching branches with the tips of the branches almost touching the ground around the shrub. Because of this growth habit, it is an excellent candidate for individual potting or for planting in elevated beds. In the early Spring, Primrose Jasmine is covered with lemon yellow, non-fragrant flowers growing on square stems and the leaves are dark green. This is a vigorous grower and can take some shade, but it does best in full sun. Periodic trimming of the branches will be required to keep the shrub in shape.



Variety Name	Height	Width	Spacing	Water Requirements	Flowering Season(s)	Growth Form
Primrose Jasmine	5-8'	6-8'	7-9'	Moderate; likes good drainage	Early Spring	Arching tall shrub

License No. MA153184

Exhibit "D"
to the
Master License Agreement for
Hike and Bike Trails
between
CenterPoint Energy Houston Electric, LLC
and
The City of Deer Park, Texas

1. Baker Botts LLP
2. Shipley Snell Montgomery LLP
3. Morgan, Lewis & Bockius LLP
4. Hicks Davis Wynn P.C.

Exhibit "E"
to the
Master License Agreement for Hike and Bike Trails
between
CenterPoint Energy Houston Electric, LLC
and
The City of Deer Park, Texas

The following is a list of minimum requirements for a survey drawing to be used as Exhibit "A". A Metes & Bounds description is not required if the following format is followed.

- 1) North arrow & scale.
- 2) County name.
- 3) Survey name & abstract number.
- 4) Point of beginning (with State Plane Coordinates if available).
- 5) Tie to closest CenterPoint Energy property corner.
- 6) Tie to closest CenterPoint Energy above ground and underground structures (showing distance and structure number).
- 7) Hike and Bike Trail shall be identified by a centerline symbol or a cross-hatched symbol
- 8) Stationing along the Hike and Bike Trail centerline of route.
- 9) Bearing & distance of crossing or longitudinal occupation.
- 10) Locative reference – Tie to a street and any existing pipelines within 20 feet on either side of requestor's facilities.
- 11) CenterPoint Energy tract reference and adjoiner information, including width of CenterPoint Energy right of way.
- 12) Basis of bearings (& coordinates if used).
- 13) Reference to CenterPoint Energy map (if available).
- 14) Registered professional land surveyor's certification, seal, signature & printed name with registration number.
- 15) Name, address and phone number of registered professional land surveyor or firm that prepared the survey.
- 16) Ties to existing pipelines, waterlines or wet utilities every 200 feet or a change in direction and position.
- 17) Locations of swales, ditches, ponds, rivers, and/or canals located within the right of way.
- 18) A profile of any facility if it crosses any CenterPoint underground facilities (fiber optic, underground residential distribution or three phase underground duct banks).

**SECTION 01 10 00
SUMMARY**

PART 1 GENERAL

1.01 PROJECT

- A. Project Name: Deer Park Hike & Bike Trail Phase 1
- B. Owner's Name: City of Deer Park.
- C. Architect's Name: Burditt Representative.
- D. The Project consists of the construction of 8' wide decomposed granite trail, block wall, concrete ramps, grading, drainage and site furnishings..

1.02 CONTRACT DESCRIPTION

1.03 OWNER OCCUPANCY

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

1.04 CONTRACTOR USE OF SITE

- A. Construction Operations: Limited to areas noted on Drawings.
 - 1. Locate and conduct construction activities in ways that will limit disturbance to site.
- B. Arrange use of site and premises to allow:
- C. Provide access to and from site as required by law and by Owner:
 - 1. Do not obstruct roadways, sidewalks, or other public ways without permit.
- D. Time Restrictions:
 - 1. Limit conduct of the hours of 7am to 6pm Monday thru Saturday.
- E. Utility Outages and Shutdown:
 - 1. Prevent accidental disruption of utility services to other facilities.

1.05 SPECIFICATION SECTIONS APPLICABLE TO ALL CONTRACTS

- A. Unless otherwise noted, all provisions of the sections listed below apply to all contracts. Specific items of work listed under individual contract descriptions constitute exceptions.
- B. Section 01 20 00 - Price and Payment Procedures.
- C. Section 01 21 00 - Allowances.
- D. Section 01 30 00 - Administrative Requirements.
- E. Section 01 32 16 - Construction Progress Schedule.
- F. Section 01 40 00 - Quality Requirements.
- G. Section 01 42 16 - Definitions.
- H. Section 01 50 00 - Temporary Facilities and Controls.
- I. Section 01 55 00 - Vehicular Access and Parking.
- J. Section 01 60 00 - Product Requirements.
- K. Section 01 78 00 - Closeout Submittals.

1.06 CONTRACT NO. [] - GENERAL CONSTRUCTION

- A. Division 01 - General Requirements:
 - 1. Specification sections listed above.
 - 2. Section 01 70 00: Basic project engineering and layout.
 - 3. Section 01 70 00: Final cleaning.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.

END OF SECTION

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**SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.
- D. Correlation of Contractor submittals based on changes.
- E. Procedures for preparation and submittal of application for final payment.

1.02 RELATED REQUIREMENTS

- A. Section 01 21 00 - Allowances: Payment procedures relating to allowances.
- B. Section 01 22 00 - Unit Prices: Monetary values of unit prices; Payment and modification procedures relating to unit prices.
- C. Section 01 78 00 - Closeout Submittals: Project record documents.

1.03 SCHEDULE OF VALUES

- A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values in duplicate within 7 days after date of Owner-Contractor Agreement.
- E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization.
- F. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
- G. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.
- H. Revise schedule to list approved Change Orders, with each Application For Payment.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- D. Forms filled out by hand will not be accepted.
- E. For each item, provide a column for listing each of the following:
 - 1. Item Number.
 - 2. Description of work.
 - 3. Scheduled Values.
 - 4. Previous Applications.
 - 5. Work in Place and Stored Materials under this Application.
 - 6. Authorized Change Orders.
 - 7. Total Completed and Stored to Date of Application.
 - 8. Percentage of Completion.
 - 9. Balance to Finish.
 - 10. Retainage.
- F. Execute certification by signature of authorized officer.
- G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

- H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- I. Submit one electronic and two hard-copies of each Application for Payment.
- J. Include the following with the application:
 - 1. Transmittal letter as specified for submittals in Section 01 30 00.
 - 2. Construction progress schedule, revised and current as specified in Section 01 30 00.
 - 3. Current construction photographs specified in Section 01 30 00.
 - 4. Partial release of liens from major subcontractors and vendors.
 - 5. Conditional waiver and release upon progress payment form.
- K. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.05 MODIFICATION PROCEDURES

- A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
- B. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 - 2. Promptly execute the change.
- C. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within [] days.
- D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01 6000.
- E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
 - 1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
 - 2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
 - 3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
 - 4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.
- F. Substantiation of Costs: Provide full information required for evaluation.
 - 1. On request, provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 - 2. Support each claim for additional costs with additional information:
 - a. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 - 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- G. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

- H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- J. Promptly enter changes in Project Record Documents.

1.06 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
 - 1. All closeout procedures specified in Section 01 70 00.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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**SECTION 01 22 00
UNIT PRICES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. List of unit prices, for use in preparing Bids.
- B. Measurement and payment criteria applicable to Work performed under a unit price payment method.
- C. Defect assessment and non-payment for rejected work.

1.02 RELATED REQUIREMENTS

- A. Procurement Document: List of Unit Prices as supplement to Bid Form
- B. Section 01 20 00 - Price and Payment Procedures: Additional payment and modification procedures.

1.03 COSTS INCLUDED

- A. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

1.04 UNIT QUANTITIES SPECIFIED

- A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

1.05 MEASUREMENT OF QUANTITIES

- A. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.
- B. Take all measurements and compute quantities. Measurements and quantities will be verified by Architect.
- C. Assist by providing necessary equipment, workers, and survey personnel as required.
- D. Measurement Devices:
 - 1. Weigh Scales: Inspected, tested and certified by the applicable state Weights and Measures department within the past year.
 - 2. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
 - 3. Metering Devices: Inspected, tested and certified by the applicable state department within the past year.
- E. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
- F. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
- G. Measurement by Area: Measured by square dimension using mean length and width or radius.
- H. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.
- I. Stipulated Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

1.06 PAYMENT

- A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price.
- B. Payment will not be made for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products not completely unloaded from the transporting vehicle.
 - 4. Products placed beyond the lines and levels of the required Work.
 - 5. Products remaining on hand after completion of the Work.
 - 6. Loading, hauling, and disposing of rejected Products.

1.07 DEFECT ASSESSMENT

- A. Replace Work, or portions of the Work, not complying with specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct one of the following remedies:

1. The defective Work may remain, but the unit price will be adjusted to a new unit price at the discretion of Architect.
2. The defective Work will be partially repaired to the instructions of the Architect, and the unit price will be adjusted to a new unit price at the discretion of Architect.

1.08 SCHEDULE OF UNIT PRICES

A. Refer to schedule provided on Procurement Document supplemental to Bid Form.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 23 00
ALTERNATES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Description of Alternates.
- B. Procedures for pricing Alternates.

1.02 ACCEPTANCE OF ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate with Architect's review and approval of modi

1.03 SCHEDULE OF ALTERNATES

- A. Deduct Alternate No. 1 -
- B. DECOMPOSED GRANITE TRAIL - REDUCE ENTIRETY OF
- C. THE TRAIL BY 2', INCLUDING BASE AND REQUIRED GRADING
- D. +/- 11,245 SF DECOMPOSED GRANITE AREA(CONTRACTOR TO VERIFY)
- E. Alternate No. 1 - ADD 8 SOLAR LIGHT POLES WITH COMPLETE INSTALLATION. COORDINATE WITH OWNER/OWNER REP REF:LS1.04/A1,A2:

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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**SECTION 01 25 00
SUBSTITUTION PROCEDURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.02 RELATED REQUIREMENTS

- A. Section 00 21 13 - Instructions to Bidders: Restrictions on timing of substitution requests.
- B. Section 00 43 25 - Substitution Request Form - During Procurement: Required form for substitution requests made prior to award of contract (During procurement).
- C. Section 00 63 26 - Substitution Request Form - During Construction: Required form for substitution requests made after award of contract (During construction).
- D. Section 01 60 00 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

1.03 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
 - a. Substitution requests offering advantages solely to the Contractor will not be considered.

1.04 REFERENCE STANDARDS

- A. CSI/CSC Form 1.5C - Substitution Request (During the Bidding/Negotiating Stage) Current Edition.
- B. CSI/CSC Form 13.1A - Substitution Request (After the Bidding/Negotiating Phase) Current Edition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- B. A Substitution Request for specified installer constitutes a representation that the submitter:
 - 1. Has acted in good faith to obtain services of specified installer, but was unable to come to commercial, or other terms.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
 - 1. Note explicitly any non-compliant characteristics.
- D. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
 - 1. Forms indicated in the Project Manual are adequate for this purpose, and must be used.
- E. Limit each request to a single proposed substitution item.
 - 1. Submit an electronic document, combining the request form with supporting data into single document.

3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Section 00 21 13 - Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period, and the documents required.
- B. Submittal Form (before award of contract):
 - 1. Submit substitution requests by completing CSI/CSC Form 1.5C - Substitution Request (During the Bidding/Negotiating Stage). See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.

3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Submittal Form (after award of contract):
 - 1. Submit substitution requests by completing CSI/CSC Form 13.1A - Substitution Request. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.
- B. Architect will consider requests for substitutions only within 30 days after date of Agreement.
- C. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
 - 1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
 - 2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
 - 3. Bear the costs engendered by proposed substitution of:
 - a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
- D. Substitutions will not be considered under one or more of the following circumstances:
 - 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
 - 2. Without a separate written request.

3.04 RESOLUTION

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.

3.05 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.06 CLOSEOUT ACTIVITIES

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

END OF SECTION

**SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General administrative requirements.
- B. Electronic document submittal service.
- C. Preconstruction meeting.
- D. Site mobilization meeting.
- E. Progress meetings.
- F. Construction progress schedule.
- G. Progress photographs.
- H. Submittals for review, information, and project closeout.
- I. Number of copies of submittals.
- J. Requests for Interpretation (RFI) procedures.
- K. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Section 01 32 16 - Construction Progress Schedule: Form, content, and administration of schedules.
- B. Section 01 60 00 - Product Requirements: General product requirements.

1.03 REFERENCE STANDARDS

- A. AIA G716 - Request for Information 2004.
- B. AIA G810 - Transmittal Letter 2001.
- C. CSI/CSC Form 12.1A - Submittal Transmittal Current Edition.
- D. CSI/CSC Form 13.2A - Request for Information Current Edition.

1.04 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 01 70 00 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:
 - 1. Requests for Interpretation (RFI).
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 - 1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.

2. Contractor and Architect are required to use this service.
 3. It is Contractor's responsibility to submit documents in allowable format.
 4. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
 5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Submittal Service: The selected service is:
1. A format and function agreed upon by Owner, Architect, and Contractor at preconstruction meeting..
- C. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Architect and Contractor participating; further training is the responsibility of the user of the service.
- D. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.02 PRECONSTRUCTION MEETING

- A. Schedule meeting after Notice of Award.
- B. Attendance Required:
1. Owner.
 2. Architect.
 3. Contractor.
- C. Agenda:
1. Execution of Owner-Contractor Agreement.
 2. Submission of executed bonds and insurance certificates.
 3. Distribution of Contract Documents.
 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 5. Submission of initial Submittal schedule.
 6. Designation of personnel representing the parties to Contract, [] and .
 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 8. Scheduling.
 9. Scheduling activities of a Geotechnical Engineer.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 SITE MOBILIZATION MEETING

- A. Schedule meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
1. Contractor.
 2. Owner.
 3. Architect.
 4. Contractor's superintendent.
 5. Major subcontractors.
- C. Agenda:
1. Use of premises by Owner and Contractor.
 2. Owner's requirements.
 3. Construction facilities and controls provided by Owner.
 4. Temporary utilities provided by Owner.
 5. Survey and building layout.
 6. Security and housekeeping procedures.

7. Schedules.
 8. Application for payment procedures.
 9. Procedures for testing.
 10. Procedures for maintaining record documents.
 11. Requirements for start-up of equipment.
 12. Inspection and acceptance of equipment put into service during construction period.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the work at maximum bi-monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
1. Contractor.
 2. Owner.
 3. Architect.
 4. Contractor's superintendent.
 5. Major subcontractors as required.
- D. Agenda:
1. Review minutes of previous meetings.
 2. Review of work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Review of RFIs log and status of responses.
 7. Review of off-site fabrication and delivery schedules.
 8. Maintenance of progress schedule.
 9. Corrective measures to regain projected schedules.
 10. Planned progress during succeeding work period.
 11. Coordination of projected progress.
 12. Maintenance of quality and work standards.
 13. Effect of proposed changes on progress schedule and coordination.
 14. Other business relating to work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.05 CONSTRUCTION PROGRESS SCHEDULE - SEE SECTION 01 32 16

- A. Within 7 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 90 days of work, with a general outline for remainder of work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 7 days.
- C. Submit updated schedule with each Application for Payment.

3.06 PROGRESS PHOTOGRAPHS

- A. Submit photographs as required by Architect with each application for payment, taken not more than 3 days prior to submission of application for payment.
- B. Photography Type: Digital; electronic files.
- C. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Architect.
- D. In addition to periodic, recurring views, take photographs of each of the following events:
1. Completion of site clearing.
 2. Excavations in progress.
 3. Foundations in progress and upon completion.
 4. Structural framing in progress and upon completion.

5. Enclosure of building, upon completion.
 6. Final completion, minimum of ten (10) photos.
- E. Views:
1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
 2. Consult with Architect for instructions on views required.
 3. Provide factual presentation.
 4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
- F. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
1. Delivery Medium: Via email.
 2. File Naming: Include project identification, date and time of view, and view identification.
 3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.
 4. Hard Copy: Printed hardcopy (grayscale) of PDF file and point of view sketch.

3.07 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: A request seeking one of the following:
1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 2. Prepare in a format and with content acceptable to Architect .
 - a. Use AIA G716 - Request for Information .
 - b. Use CSI/CSC Form 13.2A - Request for Interpretation.
 3. Prepare using an electronic version of the form appended to this section.
 4. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
1. Unacceptable Uses for RFIs: Do not use RFIs to request the following:
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 60 00 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 2. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response.
 3. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without

- a response.
- a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 - 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 - 2. Owner's, Architect's, and Contractor's names.
 - 3. Discrete and consecutive RFI number, and descriptive subject/title.
 - 4. Issue date, and requested reply date.
 - 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 - 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 - 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
 - 1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 - 2. Note dates of when each request is made, and when a response is received.
 - 3. Highlight items requiring priority or expedited response.
 - 4. Highlight items for which a timely response has not been received to date.
 - 5. Identify and include improper or frivolous RFIs.
- H. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt or ten calendar days if response is required by Architect's consultant(s). For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
 - 1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
 - 1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 - 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 - 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 - 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.08 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format.
 - 1. Submit at the same time as the preliminary schedule specified in Section - 01 32 16 - Construction Progress Schedule.
 - 2. Coordinate with Contractor's construction schedule and schedule of values.
 - 3. Format schedule to allow tracking of status of submittals throughout duration of construction.

4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
 - a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.09 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 1. Product data.
 2. Shop drawings.
 3. Samples for selection.
 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

3.10 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 1. Design data.
 2. Sustainability design submittals and reports.
 3. Certificates.
 4. Test reports.
 5. Inspection reports.
 6. Manufacturer's instructions.
 7. Manufacturer's field reports.
 8. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.11 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 78 00 - Closeout Submittals:
 1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.
 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.12 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Extra Copies at Project Closeout: See Section 01 78 00.
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 1. After review, produce duplicates.
 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.13 SUBMITTAL PROCEDURES

A. General Requirements:

1. Use a separate transmittal for each item.
2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
3. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
4. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
5. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
6. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - a. Send submittals in electronic format via email to Architect.
7. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
 - b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
 - c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days.
8. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
9. Provide space for Contractor and Architect review stamps.
10. When revised for resubmission, identify all changes made since previous submission.
11. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
12. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
13. Submittals not requested will not be recognized or processed.

B. Product Data Procedures:

1. Submit only information required by individual specification sections.
2. Collect required information into a single submittal.
3. Submit concurrently with related shop drawing submittal.
4. Do not submit (Material) Safety Data Sheets for materials or products.

C. Shop Drawing Procedures:

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
2. Do not reproduce Contract Documents to create shop drawings.
3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

D. Samples Procedures:

1. Transmit related items together as single package.
2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
3. Include with transmittal high-resolution image files of samples to facilitate electronic review and approval. Provide separate submittal page for each item image.

3.14 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.

- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
 - 1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. Architect's and consultants' actions on items submitted for review:
 - 1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "Approved", or language with same legal meaning.
 - b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
 - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
 - c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
 - 1) Resubmit corrected item, with review notations acknowledged and incorporated. Resubmit separately, or as part of project record documents.
 - 2) Non-responsive resubmittals may be rejected.
 - 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Revise and Resubmit".
 - 1) Resubmit revised item, with review notations acknowledged and incorporated.
 - 2) Non-responsive resubmittals may be rejected.
 - b. "Rejected".
 - 1) Submit item complying with requirements of Contract Documents.
- E. Architect's and consultants' actions on items submitted for information:
 - 1. Items for which no action was taken:
 - a. "Received" - to notify the Contractor that the submittal has been received for record only.
 - 2. Items for which action was taken:
 - a. "Reviewed" - no further action is required from Contractor.

END OF SECTION

SECTION 01 32 16
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type.
- C. Construction progress schedule, with network analysis diagrams and reports.

1.02 RELATED SECTIONS

- A. Section 01 10 00 - Summary: Work sequence.

1.03 REFERENCE STANDARDS

- A. AGC (CPSM) - Construction Planning and Scheduling Manual 2004.
- B. M-H (CPM) - CPM in Construction Management - Project Management with CPM 2015.

1.04 SUBMITTALS

- A. Within 10 days after date of Agreement, submit preliminary schedule.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.

1.05 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- B. Diagram Sheet Size: Maximum 22 x 17 inches.
- C. Sheet Size: Multiples of 8-1/2 x 11 inches.
- D. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- D. Provide legend for symbols and abbreviations used.

3.03 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

3.04 NETWORK ANALYSIS

- A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.
- B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
- C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
 - 1. Preceding and following event numbers.
 - 2. Activity description.
 - 3. Estimated duration of activity, in maximum 15 day intervals.
 - 4. Earliest start date.
 - 5. Earliest finish date.

6. Actual start date.
 7. Actual finish date.
 8. Latest start date.
 9. Latest finish date.
 10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
 11. Monetary value of activity, keyed to Schedule of Values.
 12. Percentage of activity completed.
 13. Responsibility.
- D. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and recomputation of all dates and float.
- E. Required Reports: List activities in sorts or groups:
1. By preceding work item or event number from lowest to highest.
 2. By amount of float, then in order of early start.

3.05 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.06 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.

3.07 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

**SECTION 01 40 00
QUALITY REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittals.
- B. Quality assurance.
- C. References and standards.
- D. Testing and inspection agencies and services.
- E. Contractor's construction-related professional design services.
- F. Contractor's design-related professional design services.
- G. Control of installation.
- H. Manufacturers' field services.
- I. Defect Assessment.

1.02 RELATED REQUIREMENTS

- A. Document 00 31 00 - Available Project Information: Soil investigation data.
- B. Document 00 72 00 - General Conditions: Inspections and approvals required by public authorities.
- C. Section 01 21 00 - Allowances: Allowance for payment of testing services.
- D. Section 01 30 00 - Administrative Requirements: Submittal procedures.
- E. Section 01 42 16 - Definitions.
- F. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.03 REFERENCE STANDARDS

- A. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation 2017.
- B. IAS AC89 - Accreditation Criteria for Testing Laboratories 2018.

1.04 DEFINITIONS

- A. Contractor's Quality Control Plan: Contractor's management plan for executing the Contract for Construction.
- B. Contractor's Professional Design Services: Design of some aspect or portion of the project by party other than the design professional of record. Provide these services as part of the Contract for Construction.
 - 1. Design Services Types Required:
 - a. Construction-Related: Services Contractor needs to provide in order to carry out the Contractor's sole responsibilities for construction means, methods, techniques, sequences, and procedures.
 - b. Design-Related: Design services explicitly required to be performed by another design professional due to highly-technical and/or specialized nature of a portion of the project. Services primarily involve engineering analysis, calculations, and design, and are not intended to alter the aesthetic aspects of the design.
- C. Design Data: Design-related, signed and sealed drawings, calculations, specifications, certifications, shop drawings and other submittals provided by Contractor, and prepared directly by, or under direct supervision of, appropriately licensed design professional.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Designer's Qualification Statement: Submit for Architect's knowledge as contract administrator, or for Owner's information.
 - 1. Include information for each individual professional responsible for producing, or supervising production of, design-related professional services provided by Contractor.
 - a. Full name.
 - b. Professional licensure information.
 - c. Statement addressing extent and depth of experience specifically relevant to design of items assigned to Contractor.
- C. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's

information.

1. Include calculations that have been used to demonstrate compliance to performance and regulatory criteria provided, and to determine design solutions.
 2. Include required product data and shop drawings.
 3. Include a statement or certification attesting that design data complies with criteria indicated, such as building codes, loads, functional, and similar engineering requirements.
 4. Include signature and seal of design professional responsible for allocated design services on calculations and drawings.
- D. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Compliance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.
 2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
- E. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- F. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- G. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
1. Submit report in duplicate within 30 days of observation to Architect for information.
 2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
- H. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
 2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.06 QUALITY ASSURANCE

- A. Testing Agency Qualifications:
1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
 3. Qualification Statement: Provide documentation showing testing laboratory is accredited under IAS AC89.

- B. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- C. Contractor's Quality Control (CQC) Plan:
 - 1. Prior to start of work, submit a comprehensive plan describing how contract deliverables will be produced. Tailor CQC plan to specific requirements of the project. Include the following information:
 - a. Management Structure: Identify personnel responsible for quality. Include a chart showing lines of authority.
 - 1) Include qualifications (in resume form), duties, responsibilities of each person assigned to CQC function.
 - b. Management Approach: Define, describe, and include in the plan specific methodologies used in executing the work.
 - 1) Management and control of documents and records relating to quality.
 - 2) Communications.
 - 3) Coordination procedures.
 - 4) Resource management.
 - 5) Process control.
 - 6) Inspection and testing procedures and scheduling.
 - 7) Control of noncomplying work.
 - 8) Tracking deficiencies from identification, through acceptable corrective action, and verification.
 - 9) Control of testing and measuring equipment.
 - 10) Project materials certification.
 - 11) Managerial continuity and flexibility.
 - c. Owner will not make a separate payment for providing and maintaining a Quality Control Plan. Include associated costs in Bid price.
 - d. Acceptance of the plan is required prior to start of construction activities not including mobilization work. Owner's acceptance of the plan will be conditional and predicated on continuing satisfactory adherence to the plan. Owner reserves the right to require Contractor to make changes to the plan and operations, including removal of personnel, as necessary, to obtain specified quality of work results.
- D. Quality-Control Personnel Qualifications. Engage a person with requisite training and experience to implement and manage quality assurance (QA) and quality control (QC) for the project.

1.07 REFERENCES AND STANDARDS

- A. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- B. Obtain copies of standards where required by product specification sections.
- C. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

1.08 TESTING AND INSPECTION AGENCIES AND SERVICES

PART 3 EXECUTION

2.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

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

2.02 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
- B. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 2. Perform specified sampling and testing of products in accordance with specified standards.
 - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
 - 5. Perform additional tests and inspections required by Architect.
 - 6. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 - 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 - 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 - 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

2.03 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

2.04 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.
- C. If, in the opinion of Owner, it is not practical to remove and replace the work, Owner will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 41 00
REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY OF REFERENCE STANDARDS

- A. Regulatory requirements applicable to this project are the following:
- B. 28 CFR 35 - Nondiscrimination on the Basis of Disability in State and Local Government Services; Final Rule; Department of Justice current edition.
- C. 28 CFR 36 - Nondiscrimination by Public Accommodations and in Commercial Facilities; Final Rule; Department of Justice current edition.
- D. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines current edition.
- E. 49 CFR 37 - Transportation Services for Individuals with Disabilities (ADA) current edition.
- F. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- G. FED-STD-795 - Uniform Federal Accessibility Standards (UFAS) 1988.
- H. 29 CFR 1910 - Occupational Safety and Health Standards current edition.
- I. State of Texas amendments to some or all of the following.
- J. City of Bryan amendments to some or all of the following.
- K. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- L. ICC (IFC) - International Fire Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- M. NFPA 1 - Fire Code 2018.
- N. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- O. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- P. NFPA 5000 - Building Construction and Safety Code 2018.
- Q. ICC (IPC) - International Plumbing Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- R. IAPMO (UPC) - Uniform Plumbing Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- S. ICC (IMC) - International Mechanical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- T. IAPMO (UPC) - Uniform Plumbing Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- U. ICC (IFGC) - International Fuel Gas Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- V. ICC (IPSDC) - International Private Sewage Disposal Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- W. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- X. Elevator Code: [_____].
- Y. ICC (IECC) - International Energy Conservation Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- Z. ICC (IPMC) - International Property Maintenance Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- AA. Existing Building Code: Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements..
- BB. Erosion and Sedimentation Control Regulations: Per requirements of Authority Having Jurisdiction..
- CC. Others not listed as indicated on Drawings..

1.02 RELATED REQUIREMENTS

A. Section 01 40 00 - Quality Requirements.

1.03 QUALITY ASSURANCE

A. Contractor's Designer Qualifications: Refer to Section - 01 40 00 - Quality Requirements.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 42 16
DEFINITIONS

PART 1 GENERAL

1.01 SUMMARY

- A. Other definitions are included in individual specification sections.

1.02 DEFINITIONS

- A. Furnish: To supply, deliver, unload, and inspect for damage.
- B. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.
- C. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.
- D. Project Manual: The book-sized volume that includes the procurement requirements (if any), the contracting requirements, and the specifications.
- E. Provide: To furnish and install.
- F. Supply: Same as Furnish.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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**SECTION 01 42 19
REFERENCE STANDARDS**

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Document 00 72 00 - General Conditions: Reference standards.

1.02 QUALITY ASSURANCE

- A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.
- C. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect shall be altered by Contract Documents by mention or inference otherwise in any reference document.

PART 2 CONSTRUCTION INDUSTRY ORGANIZATION DOCUMENTS

- 2.01 AA -- ALUMINUM ASSOCIATION, INC.
- 2.02 AABC -- ASSOCIATED AIR BALANCE COUNCIL
- 2.03 AAMA -- AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION
- 2.04 AASHTO -- AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
- 2.05 AATCC -- AMERICAN ASSOCIATION OF TEXTILE CHEMISTS & COLORISTS
- 2.06 ABMA -- AMERICAN BEARING MANUFACTURERS ASSOCIATION, INC.
- 2.07 ACA -- AMERICAN COATINGS ASSOCIATION
- 2.08 ACG -- AABC COMMISSIONING GROUP
- 2.09 ACGIH -- AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS
- 2.10 ACI -- AMERICAN CONCRETE INSTITUTE INTERNATIONAL
- 2.11 ADC -- AIR DIFFUSION COUNCIL
- 2.12 AEIC -- ASSOCIATION OF EDISON ILLUMINATING COMPANIES
- 2.13 AFPA -- AMERICAN FOREST AND PAPER ASSOCIATION
- 2.14 AGA -- AMERICAN GALVANIZERS ASSOCIATION, INC.
- 2.15 AGC -- ASSOCIATED GENERAL CONTRACTORS OF AMERICA
- 2.16 AGMA -- AMERICAN GEAR MANUFACTURERS ASSOCIATION
- 2.17 AHA -- AMERICAN HARDBOARD ASSOCIATION
- 2.18 AHAM -- ASSOCIATION OF HOME APPLIANCE MANUFACTURERS:
- 2.19 AHRI -- AIR-CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE
- 2.20 AI -- THE ASPHALT INSTITUTE
- 2.21 AIA -- THE AMERICAN INSTITUTE OF ARCHITECTS
- 2.22 AISC -- AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.

- 2.23 AISI -- AMERICAN IRON AND STEEL INSTITUTE
- 2.24 AIST -- ASSOCIATION FOR IRON AND STEEL TECHNOLOGY
- 2.25 AITC -- AMERICAN INSTITUTE OF TIMBER CONSTRUCTION
- 2.26 ALI -- AMERICAN LADDER INSTITUTE
- 2.27 ALSC -- AMERICAN LUMBER STANDARDS COMMITTEE
- 2.28 AMCA -- AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.
- 2.29 ANSI -- AMERICAN NATIONAL STANDARDS INSTITUTE
- 2.30 AOSA -- ASSOCIATION OF OFFICIAL SEED ANALYSTS
- 2.31 APA -- APA - THE ENGINEERED WOOD ASSOCIATION
- 2.32 APHA -- AMERICAN PUBLIC HEALTH ASSOCIATION
- 2.33 API -- AMERICAN PETROLEUM INSTITUTE
- 2.34 API -- ALLIANCE FOR THE POLYURETHANES INDUSTRY, AMERICAN PLASTICS COUNCIL
- 2.35 APSP -- ASSOCIATION OF POOL & SPA PROFESSIONALS
- 2.36 ARI -- AIR-CONDITIONING AND REFRIGERATION INSTITUTE (SEE AHRI)
- 2.37 ARPM - ASSOCIATION FOR RUBBER PRODUCTS MANUFACTURERS
- 2.38 ARRA -- ASPHALT RECYCLING AND RECLAIMING ASSOCIATION
- 2.39 ASA -- ACOUSTICAL SOCIETY OF AMERICA
- 2.40 ASCA -- ARCHITECTURAL SPRAY COATERS ASSOCIATION
- 2.41 ASCE -- AMERICAN SOCIETY OF CIVIL ENGINEERS
- 2.42 ASHE -- AMERICAN SOCIETY FOR HEALTH CARE ENGINEERING (AMERICAN HOSPITAL ASSOCIATION)
- 2.43 ASHRAE -- AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.
- 2.44 ASME -- THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
- 2.45 ASPA -- AMERICAN SOD PRODUCERS ASSOCIATION (SEE TURFGRASS PRODUCERS INTERNATIONAL)
- 2.46 ASPE -- AMERICAN SOCIETY OF PLUMBING ENGINEERS
- 2.47 ASSE -- AMERICAN SOCIETY OF SANITARY ENGINEERING
- 2.48 ASTM A SERIES -- ASTM INTERNATIONAL
 - A. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement 2016.
- 2.49 ASTM E SERIES -- ASTM INTERNATIONAL
- 2.50 AWCI -- ASSOCIATION OF THE WALL AND CEILING INDUSTRIES INTERNATIONAL
- 2.51 AWI -- ARCHITECTURAL WOODWORK INSTITUTE
- 2.52 AWPA -- AMERICAN WOOD-PRESERVERS' ASSOCIATION
- 2.53 AWPB -- AMERICAN WOOD PRESERVERS BUREAU
- 2.54 AWS -- AMERICAN WELDING SOCIETY
- 2.55 AWWA -- AMERICAN WATER WORKS ASSOCIATION

- 2.56 BHMA -- BUILDERS HARDWARE MANUFACTURERS ASSOCIATION
- 2.57 BIA -- BRICK INDUSTRY ASSOCIATION
- 2.58 BIFMA -- BUSINESS AND INSTITUTIONAL FURNITURE MANUFACTURERS ASSOCIATION
- 2.59 BOMA -- BUILDING OWNERS AND MANAGERS ASSOCIATION
- 2.60 BSI -- BRITISH STANDARDS INSTITUTION
- 2.61 BLUETOOTH CS - BLUETOOTH CORE SPECIFICATION;2016, ADDENDUM 2017.
- 2.62 C2C -- CRADLE TO CRADLE PRODUCTS INNOVATION INSTITUTE
- 2.63 CABO -- COUNCIL OF AMERICAN BUILDING OFFICIALS:
- 2.64 CAGI -- COMPRESSED AIR AND GAS INSTITUTE
- 2.65 CAL -- STATE OF CALIFORNIA
- 2.66 CAN -- STANDARDS COUNCIL OF CANADA (NATIONAL STANDARDS OF CANADA)
- 2.67 CARB -- CALIFORNIA AIR RESOURCES BOARD
- 2.68 CBMA -- CERTIFIED BALLAST MANUFACTURERS ASSOCIATION
- 2.69 CDA -- COPPER DEVELOPMENT ASSOCIATION, INC.
- 2.70 CEA -- CONSUMER ELECTRONICS ASSOCIATION
- 2.71 CEN -- COMITÉ EUROPÉEN DE NORMALISATION (EUROPEAN COMMITTEE FOR STANDARDS)
- 2.72 CFSEI - COLD-FORMED STEEL ENGINEERS INSTITUTE
- 2.73 CGA -- CANADIAN GAS ASSOCIATION
- 2.74 CGA -- COMPRESSED GAS ASSOCIATION
- 2.75 CGSB -- CANADIAN GENERAL STANDARDS BOARD
- 2.76 CHPS -- COLLABORATIVE FOR HIGH PERFORMANCE SCHOOLS
- 2.77 CIA SSG - CANOPEN SPECIFICATIONS, STANDARDS AND GUIDELINES;CURRENT EDITION.
- 2.78 CISCA -- CEILINGS & INTERIOR SYSTEMS CONSTRUCTION ASSOCIATION
- 2.79 CISPI -- CAST IRON SOIL PIPE INSTITUTE
- 2.80 CLFMI -- CHAIN LINK FENCE MANUFACTURERS INSTITUTE
- 2.81 CMR -- CODE OF MASSACHUSETTS REGULATIONS
- 2.82 CONSENSUSDOCS -- CONSENSUSDOCS, LLC
- 2.83 CPA -- COMPOSITE PANEL ASSOCIATION
- 2.84 CRI -- CARPET AND RUG INSTITUTE
- 2.85 CRRC -- COOL ROOF RATING COUNCIL
- 2.86 CRSI -- CONCRETE REINFORCING STEEL INSTITUTE
- 2.87 CSA -- CSA INTERNATIONAL (FORMERLY CANADIAN STANDARDS ASSOCIATION)
- 2.88 CSFM -- CALIFORNIA STATE FIRE MARSHAL
- 2.89 CSI/CSC -- CONSTRUCTION SPECIFICATIONS INSTITUTE/CONSTRUCTION SPECIFICATIONS CANADA
- 2.90 CSSB -- CEDAR SHAKE AND SHINGLE BUREAU
- 2.91 CTA -- CONSUMER TECHNOLOGY ASSOCIATION (FORMERLY CONSUMER ELECTRONICS ASSOCIATION)
- 2.92 CTI -- CERAMIC TILE INSTITUTE
- 2.93 CTI -- COOLING TECHNOLOGY INSTITUTE
- 2.94 DASMA -- DOOR & ACCESS SYSTEMS MANUFACTURERS' ASSOCIATION, INTERNATIONAL
- 2.95 DBIA -- THE DESIGN BUILD INSTITUTE OF AMERICA, INC.
- 2.96 DFI -- DEEP FOUNDATION INSTITUTE
- 2.97 DHI -- DOOR AND HARDWARE INSTITUTE
- 2.98 DIN -- DEUTSCHES INSTITUT FUR NORMUNG
- 2.99 DIPRA - DUCTILE IRON PIPE RESEARCH ASSOCIATION
- 2.100 DOCSIS -- DATA-OVER-CABLE SERVICE INTERFACE SPECIFICATIONS
- 2.101 EC -- EUROPEAN COMMISSION
- 2.102 ECHA -- EUROPEAN CHEMICALS AGENCY
- 2.103 EIA -- ELECTRONIC INDUSTRIES ALLIANCE
- 2.104 EIA -- ENVIRONMENTAL INDUSTRY ASSOCIATION
- 2.105 EIMA -- EXTERIOR INSULATION MANUFACTURERS ASSOCIATION

- 2.106 EJCDC -- ENGINEERS' JOINT CONTRACT DOCUMENTS COMMITTEE
- 2.107 EJMA -- EXPANSION JOINT MANUFACTURERS ASSOCIATION
- 2.108 ETG -- ETHERCAT TECHNOLOGY GROUP
- 2.109 ETL -- ETL TESTING LABORATORY
- 2.110 FIELDCOMM GROUP (FFTS) - FOUNDATION FIELDBUS TECHNICAL SPECIFICATIONS;2014.
- 2.111 FEMA -- FEDERAL EMERGENCY MANAGEMENT AGENCY
- 2.112 FLA -- STATE OF FLORIDA
- 2.113 FM -- FACTORY MUTUAL GLOBAL
- 2.114 GA -- GYPSUM ASSOCIATION
- 2.115 GANA -- GLASS ASSOCIATION OF NORTH AMERICA
- 2.116 GEI -- GREENGUARD ENVIRONMENTAL INSTITUTE
- 2.117 GREEN GLOBES -- GREEN BUILDING INITIATIVE
- 2.118 GREENSEAL -- GREENSEAL, INC.
- 2.119 GREENSCREEN -- CLEAN PRODUCTION ACTION
- 2.120 GRI -- GEOSYNTHETIC RESEARCH INSTITUTE
- 2.121 HI -- HYDRAULIC INSTITUTE
- 2.122 HI -- THE HYDRONICS INSTITUTE (SEE AHRI)
- 2.123 HPDC -- HEALTH PRODUCT DECLARATION COLLABORATIVE
- 2.124 HPVA -- HARDWOOD PLYWOOD VENEER ASSOCIATION
- 2.125 HPW -- H.P. WHITE LABORATORY, INC.
- 2.126 IAAF -- INTERNATIONAL AMATEUR ATHLETIC FEDERATION
- 2.127 IAPMO -- INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS
- 2.128 IAS -- INTERNATIONAL ACCREDITATION SERVICE
- 2.129 ICBO -- INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS
- 2.130 ICBO-ES -- ICBO EVALUATION SERVICE, INC.
- 2.131 ICC -- INTERNATIONAL CODE COUNCIL, INC.
- 2.132 ICC-ES -- ICC EVALUATION SERVICE, INC.
- 2.133 ICEA -- INSULATED CABLE ENGINEERS ASSOCIATION
- 2.134 ICN - THE INSTITUTE OF CHILD NUTRITION, WWW.THEICN.ORG
- 2.135 ICRI -- INTERNATIONAL CONCRETE REPAIR INSTITUTE
- 2.136 IEC -- INTERNATIONAL ELECTROTECHNICAL COMMISSION
- 2.137 IEEE -- INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS
- 2.138 IES/IESNA -- ILLUMINATING ENGINEERING SOCIETY
- 2.139 IETF -- INTERNET ENGINEERING TASK FORCE
- 2.140 IGMA -- INSULATING GLASS MANUFACTURERS ALLIANCE
- 2.141 IGSHPA -- INTERNATIONAL GROUND SOURCE HEAT PUMP ASSOCIATION
- 2.142 IIR -- INTERNATIONAL INSTITUTE OF AMMONIA REFRIGERATION
- 2.143 ILFI -- INTERNATIONAL LIVING FUTURE INSTITUTE
- 2.144 ILI -- INDIANA LIMESTONE INSTITUTE OF AMERICA, INC.
- 2.145 IMIAWC -- INTERNATIONAL MASONRY INDUSTRY ALL-WEATHER COUNCIL
- 2.146 ISA -- INSTRUMENT SOCIETY OF AMERICA
- 2.147 ISDI -- INSULATED STEEL DOOR INSTITUTE
- 2.148 ISFA - INTERNATIONAL SURFACE FABRICATORS ASSOCIATION
- 2.149 ISS -- IRON AND STEEL SOCIETY
- 2.150 ISSFA - INTERNATIONAL SOLID SURFACE FABRICATORS ASSOCIATION
- 2.151 ISO -- INTERNATIONAL STANDARDS ORGANIZATION
- 2.152 ITS -- INTERTEK TESTING SERVICES NA, INC.
- 2.153 ITU-T -- INTERNATIONAL TELECOMMUNICATIONS UNION -TELECOMMUNICATION STANDARDIZATION
SECTOR
- 2.154 IWBI -- INTERNATIONAL WELL BUILDING INSTITUTE

- 2.155 KCMA -- KITCHEN CABINET MANUFACTURERS ASSOCIATION
- 2.156 LIA -- LEAD INDUSTRIES ASSOCIATION, INC.
- 2.157 LONMARK -- LONMARK INTERNATIONAL
- 2.158 LPI -- LIGHTNING PROTECTION INSTITUTE
- 2.159 MBMA -- METAL BUILDING MANUFACTURERS ASSOCIATION
- 2.160 M-H -- MCGRAW-HILL BOOK COMPANY
- 2.161 MFMA -- MAPLE FLOORING MANUFACTURERS ASSOCIATION
- 2.162 MFMA -- METAL FRAMING MANUFACTURERS ASSOCIATION
- 2.163 MIAMI -- MIAMI-DADE COUNTY
- 2.164 MICROSOFT DOCS - MICROSOFT TECHNICAL DOCUMENTATION;CURRENT EDITION.
- 2.165 ML/SFA -- METAL LATH/STEEL FRAMING ASSOCIATION - SEE NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS
- 2.166 MPI -- MASTER PAINTERS INSTITUTE (MASTER PAINTERS AND DECORATORS ASSOCIATION)
- 2.167 MMSA -- MATERIALS AND METHODS STANDARDS ASSOCIATION
- 2.168 MSS -- MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY, INC.
- 2.169 NAA -- NATIONAL ARBORIST ASSOCIATION
- 2.170 NAAMM -- THE NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS
- 2.171 NACE -- NACE INTERNATIONAL
- 2.172 NADCA -- NATIONAL AIR DUCT CLEANING ASSOCIATION
- 2.173 NAGDM -- NATIONAL ASSOCIATION OF GARAGE DOOR MANUFACTURERS
- 2.174 NAMM -- NATIONAL ASSOCIATION OF MIRROR MANUFACTURERS
- 2.175 NASSPA -- NORTH AMERICAN STEEL SHEET PILE ASSOCIATION
- 2.176 NBBI -- THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS
- 2.177 NBGQA -- NATIONAL BUILDING GRANITE QUARRIES ASSOCIATION, INC.
- 2.178 NBI -- NEW BUILDINGS INSTITUTE
- 2.179 NCAA -- NATIONAL COLLEGIATE ATHLETIC ASSOCIATION
- 2.180 NCMA -- NATIONAL CONCRETE MASONRY ASSOCIATION
- 2.181 NCWPB - NATIONAL CERTIFIED PIPE WELDING BUREAU
- 2.182 NCRP -- NATIONAL COUNCIL ON RADIATION PROTECTION AND MEASUREMENTS
- 2.183 NEBB -- NATIONAL ENVIRONMENTAL BALANCING BUREAU
- 2.184 NECA -- NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION
- 2.185 NEII -- NATIONAL ELEVATOR INDUSTRY, INC.
- 2.186 NELMA -- NORTHEASTERN LUMBER MANUFACTURERS ASSOCIATION, INC.
- 2.187 NEMA -- NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
- 2.188 NETA -- INTERNATIONAL ELECTRICAL TESTING ASSOCIATION
- 2.189 NFHS -- NATIONAL FEDERATION OF STATE HIGH SCHOOL ASSOCIATIONS:
- 2.190 NFPA -- NATIONAL FIRE PROTECTION ASSOCIATION
- 2.191 NFRC -- NATIONAL FENESTRATION RATING COUNCIL, INC.
- 2.192 NHLA -- NATIONAL HARDWOOD LUMBER ASSOCIATION
- 2.193 NIBS -- NATIONAL INSTITUTE OF BUILDING SCIENCES
- 2.194 NIST -- NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (U.S. DEPARTMENT OF COMMERCE)
- 2.195 NLA -- NATIONAL LIME ASSOCIATION
- 2.196 NLGA -- NATIONAL LUMBER GRADES AUTHORITY (CANADA)
- 2.197 NOFMA -- NATIONAL OAK FLOORING MANUFACTURERS ASSOCIATION
- 2.198 NPA -- NATIONAL PARTICLEBOARD ASSOCIATION
- 2.199 NPCA -- NATIONAL PAINT AND COATINGS ASSOCIATION
- 2.200 NRCA -- NATIONAL ROOFING CONTRACTORS ASSOCIATION
- 2.201 NSF -- NSF INTERNATIONAL (THE PUBLIC HEALTH AND SAFETY ORGANIZATION)
- 2.202 NSI -- NATURAL STONE INSTITUTE
- 2.203 NSPI -- NATIONAL SPA AND POOL INSTITUTE

- 2.204 NSSA - NATIONAL STORM SHELTER ASSOCIATION
- 2.205 NSWMA -- NATIONAL SOLID WASTES MANAGEMENT ASSOCIATION
- 2.206 NTMA -- NATIONAL TERRAZZO AND MOSAIC ASSOCIATION, INC., THE
- 2.207 NTMA -- NATIONAL TILE AND MARBLE ASSOCIATION
- 2.208 NWFA -- NATIONAL WOOD FLOORING ASSOCIATION
- 2.209 NWWDA -- NATIONAL WOOD WINDOW AND DOOR ASSOCIATION (NAME CHANGED TO WDMA)
- 2.210 ODVA -- OPEN DEVICENET VENDOR ASSOCIATION, INC.
- 2.211 OPC -- OPEN PLATFORM COMMUNICATIONS FOUNDATION
- 2.212 ORACLE -- ORACLE INTEGRATED CLOUD APPLICATIONS & PLATFORM SERVICES
- 2.213 OWMA -- OPERABLE WALL MANUFACTURERS ASSOCIATION
- 2.214 PCA -- PORTLAND CEMENT ASSOCIATION
- 2.215 PCI -- PRECAST/PRESTRESSED CONCRETE INSTITUTE
- 2.216 PDCA -- PAINTING AND DECORATING CONTRACTORS OF AMERICA
- 2.217 PDI -- PLUMBING AND DRAINAGE INSTITUTE
- 2.218 PECE - PORTLAND ENERGY CONSERVATION, INC.
- 2.219 PEI -- PORCELAIN ENAMEL INSTITUTE
- 2.220 PHCC -- PLUMBING HEATING COOLING CONTRACTORS ASSOCIATION
- 2.221 PROFIBUS/PROFINET SSG - PROFINET, PROFIBUS, AND IO-LINK SPECIFICATIONS, STANDARDS AND GUIDELINES;CURRENT EDITION.
- 2.222 PPI -- PLASTICS PIPE INSTITUTE
- 2.223 PTI -- POST-TENSIONING INSTITUTE
- 2.224 RCSC -- RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS
- 2.225 RIS -- REDWOOD INSPECTION SERVICE
- 2.226 RFCI -- RESILIENT FLOOR COVERING INSTITUTE
- 2.227 RTI - ROOF TILE INSTITUTE
- 2.228 SAE -- SAE INTERNATIONAL
- 2.229 SBCCI -- SOUTHERN BUILDING CODE CONGRESS INTERNATIONAL, INC.
- 2.230 SCAQMD -- SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
- 2.231 SCMA -- SOUTHERN CYPRESS MANUFACTURERS ASSOCIATION
- 2.232 SCS - SCIENTIFIC CERTIFICATION SYSTEMS
- 2.233 SCTE -- SOCIETY OF CABLE TELECOMMUNICATIONS ENGINEERS
- 2.234 SDI -- STEEL DECK INSTITUTE
 - A. SDI (QA/QC) - Standard for Quality Control and Quality Assurance for Installation of Steel Deck 2017.
- 2.235 SDI -- STEEL DOOR INSTITUTE
- 2.236 SEFA -- SCIENTIFIC EQUIPMENT AND FURNITURE ASSOCIATION
- 2.237 SIGMA -- SEALED INSULATING GLASS MANUFACTURERS ASSOCIATION (SEE IGMA)

- 2.238 SJI -- STEEL JOIST INSTITUTE**
 - 2.239 SMA -- SCREEN MANUFACTURERS ASSOCIATION**
 - 2.240 SMA -- STUCCO MANUFACTURERS ASSOCIATION, INC.**
 - 2.241 SMACNA -- SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION, INC.**
 - 2.242 SPIB -- SOUTHERN PINE INSPECTION BUREAU, INC.**
 - 2.243 SPRI -- SINGLE PLY ROOFING INDUSTRY**
 - 2.244 SRI -- STEEL RECYCLING INSTITUTE**
 - 2.245 SSPC -- SOCIETY FOR PROTECTIVE COATINGS**
 - 2.246 STI -- STEEL TANK INSTITUTE**
 - 2.247 SWI -- STEEL WINDOW INSTITUTE**
 - 2.248 SWRI -- SEALANT, WATERPROOFING AND RESTORATION INSTITUTE**
 - 2.249 TCNA -- TILE COUNCIL OF NORTH AMERICA, INC.**
 - 2.250 TDI -- TEXAS DEPARTMENT OF INSURANCE**
 - 2.251 TIA -- TELECOMMUNICATIONS INDUSTRY ASSOCIATION**
 - 2.252 TIMA -- TIMA**
 - 2.253 TMS -- THE MASONRY SOCIETY**
 - A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2016.
 - 2.254 TPI -- TRUSS PLATE INSTITUTE**
 - 2.255 TPI -- TURFGRASS PRODUCERS INTERNATIONAL**
 - 2.256 UL -- UNDERWRITERS LABORATORIES INC.**
 - 2.257 ULC -- UNDERWRITERS' LABORATORIES OF CANADA**
 - 2.258 USGBC -- U.S. GREEN BUILDING COUNCIL**
 - 2.259 VSI -- VINYL SIDING INSTITUTE, A DIVISION OF THE SOCIETY OF THE PLASTICS INDUSTRY, INC.**
 - 2.260 W3C SSG - WEB OF SERVICES STANDARDS COLLECTION (HTTP, XML, WSDL, UDDI, AND OTHERS);CURRENT EDITION.**
 - 2.261 WCMA -- WINDOW COVERING MANUFACTURERS ASSOCIATION**
 - 2.262 WDMA -- WINDOW AND DOOR MANUFACTURERS ASSOCIATION (FORMERLY NWWDA)**
 - 2.263 WI -- WOODWORK INSTITUTE**
 - 2.264 WMMPA -- WOOD MOULDING AND MILLWORK PRODUCERS ASSOCIATION**
 - 2.265 WRCLA -- WESTERN RED CEDAR LUMBER ASSOCIATION**
 - 2.266 WWPA -- WESTERN WOOD PRODUCTS ASSOCIATION**
- PART 3 UNITED STATES GOVERNMENT AND RELATED AGENCIES DOCUMENTS**
- 3.01 ATBCB -- US ARCHITECTURAL AND TRANSPORTATION BARRIERS COMPLIANCE BOARD (THE ACCESS BOARD)**
 - 3.02 CFR -- CODE OF FEDERAL REGULATIONS**

- 3.03 COE -- CORPS OF ENGINEERS, U.S. ARMY
 - 3.04 CPSC -- CONSUMER PRODUCTS SAFETY COMMISSION
 - 3.05 DOS -- UNITED STATES DEPARTMENT OF STATE
 - 3.06 EPA -- ENVIRONMENTAL PROTECTION AGENCY
 - 3.07 FAA -- FEDERAL AVIATION ADMINISTRATION
 - 3.08 FDA -- FOOD AND DRUG ADMINISTRATION
 - 3.09 FEMA -- U.S. FEDERAL EMERGENCY MANAGEMENT AGENCY
 - 3.10 FHWA -- FEDERAL HIGHWAY ADMINISTRATION
 - 3.11 FS -- FEDERAL SPECIFICATIONS AND STANDARDS (GENERAL SERVICES ADMINISTRATION)
 - 3.12 GSA -- U.S. GENERAL SERVICES ADMINISTRATION
 - 3.13 HHS -- U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, CENTERS FOR DISEASE CONTROL AND PREVENTION
 - 3.14 MIL -- MILITARY SPECIFICATIONS AND STANDARDS
 - 3.15 NASEM -- NATIONAL ACADEMIES OF SCIENCE, ENGINEERING, AND MEDICINE
 - 3.16 NIJ -- NATIONAL INSTITUTE OF JUSTICE (DEPT. OF JUSTICE)
 - 3.17 NPS -- NATIONAL PARK SERVICE (DEPT. OF THE INTERIOR)
 - 3.18 NSA -- NATIONAL SECURITY AGENCY
 - 3.19 PS -- PRODUCT STANDARDS
 - 3.20 USAB -- UNITED STATES ACCESS BOARD
 - 3.21 USC -- UNITED STATES CODE
 - 3.22 USDA -- UNITED STATES DEPARTMENT OF AGRICULTURE
 - 3.23 USDHUD -- UNITED STATES DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
 - 3.24 USGS -- UNITED STATES GEOLOGICAL SURVEY
- END OF SECTION

SECTION 01 45 33
CODE-REQUIRED SPECIAL INSPECTIONS AND PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Testing services incidental to special inspections.
- B. Submittals.
- C. Manufacturers' field services.
- D. Fabricators' field services.

1.02 RELATED REQUIREMENTS

- A. Document 00 31 00 - Available Project Information: Soil investigation data.
- B. Inspections and approvals required by public authorities.
- C. Section 01 30 00 - Administrative Requirements: Submittal procedures.
- D. Section 01 40 00 - Quality Requirements.
- E. Section 01 42 19 - Reference Standards.
- F. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.03 ABBREVIATIONS AND ACRONYMS

- A. AHJ: Authority having jurisdiction.
- B. IAS: International Accreditation Service, Inc.
- C. NIST: National Institute of Standards and Technology.

1.04 DEFINITIONS

- A. Code or Building Code: ICC (IBC), International Building Code, Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements and specifically, Chapter 17 - Special Inspections and Tests.
- B. Authority Having Jurisdiction (AHJ): Agency or individual officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located.
- C. Special Inspection:
 - 1. Special inspections are inspections and testing of materials, installation, fabrication, erection or placement of components and connections mandated by the AHJ that also require special expertise to ensure compliance with the approved Contract Documents and the referenced standards.
 - 2. Special inspections are separate from and independent of tests and inspections conducted by Owner or Contractor for the purposes of quality assurance and contract administration.

1.05 REFERENCE STANDARDS

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary 2014 (Errata 2018).
- B. AISC 360 - Specification for Structural Steel Buildings 2016.
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2020.
- E. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement 2016.
- F. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field 2019a.
- G. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete 2017.
- H. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction 2019.
- I. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection 2020.
- J. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing 2015.
- K. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020.
- L. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel 2018.
- M. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel 2018.

- N. IAS AC89 - Accreditation Criteria for Testing Laboratories 2018.
- O. IAS AC291 - Accreditation Criteria for Special Inspection Agencies 2017.
- P. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- Q. SDI (QA/QC) - Standard for Quality Control and Quality Assurance for Installation of Steel Deck 2017.
- R. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2016.

1.06 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Testing Agency Qualifications: Prior to the start of work, the Testing Agency is required to:
 - 1. Submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
 - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
 - 3. Submit certification that Testing Agency is acceptable to AHJ.
- C. Test Reports: After each test or inspection, promptly submit at least two copies of report; one to Architect and one to AHJ.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test or inspection.
 - h. Date of test or inspection.
 - i. Results of test or inspection.
 - j. Compliance with Contract Documents.

1.07 TESTING AND INSPECTION AGENCIES

- A. Owner or Architect may employ services of an independent testing agency to perform additional testing and sampling associated with special inspections but not required by the building code.
- B. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 TESTING AND INSPECTION AGENCY DUTIES AND RESPONSIBILITIES

- A. Testing Agency Duties:
 - 1. Test samples submitted by Contractor.
 - 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 3. Perform specified sampling and testing of products in accordance with specified standards.
 - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of work or products.
 - 6. Perform additional tests and inspections required by Architect.
 - 7. Submit reports of all tests or inspections specified.
- B. Limits on Testing or Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the work.

- C. On instructions by Architect, perform re-testing required because of non-compliance with specified requirements, using the same agency.
- D. Contractor will pay for re-testing required because of non-compliance with specified requirements.

3.02 CONTRACTOR DUTIES AND RESPONSIBILITIES

- A. Contractor Responsibilities, General:
 - 1. Deliver to agency at designated location, adequate samples of materials for special inspections that require material verification.
 - 2. Cooperate with agency and laboratory personnel; provide access to approved documents at project site, to the work, to manufacturers' facilities, and to fabricators' facilities.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to work to be tested or inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested or inspected.
 - c. To facilitate tests or inspections.
 - d. To provide storage and curing of test samples.
 - 4. Notify Architect and laboratory 3 days prior to expected time for operations requiring testing or inspection services.
 - 5. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 - 6. Retain special inspection records.

3.03 MANUFACTURERS' AND FABRICATORS' FIELD SERVICES

- A. When specified in individual specification sections, require material suppliers, assembly fabricators, or product manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, to test, adjust, and balance equipment, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

END OF SECTION

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SECTION 01 57 13
TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Prevention of erosion due to construction activities.
- B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.
- C. Restoration of areas eroded due to insufficient preventive measures.
- D. Performance bond.
- E. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.02 RELATED REQUIREMENTS

- A. Section 01 33 29.02 - Sustainable Design Reporting - LEED v4: Submittal requirements for sustainable design documentation.
- B. Section 01 33 29.03 - Sustainable Design Reporting - Green Globes: Submittal requirements for sustainable design documentation.
- C. Section 03 30 00 - Cast-in-Place Concrete: Concrete for temporary and permanent erosion control structures indicated on drawings.
- D. Section 31 10 00 - Site Clearing: Limits on clearing; disposition of vegetative clearing debris.
- E. Section 31 22 00 - Grading: Temporary and permanent grade changes for erosion control.
- F. Section 31 37 00 - Riprap: Temporary and permanent stabilization using riprap.
- G. Section 32 11 23 - Aggregate Base Courses: Temporary and permanent roadways.
- H. Section 32 92 19 - Seeding: Permanent turf for erosion control.
- I. Section 32 92 23 - Sodding: Permanent turf for erosion control.
- J. Section 32 93 00 - Plants: Permanent plantings for erosion control.

1.03 REFERENCE STANDARDS

- A. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc-Type Apparatus 2014 (Reapproved 2018).
- B. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity. 1999a (Reapproved 2014).
- C. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles 2015a.
- D. ASTM D4751 - Standard Test Methods for Determining Apparent Opening Size of a Geotextile 2020a.
- E. ASTM D4873/D4873M - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples 2017.
- F. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit Current Edition.
- G. FHWA FLP-94-005 - Best Management Practices for Erosion and Sediment Control 1995.
- H. USDA TR-55 - Urban Hydrology for Small Watersheds; USDA Natural Resources Conservation Service 2015.

1.04 PERFORMANCE REQUIREMENTS

- A. Comply with requirements of EPA (NPDES) for erosion and sedimentation control, as specified by the NPDES, for Phases I and II, and in compliance with requirements of Construction General Permit (CGP), whether the project is required by law to comply or not.
- B. Also comply with all more stringent requirements of State of Texas Erosion and Sedimentation Control Manual.
- C. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.
- D. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
- E. Provide to Owner a Performance Bond covering erosion and sedimentation preventive measures only, in an amount equal to 100 percent of the cost of erosion and sedimentation control work.
- F. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

- G. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
 - 1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
 - 2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.
- H. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
 - 1. Control movement of sediment and soil from temporary stockpiles of soil.
 - 2. Prevent development of ruts due to equipment and vehicular traffic.
 - 3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- I. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
 - 1. Prevent windblown soil from leaving the project site.
 - 2. Prevent tracking of mud onto public roads outside site.
 - 3. Prevent mud and sediment from flowing onto sidewalks and pavements.
 - 4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- J. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
 - 1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
 - 2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.
- K. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
 - 1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
- L. Open Water: Prevent standing water that could become stagnant.
- M. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Erosion and Sedimentation Control Plan:
 - 1. Submit within 2 weeks after Notice to Proceed.
 - 2. Include:
 - a. Site plan identifying soils and vegetation, existing erosion problems, and areas vulnerable to erosion due to topography, soils, vegetation, or drainage.
 - b. Site plan showing grading; new improvements; temporary roads, traffic accesses, and other temporary construction; and proposed preventive measures.
 - c. Where extensive areas of soil will be disturbed, include storm water flow and volume calculations, soil loss predictions, and proposed preventive measures.
 - d. Schedule of temporary preventive measures, in relation to ground disturbing activities.
 - e. Other information required by law.
 - f. Format required by law is acceptable, provided any additional information specified is also included.
 - 3. Obtain the approval of the Plan by authorities having jurisdiction.
 - 4. Obtain the approval of the Plan by Owner.
- C. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished.

PART 3 EXECUTION

2.01 EXAMINATION

- A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

2.02 PREPARATION

- A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

2.03 SCOPE OF PREVENTIVE MEASURES

- A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.
- B. Construction Entrances: Traffic-bearing aggregate surface.
 - 1. Width: As required; 20 feet, minimum.
 - 2. Length: 50 feet, minimum.
 - 3. Provide at each construction entrance from public right-of-way.
 - 4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.
- C. Linear Sediment Barriers: Made of silt fences.
 - 1. Provide linear sediment barriers:
 - a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.
 - 2. Space sediment barriers with the following maximum slope length upslope from barrier:
 - a. Slope of Less Than 2 Percent: 100 feet..
 - b. Slope Between 2 and 5 Percent: 75 feet.
 - c. Slope Between 5 and 10 Percent: 50 feet.
 - d. Slope Between 10 and 20 Percent: 25 feet.
 - e. Slope Over 20 Percent: 15 feet.
- D. Storm Drain Curb Inlet Sediment Trap: Protect each curb inlet using one of the following measures:
 - 1. Filter fabric wrapped around hollow concrete blocks blocking entire inlet face area; use one piece of fabric wrapped at least 1-1/2 times around concrete blocks and secured to prevent dislodging; orient cores of blocks so runoff passes into inlet.
 - 2. Straw bale row blocking entire inlet face area; anchor into pavement.
- E. Storm Drain Drop Inlet Sediment Traps: As detailed on drawings.
- F. Temporary Splash Pads: Stone aggregate over filter fabric; size to suit application; provide at downspout outlets and storm water outlets.
- G. Soil Stockpiles: Protect using one of the following measures:
 - 1. Cover with polyethylene film, secured by placing soil on outer edges.
 - 2. Cover with mulch at least 4 inches thickness of pine needles, sawdust, bark, wood chips, or shredded leaves, or 6 inches of straw or hay.
- H. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.
- I. Temporary Seeding: Use where temporary vegetated cover is required.

2.04 MAINTENANCE

- A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.
- B. Repair deficiencies immediately.
- C. Silt Fences:
 - 1. Promptly replace fabric that deteriorates unless need for fence has passed.
 - 2. Remove silt deposits that exceed one-third of the height of the fence.
 - 3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.
- D. Clean out temporary sediment control structures weekly and relocate soil on site.
- E. Place sediment in appropriate locations on site; do not remove from site.

2.05 CLEAN UP

- A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Architect.
- B. Clean out temporary sediment control structures that are to remain as permanent measures.
- C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION

**SECTION 01 70 00
EXECUTION AND CLOSEOUT REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Pre-installation meetings.
- C. Cutting and patching.
- D. Surveying for laying out the work.
- E. Cleaning and protection.
- F. Starting of systems and equipment.
- G. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- H. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

- A. Section 01 10 00 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01 30 00 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
- C. Section 01 40 00 - Quality Requirements: Testing and inspection procedures.
- D. Section 01 50 00 - Temporary Facilities and Controls: Temporary exterior enclosures.
- E. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.
- F. Section 02 41 00 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.

1.03 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations 2019.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
 - 1. On request, submit documentation verifying accuracy of survey work.
 - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
 - 3. Submit surveys and survey logs for the project record.
- C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
 - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
 - 2. Identify demolition firm and submit qualifications.
 - 3. Include a summary of safety procedures.
- D. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.
 - 6. Include in request:
 - a. Identification of Project.
 - b. Location and description of affected work.
 - c. Necessity for cutting or alteration.
 - d. Description of proposed work and products to be used.
 - e. Effect on work of Owner or separate Contractor.
 - f. Written permission of affected separate Contractor.
 - g. Date and time work will be executed.

- E. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.05 QUALIFICATIONS

- A. For demolition work, employ a firm specializing in the type of work required.
- B. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,
- C. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located. Employ only individual(s) trained and experienced in establishing and maintaining horizontal and vertical control points necessary for laying out construction work on project of similar size, scope and/or complexity.
- D. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.06 PROJECT CONDITIONS

- A. Use of explosives is not permitted.
- B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- D. Perform dewatering activities, as required, for the duration of the project.
- E. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- F. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- G. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - 1. Minimize amount of bare soil exposed at one time.
 - 2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
 - 3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
 - 4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- H. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
 - 1. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.
 - 2. Indoors: Limit conduct of especially noisy interior work to the hours of 6 pm to 7 am.
- I. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- J. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.07 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of examination, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Contractor shall locate and protect survey control and reference points.
- D. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- E. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

- F. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- G. Utilize recognized engineering survey practices.
- H. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations; and other portions of the work as required..
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations, ground floor elevations, and and other portions of the work as required..
- I. Periodically verify layouts by same means.
- J. Maintain a complete and accurate log of control and survey work as it progresses.

3.05 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-complying work.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of the penetrated element.
- I. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.09 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- D. Verify that wiring and support components for equipment are complete and tested.
- E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- F. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.11 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
 - 1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
- B. Use cleaning materials that are nonhazardous.
- C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- F. Clean filters of operating equipment.
- G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, drainage systems, and []].
- H. Clean site; sweep paved areas, rake clean landscaped surfaces.
- I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.12 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
- B. Accompany Owner's designated representative on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.

- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.13 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

**SECTION 01 78 00
CLOSEOUT SUBMITTALS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Section 01 70 00 - Execution and Closeout Requirements: Contract closeout procedures.
- C. Individual Product Sections: Specific requirements for operation and maintenance data.
- D. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 2. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 3. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 2. Field changes of dimension and detail.

3. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 1. Product data, with catalog number, size, composition, and color and texture designations.
 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 1. Description of unit or system, and component parts.
 2. Identify function, normal operating characteristics, and limiting conditions.
 3. Include performance curves, with engineering data and tests.
 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Additional Requirements: As specified in individual product specification sections.

3.05 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

END OF SECTION

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**SECTION 02 41 00
DEMOLITION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Building demolition excluding removal of hazardous materials and toxic substances.
- B. Selective demolition of built site elements.
- C. Abandonment and removal of existing utilities and utility structures.

1.02 RELATED REQUIREMENTS

- A. Section 00 31 00 - Available Project Information:
- B. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.
- C. Section 01 10 00 - Summary: Description of items to be salvaged or removed for re-use by Contractor.
- D. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- E. Section 01 60 00 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- F. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
- G. Section 01 74 19 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
- H. Section 31 22 00 - Grading: Topsoil removal.
- I. Section 31 22 00 - Grading: Fill material for filling holes, pits, and excavations generated as a result of removal operations.
- J. Section 31 23 23 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards current edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations 2019.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Site Plan: Showing:
 - 1. Areas for temporary construction and field offices.
- C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
 - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
 - 2. Identify demolition firm and submit qualifications.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Fill Material: As specified in Section 31 23 23 - Fill.

PART 3 EXECUTION

3.01 SCOPE

- A. Remove the entire building designated on Drawings..
- B. Remove paving and curbs as required to accomplish new work.
- C. Within area of new construction, remove foundation walls and footings to depth as required for construction of new work.
- D. Outside area of new construction, remove foundation walls and footings where indicated to a minimum of 2 feet below finished grade.
- E. Remove manholes and manhole covers, curb inlets and catch basins.
- F. Remove fences and gates.

- G. Remove other items indicated, for salvage or recycling as required by Owner..
- H. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill to complete new work.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Use of explosives is not permitted.
 - 3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 4. Provide, erect, and maintain temporary barriers and security devices.
 - 5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 - 6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 7. Do not close or obstruct roadways or sidewalks without permit.
 - 8. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
 - 9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Protect existing structures and other elements that are not to be removed.
 - 1. Provide bracing and shoring.
 - 2. Prevent movement or settlement of adjacent structures.
 - 3. Stop work immediately if adjacent structures appear to be in danger.
- D. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- E. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.
- F. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.03 EXISTING UTILITIES

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
- H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.04 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Remove from site all materials not to be reused on site; comply with requirements of Section 01 74 19 - Waste Management.
- C. Leave site in clean condition, ready for subsequent work.
- D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 31 05 19
GEOSYNTHETICS FOR EARTHWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Geotextile for separation.

1.02 RELATED REQUIREMENTS

- A. Section 02 41 00 - Demolition: Site demolition.
- B. Section 31 10 00 - Site Clearing.
- C. Section 31 22 00 - Grading.
- D. Section 31 23 16 - Excavation.
- E. Section 31 23 16.13 - Trenching.
- F. Section 31 23 23 - Fill.

1.03 REFERENCE STANDARDS

- A. AASHTO M 288 - Standard Specification for Geosynthetic Specification for Highway Applications 2017.
- B. ASTM D1621 - Standard Test Method for Compressive Properties Of Rigid Cellular Plastics 2016.
- C. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc-Type Apparatus 2014 (Reapproved 2018).
- D. ASTM D4491/D4491M - Standard Test Methods for Water Permeability of Geotextiles by Permittivity 2020.
- E. ASTM D4533/D4533M - Standard Test Method for Trapezoid Tearing Strength of Geotextiles 2015.
- F. ASTM D4595 - Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method 2017.
- G. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles 2015a.
- H. ASTM D4833/D4833M - Standard Test Method for Index Puncture Resistance of Geomembranes, and Related Products 2007 (Reapproved 2020).
- I. ASTM D4873/D4873M - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples 2017.
- J. ASTM D5199 - Standard Test Method for Measuring the Nominal Thickness of Geosynthetics 2012 (Reapproved 2019).
- K. ASTM D5321/D5321M - Standard Test Method for Determining the Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces by Direct Shear 2020.
- L. ASTM D7877 - Standard Guide for Electronic Methods for Detecting and Locating Leaks in Waterproof Membranes 2014.
- M. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015.
- N. GRI GM13 - Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes 2019.
- O. GRI GM17 - Test Methods, Test Properties and Testing Frequency for Linear Low Density Polyethylene (LLDPE) Smooth and Textured Geomembranes 2019.
- P. GRI GM29 - Field Integrity Evaluation of Geomembrane Seams (and Sheet) Using Destructive and/or Nondestructive Testing 2019.
- Q. GRI GM32 - Geomembrane Seaming Using Data Acquisition Hot Wedge Welding Devices 2019.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data on each product to be used, including physical properties, seaming materials, and installation instructions.
- C. Shop Drawings:
 - 1. Indicate overall layout, dimensions, geotextile sheet and seam layout.
 - 2. Indicate anchorage, penetration, and seaming details.

- D. Manufacturer's Certification: Indicating the proposed geosynthetic function meets design requirements supported by applicable testing results.
- E. Manufacturer's Instructions: Indicate seaming method.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience and approved by manufacturer.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. See Section 01 60 00 - Product Requirements for additional requirements.
- B. Identify, store, and handle geosynthetic rolls and samples according to ASTM D4873/D4873M.
- C. Protect materials from sunlight and other ultraviolet light sources during storage.
- D. Handle geosynthetics with care and prevent dragging, dropping, or imbalanced lifting.

1.08 FIELD CONDITIONS

- A. Temperature Requirements: Do not place geosynthetic when ambient air or base surface temperature is less than 40 degrees F or above 140 degrees F (60 degrees C).
- B. Surface Requirements: Do not place geosynthetic when the receiving surface is saturated or has ponded water.
- C. Follow recommendations of geosynthetic manufacturer.

PART 2 PRODUCTS

2.01 GEOSYNTHETIC

- A. Provide geosynthetic in largest size sheets as possible to minimize field joining.
- B. Uniform thickness according to ASTM D5199.

2.02 GEOTEXTILE

- A. General:
 - 1. Material: Polyethylene consisting of 5 percent maximum regrind and free of contaminants.
 - 2. AASHTO M 288.
 - 3. Elongation: 35 percent, minimum, when tested in accordance with ASTM D4632/D4632M.
- B. Geotextile for Separation: Capable of restricting adjacent material mixing.
 - 1. Type: Woven.
 - 2. Seams: Loose laid.
 - a. Overlap: According to manufacturer.
 - 1) 12 inches (300 mm), minimum, in all directions.
 - 2) 3 inches (76 mm), minimum, in all direction.
 - b. Stitch: According to manufacturer; continuous; tied off at ends.
 - c. Strength: 90 percent of grab, minimum, when tested in accordance with ASTM D4632/D4632M.
 - d. Limit seams perpendicular to the direction of construction.
 - 3. Grab Strength: 300 lb (1.3 kN), minimum, when tested in accordance with ASTM D4632/D4632M.
 - 4. Puncture Strength: 450 lb (2.0 kN), minimum, when tested in accordance with ASTM D4833/D4833M.
 - 5. Trapezoid Tear Strength: 100 lb (0.4 kN), minimum, when tested in accordance with ASTM D4533/D4533M.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify the receiving surface is smooth, without ruts or protrusions, and grades are according to design drawings.
- B. Verify the receiving surface is unsaturated and free of ponded water.
- C. Verify the geosynthetic is free of defects or flaws that may degrade physical performance.

3.02 PREPARATION

- A. Remove vegetation, boulders, and rocks larger than 3/4 inch in size and other sharp objects in accordance with Section 31 10 00.
- B. Remove unsuitable materials in accordance with Section 31 23 16.
- C. Fill in holes, including stake holes, backfill, and fill in accordance with Section 31 23 23.
- D. Grade as indicated on drawings in accordance with Section 31 22 00.
- E. Compact smooth as indicated on drawings in accordance with Section 31 23 23.

3.03 INSTALLATION

- A. General:
 - 1. Notify Architect a minimum of 24 hours prior to installation.
 - 2. Prevent surface drainage from eroding under geosynthetic. Repair undermined areas prior to backfill.
 - 3. Position geosynthetic smooth and wrinkle free on prepared surface; unroll or unfold carefully, avoiding stretching.
 - 4. Secure geosynthetic to prevent movement or damage during installation.
 - 5. Follow manufacturer's recommended installation procedures.
- B. Separation:
 - 1. Install geotextile according to manufacturer's recommendations.
 - 2. Lay sheets in the direction of construction.
 - 3. Place adjacent geotextile and loosely fasten until seamed.
 - 4. Repairs: Remove damaged portion of geotextile and seam an additional layer to cover the affected area in all directions.

3.04 BACKFILL

- A. Obtain approval for geosynthetic sheet installation from Architect before placing fill.
- B. Backfill in a manner to prevent damage to geosynthetic. Repair geosynthetic damaged during backfill operations.
- C. Cover geosynthetic in the installed direction in accordance with Section 31 23 23.

3.05 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Provide manufacturer's field representative at all times during geosynthetic installation.
- C. Inspect completed liner for pinholes, punctures, and tears; inspect seams and joints for unbonded areas. Repair any defects or damages found.
- D. Perform one interface friction test for each geosynthetic and backfill combination in accordance with ASTM D5321/D5321M. Provide results to the Architect.
- E. Leakage Testing: Test barrier for leakage according to ASTM D7877.
- F. Product Conformance Testing: Confirm geosynthetic supplied meets design requirements according to ASTM D4595.

3.06 PROTECTION

- A. Do not exceed geosynthetic manufacturer's recommended exposure to UV radiation.
- B. Prevent surface water runoff from contaminating geosynthetic.
- C. Do not use pins or staples where risk of damaging underlying geosynthetic layer is present.
- D. Erect barricades to prevent traffic over geosynthetic before it is filled.

END OF SECTION

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**SECTION 31 10 00
SITE CLEARING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Clearing and protection of vegetation.
- B. Removal of existing debris.

1.02 RELATED REQUIREMENTS

- A. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- B. Section 01 57 13 - Temporary Erosion and Sediment Control.
- C. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.
- D. Section 02 41 00 - Demolition: Removal of built elements and utilities.
- E. Section 31 22 00 - Grading: Topsoil removal.
- F. Section 31 22 00 - Grading: Fill material for filling holes, pits, and excavations generated as a result of removal operations.
- G. Section 32 93 00 - Plants: Pruning of existing trees to remain.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SITE CLEARING

- A. Comply with other requirements specified in Section 01 70 00.
- B. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

3.02 EXISTING UTILITIES AND BUILT ELEMENTS

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Protect existing structures and other elements that are not to be removed.

3.03 VEGETATION

- A. Scope: Remove trees, shrubs, brush, and stumps in areas to be covered by building structure, paving, playing fields, lawns, and planting beds.
- B. Do not remove or damage vegetation beyond the limits indicated on drawings.
- C. Install substantial, highly visible fences to prevent inadvertent damage to vegetation to remain:
 - 1. At vegetation removal limits.
- D. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.
- E. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
 - 1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
 - 2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
 - 3. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
 - 4. Sod: Re-use on site if possible; otherwise sell if marketable, and if not, treat as specified for other vegetation removed.
 - 5. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.
- F. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.

- G. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.04 DEBRIS

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

**SECTION 31 22 00
GRADING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Removal of topsoil.
- B. Rough grading the site for site structures.
- C. Finish grading for planting.

1.02 RELATED REQUIREMENTS

- A. Section 31 10 00 - Site Clearing.
- B. Section 31 23 16 - Excavation.
- C. Section 31 23 23 - Fill: Filling and compaction.
- D. Section 32 92 19 - Seeding: Finish ground cover.
- E. Section 32 92 23 - Sodding: Finish ground cover.
- F. Section 32 93 00 - Plants: Topsoil in beds and pits.

1.03 SUBMITTALS

- A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.04 QUALITY ASSURANCE

- A. Perform Work in accordance with State of Texas, Highway Department standards.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Topsoil: See Section 31 23 23.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.
- B. Verify the absence of standing or ponding water.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect from damage above- and below-grade utilities to remain.
- D. Notify utility company to remove and relocate utilities.
- E. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.
- F. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.
- G. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.
- H. Protect plants, lawns, rock outcroppings, and other features to remain as a portion of final landscaping.

3.03 ROUGH GRADING

- A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
- B. Do not remove topsoil when wet.
- C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
- D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.
- E. When excavating through roots, perform work by hand and cut roots with sharp axe.
- F. See Section 31 23 23 for filling procedures.
- G. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key fill material to slope for firm bearing.
- H. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.
- I. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.04 SOIL REMOVAL

- A. Stockpile excavated topsoil on site.
- B. Stockpile topsoil to be re-used on site; remove remainder from site.
- C. Stockpile excavated subsoil on site.
- D. Stockpile subsoil to be re-used on site; remove remainder from site.
- E. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.05 FINISH GRADING

- A. Before Finish Grading:
 - 1. Verify building and trench backfilling have been inspected.
 - 2. Verify subgrade has been contoured and compacted.
- B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.
- C. Where topsoil is to be placed, scarify surface to depth of 3 inches.
- D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.
- E. Place topsoil in areas where seeding are indicated.
- F. Place topsoil in areas indicated.
- G. Place topsoil where required to level finish grade.
- H. Place topsoil to thickness as indicated.
- I. Place topsoil to the following compacted thicknesses:
 - 1. Areas to be Seeded with Grass: 6 inches.
 - 2. Areas to be Sodded: 2\ inches.
- J. Place topsoil during dry weather.
- K. Remove roots, weeds, rocks, and foreign material while spreading.
- L. Near plants spread topsoil manually to prevent damage.
- M. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
- N. Lightly compact placed topsoil.
- O. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.06 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.
- B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

3.07 REPAIR AND RESTORATION

- A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.
- B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Landscape Architect as to remedy.
- C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

3.08 FIELD QUALITY CONTROL

- A. See Section 31 23 23 for compaction density testing.

3.09 CLEANING

- A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.
- B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

**SECTION 32 13 13
CONCRETE PAVING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete sidewalks and integral curbs.

1.02 RELATED REQUIREMENTS

- A. Section 03 10 00 - Concrete Forming and Accessories.
- B. Section 03 20 00 - Concrete Reinforcing.
- C. Section 03 30 00 - Cast-in-Place Concrete.
- D. Section 03 35 33 - Stamped Concrete Finishing: Additional requirements for patterned surfaces.
- E. Section 07 92 00 - Joint Sealants: Sealing joints.
- F. Section 09 91 13 - Exterior Painting: Pavement markings.
- G. Section 23 83 00 - Radiant Heating and Cooling Units: Electric cables and electric mats.
- H. Section 31 22 00 - Grading: Preparation of site for paving and base and preparation of subsoil at pavement perimeter for planting.
- I. Section 31 23 23 - Fill: Compacted subbase for paving.
- J. Section 32 17 26 - Tactile Warning Surfacing: Plastic tactile and detectable warning tiles for pedestrian walking surfaces.

1.03 PRICE AND PAYMENT PROCEDURES

- A. Concrete paving is to be provided by the unit price method.
- B. Concrete Pavement Mix (Base): Measurement by the cubic yard. Includes mix design, supplying to site, testing.
- C. Concrete Pavement Mix (Wearing Course): Measurement by the cubic yard. Includes mix design, supplying to site, testing.
- D. Concrete Placed: Measurement by the square yard per inch thickness. Includes preparing base, placing, floating and finishing, testing.

1.04 REFERENCE STANDARDS

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).
- B. ACI 301 - Specifications for Structural Concrete 2016.
- C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).
- D. ACI 305R - Guide to Hot Weather Concreting 2010.
- E. ACI 306R - Guide to Cold Weather Concreting 2016.
- F. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2020.
- G. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.
- H. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.
- I. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2020.
- J. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2020.
- K. ASTM C150/C150M - Standard Specification for Portland Cement 2020.
- L. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method 2016.
- M. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete 2010a (Reapproved 2016).
- N. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete 2019.
- O. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete 2019.
- P. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2019.

- Q. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing 2017.
- R. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2018.
- S. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction 2018.
- T. ASTM D8139 - Standard Specification for Semi-Rigid, Closed-Cell Polypropylene Foam, Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction 2017.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on joint filler, admixtures, and curing compound.
- C. Samples: Submit two sample panels, 12 by 12 inch in size illustrating exposed aggregate finish.
- D. Design Data: Indicate pavement thickness, designed concrete strength, reinforcement, and typical details.

PART 2 PRODUCTS

2.01 FORM MATERIALS

- A. Form Materials: As specified in Section 03 10 00, comply with ACI 301.
- B. Wood form material, profiled to suit conditions.
- C. Joint Filler: Preformed; non-extruding bituminous type (ASTM D1751) or sponge rubber or cork (ASTM D1752).
 - 1. Thickness: 1/2 inch.

2.02 REINFORCEMENT

- A. Reinforcing Steel and Welded Wire Reinforcement: Types specified in Section 03 20 00.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 80 (80,000 psi) yield strength; deformed billet steel bars; unfinished.
- C. Steel Welded Wire Reinforcement: Plain type, ASTM A1064/A1064M; in flat sheets; unfinished.
- D. Dowels: ASTM A615/A615M, Grade 40 - 40,000 psi yield strength; deformed billet steel bars; unfinished finish.

2.03 CONCRETE MATERIALS

- A. Obtain cementitious materials from same source throughout.
- B. Concrete Materials: As specified in Section 03 30 00.
- C. Concrete Materials: Provide in accordance with State of Texas Highways standards.
- D. Cement: ASTM C150/C150M, Normal - Type I Portland cement, gray color.
- E. Fine and Coarse Mix Aggregates: ASTM C33/C33M.
- F. Water: Clean, and not detrimental to concrete.

2.04 ACCESSORIES

2.05 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

2.06 MIXING

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

3.02 SUBBASE

- A. See Section 32 11 23 for construction of base course for work of this Section.
- B. Prepare subbase in accordance with State of Texas Highways standards.

3.03 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Coat surfaces of manhole frames with oil to prevent bond with concrete pavement.

- C. Notify Architect minimum 24 hours prior to commencement of concreting operations.

3.04 FORMING

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT

- A. Place reinforcement at top of slabs-on-grade.
- B. Place reinforcement as indicated.
- C. Interrupt reinforcement at contraction joints.
- D. Place dowels to achieve pavement and curb alignment as detailed.

3.06 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete in accordance with State of Texas Highways standards.
- C. Do not place concrete when base surface is wet.
- D. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.
- E. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
- F. Apply surface retarder to all exposed surfaces in accordance with manufacturer's instructions.

3.07 JOINTS

- A. Align curb, gutter, and sidewalk joints.
- B. Place 3/8 inch wide expansion joints at 20 foot intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
 - 1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch of finished surface.
 - 2. Secure to resist movement by wet concrete.
- C. Provide scored joints.
 - 1. At 3 feet intervals.
 - 2. Between sidewalks and curbs.
 - 3. Between curbs and pavement.
- D. Provide keyed joints as indicated.
- E. Saw cut contraction joints 3/16 inch wide at an optimum time after finishing. Cut 1/3 into depth of slab.

3.08 FINISHING

- A. Area Paving: Light broom, texture perpendicular to pavement direction.
- B. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.
- C. Curbs and Gutters: Light broom, texture parallel to pavement direction.

3.09 TOLERANCES

- A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.
- B. Maximum Variation From True Position: 1/4 inch.

3.10 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
 - 1. Provide free access to concrete operations at project site and cooperate with appointed firm.
 - 2. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
 - 3. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.
- B. Compressive Strength Tests: ASTM C39/C39M; for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.
 - 1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
 - 2. Perform one slump test for each set of test cylinders taken.

- C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.11 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Do not permit pedestrian traffic over pavement for 7 days minimum after finishing.
- C. Do not permit pedestrian traffic over pavement until 75 percent design strength of concrete has been achieved.

END OF SECTION

**SECTION 32 16 23
SIDEWALKS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete sidewalks.
- B. Concrete wheelchair ramps.

1.02 RELATED REQUIREMENTS

- A. Section 32 11 23 - Aggregate Base Courses.
- B. Section 32 13 13 - Concrete Paving.
- C. Section 32 17 26 - Tactile Warning Surfacing.

1.03 PRICE AND PAYMENT PROCEDURES

- A. Provide concrete sidewalk paving by the unit price method.
- B. See Section 01 22 00 - Unit Prices, for additional unit price requirements.
- C. Concrete for Sidewalks: Measurement by the square yard. Includes mix design, supplying to site, preparing base, placing, floating, finishing and verification.
- D. Concrete for Wheelchair Ramps: Measurement by each. Includes mix design, supplying to site, preparing base, placing, floating, finishing and verification.

1.04 REFERENCE STANDARDS

- A. ACI 305R - Guide to Hot Weather Concreting 2010.
- B. ACI 306R - Guide to Cold Weather Concreting 2016.
- C. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- D. AI MS-19 - Basic Asphalt Emulsion Manual 2008.
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.
- F. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.
- G. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2020.
- H. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar 2018.
- I. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete 2019.
- J. ASTM C902 - Standard Specification for Pedestrian and Light Traffic Paving Brick 2015.
- K. ASTM C936/C936M - Standard Specification for Solid Concrete Interlocking Paving Units 2020.
- L. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction 2009a.
- M. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete 2019.
- N. ASTM C1116/C1116M - Standard Specification for Fiber-Reinforced Concrete 2010a (Reapproved 2015).
- O. ASTM D946/D946M - Standard Specification for Penetration-Graded Asphalt Binder for Use in Pavement Construction 2020.
- P. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2018.
- Q. ASTM D5268 - Standard Specification for Topsoil Used for Landscaping and Construction Purposes 2019, with Editorial Revision (2020).
- R. ASTM D8139 - Standard Specification for Semi-Rigid, Closed-Cell Polypropylene Foam, Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction 2017.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Concrete: Provide data on admixtures.
- C. Design Data: Indicate pavement thickness, design strength, reinforcement, and typical details.
- D. Weather Data: Records during placement of asphalt or concrete, including date, location of placement, quantity, and air temperature.

1.06 FIELD CONDITIONS

- A. Follow recommendations of ACI 305R and ACI 306R when concreting during hot and cold weather, respectively.

PART 2 PRODUCTS

2.01 CONCRETE SIDEWALKS AND WHEELCHAIR RAMPS

- A. Gravel Subbase: Thickness as indicated on drawings.
- B. Concrete Forms: Wood.
- C. Concrete Materials: Comply with ASTM C94/C94M.
- D. Aggregate: Pit Run, washed, 3/8 inch (1 cm) stone; free of shale, clay, friable material and debris.
- E. Reinforcement:
 - 1. Steel Welded Wire Reinforcement: ASTM A1064/A1064M, plain type, flat sheets, unfinished.
 - 2. Fiber Reinforcement: 1 percent, steel fibers, according to ASTM C1116/C1116M.
- F. Joint Filler: Preformed expansion, with a thickness of 1/2 inch.
- G. Curing Compound: Synthetic, Type 1, Class A, according to ASTM C309.
- H. Surface Sealer: Topical, Type 1, Class A, according to ASTM C1315.
- I. Tactile Warning Surfaces: See Section 32 17 26.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify gradients and elevations of the subgrade are correct as shown on drawings. Where poor subgrade material is encountered, remove and replace with suitable material.
- B. Verify compacted subgrade is acceptable, ready to support imposed loads and paving, and ready to receive work.

3.02 SUBBASE PREPARATION

- A. Maintain subgrade in a smooth, compacted condition with required section and established grade until concrete is placed.
- B. See Section 32 11 23 for aggregate subbase.
- C. Apply primer on aggregate subbase at uniform rate of 1/3 gallon per square yard.

3.03 CONCRETE SIDEWALK AND WHEELCHAIR RAMP INSTALLATION

- A. Forming:
 - 1. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
 - 2. Sidewalk Forms: Place and secure forms to location, dimension, profile, and gradient shown on drawings. Height equal to the full depth of the finished sidewalk.
 - 3. Wheelchair Ramps: Place and secure forms to location, dimension, profile, and gradient shown on drawings. Comply with ADA Standards.
- B. Reinforcement:
 - 1. Place wire-mesh reinforcement mid-height of forms.
 - 2. Uniformly add fiber reinforcement to concrete mix according to manufacturer's recommendations.
- C. Placement:
 - 1. Place concrete in a single lift.
 - 2. Consolidate concrete by tamping and spading.
 - 3. Install work in accordance with State of Texas Public Works.
- D. Joints:
 - 1. Spacing: Provide scored joints every 10 feet (3 m).
 - 2. Provide keyed joints as indicated.
 - 3. Filler height equal to the full depth of the finished concrete.
- E. Finishing:
 - 1. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge, 1/4 inch radius.
 - 2. Wheelchair Ramps: Broomed perpendicular to slope.

3. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.
4. Place surface sealer on exposed concrete surfaces after hardening. Apply in accordance with manufacturer's instructions.

F. Record weather information for placement.

3.04 TOLERANCES

- A. Surface Flatness: 1/4 inch, maximum, measured with 10 foot straight edge.
- B. Variation from True Position: 1/4 inch, maximum.
- C. Compacted Thickness: Within 1/4 inch of specified or indicated thickness.

3.05 PROTECTION

- A. Immediately after placement, protect sidewalk from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Do not permit pedestrian traffic over sidewalk for 7 days minimum after finishing.

END OF SECTION

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SECTION 32 17 26
TACTILE WARNING SURFACING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Plastic tactile and detectable warning tiles for pedestrian walking surfaces.

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete for sidewalks and platforms.
- B. Section 32 13 13 - Concrete Paving: Concrete sidewalks.
- C. Section 32 17 23.13 - Painted Pavement Markings: Crosswalk and curb markings.

1.03 REFERENCE STANDARDS

- A. 49 CFR 37 - Transportation Services for Individuals with Disabilities (ADA) current edition.
- B. AASHTO LRFD - Bridge Design Specifications 2017, with Errata (2018).
- C. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- D. ASTM A48/A48M - Standard Specification for Gray Iron Castings 2003 (Reapproved 2016).
- E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- F. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus 2019.
- G. ASTM C501 - Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser 1984 (Reapproved 2015).
- H. ASTM C903 - Standard Practice for Preparing Refractory Specimens by Cold Gunning 2015, with Editorial Revision (2016).
- I. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine 2017.
- J. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents 2020.
- K. ASTM D570 - Standard Test Method for Water Absorption of Plastics 1998 (Reapproved 2018).
- L. ASTM D638 - Standard Test Method for Tensile Properties of Plastics 2014.
- M. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics 2015.
- N. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials 2017.
- O. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes 2002 (Reapproved 2013).
- P. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- Q. ASTM G155 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials 2013.
- R. ATBCB PROWAG - Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way 2011.
- S. SAE AMS-STD-595 - Colors Used in Government Procurement 2017a.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's product data, standard details, details specific to this project; written installation and maintenance instructions.
- C. Samples: For each product specified provide two samples, 8 inches square, minimum; show actual product, color, and patterns.
- D. Shop Drawings: Submit plan and detail drawings. Indicate:
 - 1. Locations on project site. Demonstrate compliance with referenced accessibility standards.
 - 2. Sizes and layout.
 - 3. Pattern spacing and orientation.
 - 4. Attachment and fastener details, if applicable
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.
- G. Warranty: Submit manufacturer warranty; complete forms in Owner's name and register with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years documented experience.
- B. Installer Qualifications: Company certified in writing by product manufacturer as having successfully completed work substantially similar to the work of this section.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver to project site in manufacturer's protective wrapping and in manufacturer's unopened packaging.
- B. Store covered and elevated above grade and in manufacturer's unopened packaging until ready for installation. Maintain at ambient temperature between 40 and 90 degrees F.

1.07 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Cast Iron Tiles: Provide manufacturer's standard ten year warranty against manufacturing defects, breakage or deformation.
- C. Plastic Tiles: Provide manufacturer's standard five year warranty against manufacturing defects, breakage or deformation.

PART 2 PRODUCTS

2.01 TACTILE AND DETECTABLE WARNING DEVICES

- A. Plastic Tactile and Detectable Warning Tiles: ADA Standards compliant, glass fiber and carbon fiber reinforced, exterior grade, matte finish polyester sheet with truncated dome pattern, solid color throughout, internal reinforcing of sheet and of truncated domes, integral radius cut lines on back face of tile; with factory-applied removable protective sheeting.
 - 1. Material Properties:
 - a. Water Absorption: 0.20 percent, maximum, when tested in accordance with ASTM D570.
 - b. Slip Resistance: 0.50 minimum dry static coefficient of friction, when tested in accordance with ASTM D2047.
 - c. Compressive Strength: 25,000 pounds per square inch, minimum, when tested in accordance with ASTM D695.
 - d. Tensile Strength: 10,000 pounds per square inch, minimum, when tested in accordance with ASTM D638.
 - e. Flexural Strength: 25,000 pounds per square inch minimum, when tested in accordance with ASTM D790.
 - f. Chemical Stain Resistance: No reaction to 1 percent hydrochloric acid, motor oil, calcium chloride, gum, soap solution, bleach, or antifreeze, when tested in accordance with ASTM D543.
 - g. Chemical Stain Resistance: No reaction to 1 percent hydrochloric acid, motor oil, calcium chloride, gum, soap solution, bleach, or antifreeze, when tested in accordance with ASTM D1308.
 - h. Abrasion Resistance: 300, minimum, when tested in accordance with ASTM C501.
 - i. Flame Spread Index: 25, maximum, when tested in accordance with ASTM E84.
 - j. Accelerated Weathering: Delta-E of less than 5.0 at 2,000 hours exposure, when tested in accordance with ASTM G155.
 - k. Adhesion: No delamination of tile prior to board failure in a temperature range of 20 to 180 degrees F, when tested in accordance with ASTM C903.
 - l. Loading: No damage when tested according to AASHTO LRFD test method HS20.
 - m. Salt and Spray Performance: No deterioration or other defect after 200 hours of exposure, when tested in accordance with ASTM B117.
 - 2. Installation Method: Cast in place.
 - 3. Pattern: In-line pattern of truncated domes complying with ADA Standards.
 - 4. Edge: Square.
 - 5. Joint: Butt.
 - 6. Color: As selected by Architect from manufacturer's standard range.
- B. Cast Iron Detectable Warning Plates:

1. Material: Cast gray iron; ASTM A48/A48M, Class 30 A (minimum).
2. Installation Method: Cast in place.
3. Pattern: Truncated cones in compliance with ADA Standards.
4. Joint: Manufacturer standard, bolted connection.
5. Finish: Manufacturer's factory-applied powder coat.
6. Color: As selected by Architect from manufacturer's standard range.

2.02 ACCESSORIES

- A. Fasteners: ASTM A666, Type 304 stainless steel
 1. Type: Countersunk, color matched composite sleeve anchors
 2. Size: 1/4 inch diameter and 1-1/2 inches long.
- B. Adhesive: Type recommended and approved by surfacing tile manufacturer.
- C. Sealant: Elastomeric sealant of color to match adjacent surfaces; approved by surfacing tile manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. When installation location is near site boundary or property line, verify required location using property survey.
- B. Verify that work area is ready to receive work:
 1. Examine work area with installer present.
 2. If existing conditions are not as required to properly complete the work of this section, notify Architect.
 3. Do not proceed with installation until deficiencies in existing conditions have been corrected.
- C. Verify that dimensions, tolerances, and attachment methods for work in this section are properly coordinated with other work on site.

3.02 INSTALLATION, GENERAL

- A. Install in accordance with manufacturer's written instructions.
 1. Do not install damaged, warped, bowed, dented, abraded, or otherwise defective units.
 2. Do not install when ambient or substrate temperature has been below 40 degrees F during the preceding 8 daylight hours.
- B. Field Adjustment:
 1. Cut units to size and configuration shown on drawings.
 2. Do not cut plastic tiles to less than 9 inches wide in any direction.
 3. Locate relative to curb line in compliance with ATBCB PROWAG, Sections 304 and 305.
 4. Orient so dome pattern is aligned with the direction of ramp.
 5. Align truncated dome pattern between adjacent units.
- C. Install units fully seated to substrate, square to straight edges and flat to required slope.
- D. Align units so that tops of adjacent units are flush and joints between units are uniform in width.

3.03 INSTALLATION, CAST IN PLACE PLASTIC TILES

- A. Concrete:
 1. See Section 03 30 00.
 2. Slump: 4 to 7 percent.
- B. When installing multiple adjacent units, leave a 3/16 inch gap between units to allow for expansion.
- C. Tamp and vibrate units as recommended by manufacturer.
- D. Place and position weights on units while concrete cures as recommended by manufacturer. Ensure no voids or air pockets exist between top surface of concrete and underside of units.

3.04 INSTALLATION, SURFACE APPLIED PLASTIC TILES

- A. Cure concrete surfaces for a minimum of 4 days before installing units.
- B. Verify substrate is clean and dry; free of voids, projections and loose material. Remove dust, oil, grease, curing compounds, sealers and other substances that may interfere with adhesive bond or sealant adhesion.
- C. Mechanically roughen surface as required to remove contaminants and prepare surface for adhesive and sealant application.
- D. When installing multiple adjacent units, leave a 1/8 inch gap between tiles to allow for expansion.
- E. Drill fastener holes straight, true and to depth recommended by manufacturer.

- F. Apply adhesive to back of unit as recommended by manufacturer.
- G. Mechanically fasten to substrate. Avoid striking or damaging the unit itself during installation.
- H. Apply sealant to edges in cove profile.

3.05 INSTALLATION - CAST IN PLACE, CAST IRON PLATES

- A. Concrete: See Section 03 30 00.
- B. When installing multiple adjacent units, connect plates before placing.
- C. Install by method described in manufacturer's written instructions.
- D. Place units into wet concrete.
- E. Press assembly into concrete to achieve final elevation.
- F. Finish concrete adjacent to plate. Remove wet concrete spilled onto plate surface.

3.06 CLEANING PLASTIC UNITS

- A. Remove protective plastic sheeting within 24 hours of installation.
- B. Remove excess sealant or adhesive from joints and edges.
- C. Clean four days prior to date of scheduled inspection.

3.07 PROTECTION

- A. Protect installed units from traffic, subsequent construction operations or other imposed loads until concrete is fully cured.
- B. Touch-up, repair or replace damaged products prior to Date of Substantial Completion.

END OF SECTION

**SECTION 32 33 00
SITE FURNISHINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Bollards.

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Bollard infill and underground encasement.
- B. Section 05 50 00 - Metal Fabrications: Anchors to attach site furnishings to mounting surfaces.
- C. Section 05 50 00 - Metal Fabrications: Utilitarian concrete filled steel pipe bollards.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.
- C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2020.
- D. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2020.
- E. ASTM A536 - Standard Specification for Ductile Iron Castings 1984 (Reapproved 2014).
- F. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- G. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings 2018, with Editorial Revision.
- H. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire 2012.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's specifications and descriptive literature, installation instructions, and maintenance information.
- C. Shop Drawings: Indicate plans for each unit or groups of units, elevations with model number, overall dimensions; construction, and anchorage details.
- D. Samples: Submit two sets of manufacturer's available colors for metal furnishings.

1.05 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's warranty against defects in materials or workmanship for ductile iron castings for a period of 10 years from Date of Substantial Completion.
- C. Provide manufacturer's Lifetime Warranty against defects in materials or workmanship for wood benches manufactured from solid teak.

PART 2 PRODUCTS

2.01 BOLLARDS

- A. Steel Pipe Bollards: Hollow steel pipe with plain shaft.
 - 1. Materials:
 - a. Steel Pipe: ASTM A53/A53M, standard weight.
 - b. Factory Finish: Primed.
 - c. Color: As selected by Architect from manufacturer's standard range.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that mounting surfaces, preinstalled anchor bolts, or other mounting devices are properly installed; and ready to receive site furnishing items.
- B. See Section 05 50 00 for anchors to attach site furnishings to mounting surfaces.
- C. Do not begin installation until unacceptable conditions are corrected.

3.02 INSTALLATION

- A. Install site furnishings in accordance with approved shop drawings, and manufacturer's installation instructions.

- B. See Section 03 30 00 for bollard infill and underground encasement.
- C. Provide level mounting surfaces for site furnishing items.

END OF SECTION

**SECTION 32 92 19
SEEDING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preparation of subsoil.
- B. Placing topsoil.
- C. Seeding, mulching and fertilizer.

1.02 RELATED REQUIREMENTS

- A. Section 31 22 00 - Grading: Topsoil material.
- B. Section 31 22 00 - Grading: Preparation of subsoil and placement of topsoil in preparation for the work of this section.
- C. Section 31 23 23 - Fill: Topsoil material.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Topsoil samples.
- C. Certificate: Certify seed mixture approval by authority having jurisdiction.
- D. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer ; and [_____].

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable. Deliver seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Comply with regulatory agencies for fertilizer and herbicide composition.
- B. Provide certificate of compliance from authority having jurisdiction indicating approval of seed mixture.

2.02 SEED MIXTURE

- A. Seed Mixture:
 - 1. Planting date: Jan. 1 to Mar 31: Hulled and Unhulled Common Bermuda Grass 40# / acre.
 - 2. Planting date: Apr 1 to Sep 3 : Hulled Common Bermuda Grass, 40# / acre.
 - 3. Planting date: Oct 1 to Dec 31: Hulled and Unhulled Common Bermuda Grass, 40# / acre with Annual Rye Grass (Gulf) 30# / acre.

2.03 ACCESSORIES

- A. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared soil base is ready to receive the work of this Section.

3.02 PREPARATION

- A. Place topsoil in accordance with Section 31 22 00.

3.03 FERTILIZING

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after smooth raking of topsoil and prior to roller compaction.
- C. Do not apply fertilizer at same time or with same machine as will be used to apply seed.
- D. Mix thoroughly into upper 2 inches of topsoil.
- E. Lightly water to aid the dissipation of fertilizer.

3.04 SEEDING

- A. Apply seed at a rate of 1 1/2 lbs per 1000 sq ft evenly in two intersecting directions. Rake in lightly.
- B. Do not seed areas in excess of that which can be mulched on same day.
- C. Do not sow immediately following rain, when ground is too dry, or during windy periods.

- D. Immediately following seeding and compacting, apply mulch to a thickness of 1/8 inches. Maintain clear of shrubs and trees.
- E. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.
- F. Following germination, immediately re-seed areas without germinated seeds that are larger than 4 by 4 inches.

3.05 HYDROSEEDING

- A. Apply seeded slurry with a hydraulic seeder at a rate of 1 1/2 lbs per 1000 sq ft evenly in two intersecting directions.
- B. Do not hydroseed area in excess of that which can be mulched on same day.
- C. Immediately following seeding, apply mulch to a thickness of 1/8 inches. Maintain clear of shrubs and trees.
- D. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.
- E. Following germination, immediately re-seed areas without germinated seeds that are larger than 4 by 4 inches.

3.06 PROTECTION

- A. Cover seeded slopes where grade is 4 inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.
- B. Lay fabric smoothly on surface, bury top end of each section in 6 inch deep excavated topsoil trench. Provide 12 inch overlap of adjacent rolls. Backfill trench and rake smooth, level with adjacent soil.
- C. Secure outside edges and overlaps at 36 inch intervals with stakes.
- D. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.
- E. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6 inches.

3.07 MAINTENANCE

- A. Provide maintenance of seeded areas for three months from Date of Substantial Completion.
- B. Maintain seeded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.
- C. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.
- D. Roll surface to remove minor depressions or irregularities.
- E. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
- F. Immediately reseed areas that show bare spots.
- G. Protect seeded areas with warning signs during maintenance period.

END OF SECTION

**SECTION 32 92 23
SODDING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preparation of subsoil.
- B. Placing topsoil.
- C. Fertilizing.
- D. Sod installation.
- E. Maintenance.

1.02 RELATED REQUIREMENTS

- A. Section 31 22 00 - Grading: Topsoil material.
- B. Section 31 22 00 - Grading: Preparation of subsoil and placement of topsoil in preparation for the work of this section.
- C. Section 31 23 23 - Fill: Topsoil material.
- D. Section 32 01 90 - Operation and Maintenance of Planting: Post-occupancy maintenance.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Certificate: Certify grass species and location of sod source.
- C. Certificate: Certify fertilizer and herbicide mixture approval by authority having jurisdiction.
- D. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer ; and [_____].

1.04 QUALITY ASSURANCE

- A. Sod Producer: Company specializing in sod production and harvesting with minimum five years experience, and certified by the State of Texas.
- B. Installer Qualifications: Company approved by the sod producer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sod on pallets. Protect exposed roots from dehydration.
- B. Do not deliver more sod than can be laid within 24 hours.

1.06 MAINTENANCE

- A. See Section 01 70 00 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Comply with regulatory agencies for fertilizer and herbicide composition.

2.02 MATERIALS

- A. Fertilizer: [_____]; recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, to the following proportions:
 - 1. Nitrogen: 10 percent.
 - 2. Phosphoric Acid: 20 percent.
 - 3. Soluble Potash: 10 percent.
- B. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

2.03 ACCESSORIES

- A. Wood Pegs: Softwood, sufficient size and length to ensure anchorage of sod on slope.
- B. Wire Mesh: Interwoven hexagonal metal wire mesh of 2 inch size.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared soil base is ready to receive the work of this section.

3.02 PREPARATION

- A. Prepare subgrade in accordance with Section 31 22 00.
- B. Place topsoil in accordance with Section 31 22 00.

3.03 FERTILIZING

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after smooth raking of topsoil and prior to installation of sod.
- C. Apply fertilizer no more than 48 hours before laying sod.
- D. Mix thoroughly into upper 2 inches of topsoil.
- E. Lightly water to aid the dissipation of fertilizer.

3.04 LAYING SOD

- A. Moisten prepared surface immediately prior to laying sod.
- B. Lay sod immediately after delivery to site to prevent deterioration.
- C. Lay sod smooth and tight with no open joints visible, and no overlapping; stagger end joints 12 inches minimum. Do not stretch or overlap sod pieces.
- D. Where sod is placed adjacent to hard surfaces, such as curbs, pavements, etc., place top elevation of sod 1/2 inch below top of hard surface.
- E. On slopes 6 inches per foot and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at maximum 2 feet on center. Drive pegs flush with soil portion of sod.
- F. Prior to placing sod, on slopes exceeding 8 inches per foot or where indicated, place wire mesh over topsoil. Securely anchor in place with wood pegs sunk firmly into the ground.
- G. Water sodded areas immediately after installation. Saturate sod to 4 inches of soil.
- H. After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove minor depressions and irregularities.

3.05 MAINTENANCE

- A. See Section 32 01 90 - Operation and Maintenance of Planting for post-occupancy maintenance.
- B. See Section 01 70 00 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.
- C. Provide maintenance of sodded areas for three months from Date of Substantial Completion.
- D. Maintain sodded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.
- E. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.
- F. Roll surface to remove irregularities.
- G. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
- H. Immediately replace sod to areas that show deterioration or bare spots.
- I. Protect sodded areas with warning signs during maintenance period.

END OF SECTION